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INTRODUCTION

The Zeiss 35mm cameras can be divided into three distinct classes:

1. *Nonrangefinder model:*

The Ikonta 35. A compact folding type camera that is handy for traveling and for the use of color.

2. *Non-coupled rangefinder model:*

The Contina 35. Similar to the Ikonta 35 but has a rangefinder built-in (integral) but non-coupled. The rangefinder determines the distance and its measurement is then transferred to the camera's focusing scale.

3. *Coupled and combined rangefinder-viewfinder models:*

a. Rigid body. The Contax II, III, IIA and IIIA are the only models that have the interchangeable lens feature. They have a metal focal plane (curtain) type of shutter. The IIIA has a built-in exposure meter.

b. The Contessa 35. It features a 45mm lens of short focal length, as do the Ikonta 35 and the Contina 35, but the rangefinder and viewfinder are combined and a photoelectric exposure meter is built-in.

4. *Coupled rangefinder—separate viewfinder:*

The Contax I has interchangeable lenses as do the other Contax models which it preceded. However, the coupled rangefinder is separate from the viewfinder.

All the cameras use standard cartridges of 20 or 36 exposures. The dimensions of the negatives are standard, 24 x 36mm (1" x 1½"). The Zeiss line meets and fills the need of the beginner to the most advanced critical photographer. Each camera, as can be seen from its integral design, performs a definite function. The Contax, however, stands at the apex of the line because of its so many superb features which have gained for it and for Zeiss world-wide recognition and acknowledged renown. But, one thing should be clear: A Zeiss camera, whatever the model, always within its flexible capabilities of experienced engineering, delivers a picture!

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Prize Contax picture

CHAPTER 1 / **RAPID RESULTS WITH YOUR ZEISS 35MM CAMERA**

Now that you own a Zeiss 35mm camera, you'll probably want to use it immediately. You can secure good results even the first time if you follow my instructions exactly step by step. So let's first take an outdoor picture since it's easiest.

FOR OUTDOOR DISTANT SCENES

1. *Load the camera with daylight color film*, following the instruction booklet that comes with the camera, or have the camera store clerk assist you. With daylight color, you eliminate the need for conversion filters (Chapter 13). At a later time, you'll learn how to use one film for both indoor and outdoor use, but avoid any filter at the beginning. Incidentally, color film is urged as a start because all chances of processing errors are eliminated by the thoroughness of the controls under which color film is processed. Black-and-white film should be home processed for best results. As a beginner, it is advisable to avoid darkroom work until you have had some picture-taking experience. With color film, your processing problems are avoided completely.

2. *Set your distance scale for 18 feet* if you want a setting which will keep everything in focus from 10 feet to infinity. A full figure must be taken at a 10 foot focus setting with the camera held vertically.

3. *For hazy bright light, set your lens opening to the space between 8 and 5.6* which is the equivalent of $f/6.3$. Cloudy light requires an $f/4.5$ and dull light a $5/3.5$ opening.

4. *On the Contessa 35, Contina 35, and Ikonta 35, your shutter dial should be so set that the 50 is next to the index mark.* Cock the shutter gently. You will hear a click when the shutter is set. The Contax I, II, III, IIA and IIIA dials are set by lifting the winding knob and turning it until the 50 appears below the black (or red) index dot. As you release the winding knob, you'll feel it slide into the proper place. The Contax shutter is wound when the film is advanced, while the other cameras require a separate cocking movement to set the shutter tension for an exposure.

5. *Hold the camera correctly and firmly.*

6. *Look through the viewfinder window.* If your camera has a viewfinder and rangefinder combination, disregard the rangefinder

image when the focus and aperture controls are set at 18 feet and 5/6.3. (The rangefinder, however, must be used for razor-edge sharpness of a close subject.) The subject seen through the viewfinder will appear much smaller than it actually is, but whatever you do see through it at 10 feet or further, your camera will record. For very near close-ups some additional correction is needed since the window of the viewfinder is higher than the lens of your camera. (See Chapter 9, Close-ups and Parallax Control.)

7. *Wait for a bright, not-too-harshly lit sunny day* when colors will be most brilliant—that is, a clear, sunny day. If the day is dull and overcast, the colors in your final picture will also be dull. The camera settings suggested are correct for a bright day which generally produces better color pictures. For other light conditions, consult a photo-electric meter reading or if you don't have a meter, the chart in Chapter 5.

8. *Wait until the subject before your camera is at its emotional or action peak, then press the shutter release.*

9. *After taking your picture, wind the film immediately.* The Contax I, II, III, IIA and IIIA have an interlocked mechanism so that the shutter is wound simultaneously as the film is advanced. Turn the winding knob as far as it will go in order to avoid overlapping pictures. The Ikonta 35, the Contina 35, and the Contessa 35 do not have a film-and-shutter-cocking interlock, but they do have safety devices to prevent double exposures. When your roll of film is finished (the film cannot be advanced further), do not open the camera back to look at the film because 35mm film *must be rewound back into the cartridge*. The Contax IIA and IIIA are rewound after pressing the rewind button on the bottom of the camera. The Contessa 35, the Contina 35, and the Ikonta 35 are rewound by first pressing down the knob in the center of the film-winding knob. Once the rewind release is pressed, the rewind knob winds the film back into the cartridge. If there is any doubt as to what the correct procedure may be, ask your camera-store clerk to demonstrate the rewinding procedure.

10. *Open the back of the camera and remove the rewound cartridge* by pulling out the knob holding the spool in place.

11. After carefully addressing the shipping tag and checking your postage, mail your film to the processing laboratory.

12. The returned color transparencies or prints may be seen in a transparency viewer, enlarged to positive color prints on Kodachrome or Ansco Print-on enlargements, or projected with either a special table viewer for room light viewing or a home projector.

Now that you've taken your first few pictures with your new Zeiss camera, let's examine a method with which you can take pictures under all conditions, not just at 10 feet.

THE SAFE-SET METHOD

I recommend the use of the Safe-Set Method for taking pictures with all Zeiss 35mm cameras because:

1. All troublesome camera variables are eliminated because every picture-taking factor is pre-set. It avoids all last split-second fumbling delays to correct controls as the camera-to-subject distance changes.

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

If enlarged, all frames require the same approximate exposure times to make prints of a uniform size.

3. All color exposures are so uniform that they project equally well.

THE SAFE-SET CHART

The Safe-Set Chart gives you every bit of needed information at a glance. With flash, it eliminates completely the need for any calculation as to what the aperture opening should be. So, let's start by making a chart for the use of SM or SF flashlamps with Kodachrome Film, Type A (data chart for using other lamps and other film will be found at the end of the book, Page 126). This chart should be written out on adhesive tape or some similar material so that it can be pasted onto the back of your reflector. So, first let us list our equipment and standardized speed.

Lens	Film: Color	Shutter Speed	Flashlamp	<i>Indoor: ASA 16</i>
2 f.l.	Type A	1/25	SM or SF	For outdoor use, a Type A conversion filter

Then, we add four lines for the four most frequently used subject sizes. Each line is further divided into focusing distance for that size and for the lens iris opening required with the flashlamp for that particular distance.

Subject size	Distance (feet)	Iris (f/) opening
Full Body	10	f/5.6
$\frac{3}{4}$ Body	5.5	f/11
Head and Shoulders	3.5	f/16
Head	2.5	f/22

The completed chart will now look like this:

BACK OF FLASH REFLECTOR

1/25	SM	ASA 16
Head	2½'	f/22
H & S	3½'	f/16
¾	5½'	f/11
Full body	10'	f/5.6

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

If the picture calls for a number of people standing full length, then we can scan our chart for the full body line. It tells us that for Type A film, with a shutter speed set for 1/25 (this speed synchronizes with all flashlamps and speedlights), a full body picture can be taken at 10 feet. So, we set our focusing scale at 10 feet. Never touch the focusing setting because one turn of the knob changes the focus markedly. With the SM or SF lamps, our chart tells us that our lens opening for 10 feet is f/5.6. So, we rotate our lens setting until the f/5.6 marking is opposite the index mark. Now, everything is pre-set. After the shutter has been checked to see that it is set, you merely walk towards the subject looking through the rangefinder. When the two images blend, compose your picture and at the peak of effect release the shutter. You will have taken a technically perfect picture.

INDOORS WITH CONTROLLED, ARTIFICIAL LIGHT

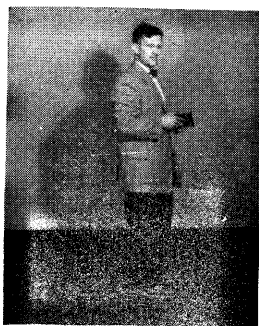
If the weather is so poor that there is little light available or if your picture is to be taken indoors, you can become totally independent of outdoor light through the use of indoor color film and an

DR. TYDINGS' SAFE-SET FORMULA FOR INDOOR FLASH

2" (50mm) Lens: *45mm		Guide No.	2H+ f/22	1H+ f/22	22	16	11	8	5.6	4	3.5	
ASA Speed		80	200	14' 5"	±6' 3"	+9' 6"	¶12' 6"	18'	25'	36'	50'	
1/25 sec.		40	140	§3'	†4' 5"	±6' 2"	+8' 9"	¶13'	17'	24'	35'	
#5,25		32	110	§2' 5"	†3' 6"	±5' 4"	6' 10"	+10'	¶13' 6"	19' 6"	27' 6"	
#6,2-6.												
81 C	81 D	Kodachrome A	90	#2'	§2' 9"	†4'	±5' 7"	8'	+11'	¶16'	22'	25'
		Anso Color Tungsten	75	#1' 6"	§2' 4"	†3' 4"	4' 8"	±6' 9"	+9' 4"	¶13'	18'	21'
SM	SF	ASA 80	110	§2' 5"	†3' 6"	±5' 4"	6' 10"	+10'	¶13' 6"	19' 6"	27' 6"	
		40	75	#1' 6"	§2' 4"	†3' 4"	4' 8"	±6' 9"	¶9' 4"	¶13'	18'	21'
		32	60	1' 3"	#2'	§2' 8"	†3' 8"	±5' 4"	7' 6"	+10' 6"	¶15'	17'
81 A	UV-16	Kodachrome A	56	1' 3"	#1' 8"	§2' 6"	†3' 6"	±5' 6"	7'	+10'	¶14'	16'
		Anso Color Tungsten	56	1' 3"	#1' 8"	§2' 6"	†3' 6"	±5' 6"	7'	+10'	¶14'	16'

*Ikonta 35, Contena 35, Contessa 35.

¶6 lamps equal #5's and ¶26 lamps produce the equal power of #25's at 1/25th second.



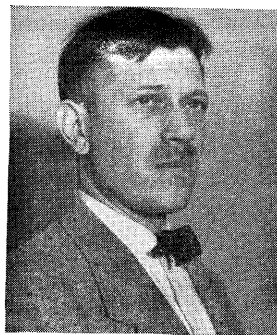
Full body



¾ body



Head and shoulders



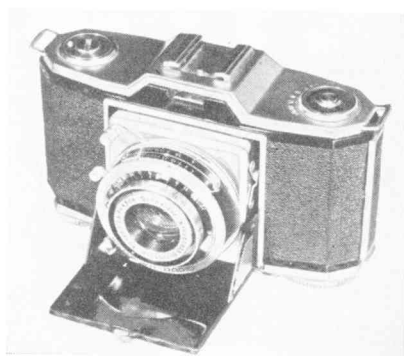
Head



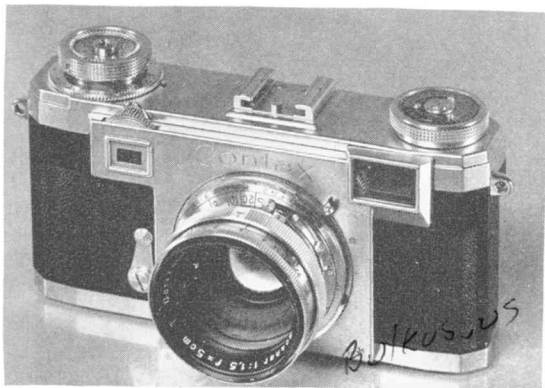
Contax I



Contina 35



Ikonta 35



Contax IIA



Contessa 35

accessory flash unit. With flash (packaged sunlight), you must remember that the synchronization of the flash and shutter takes place only at certain speeds because the duration of the light flash is so brief. The 1/25-second shutter speed is a standardized safe choice for all Zeiss cameras because it will synchronize all lamps with the focal-plane shutter of the Contax I, II, III, IIA and IIIA as well as with all the other Zeiss cameras that may have a Compur or Prontor flash-synchronized shutter.

FOR INDOOR FLASH

To use your 35mm camera for flash, follow this simple procedure:

1. Refer to the Safe-Set Chart and check your film and equipment adjustments.
2. Pre-select the subject size and subject distance from the chart.
3. Set your distance scale.
4. Choose the aperture for this distance from the chart, and set your camera lens iris to it.

You now have pre-set your shutter, your distance and the iris.

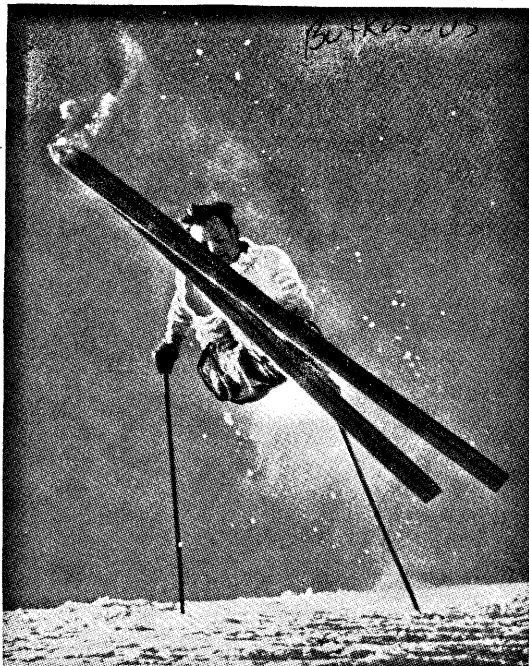
5. Now approach your subject to the approximate distance that has been set and then observe your subject either:

- a. Through the viewfinder (only with the Ikonta 35).
- b. By accurate measure of a coupled rangefinder (focuses the camera lens and rangefinder simultaneously) which is combined with the viewfinder as in the case of the Contax II, III, IIA and IIIA and the Contessa 35, to eliminate a time-consuming eye shift after the range is found.
- c. The Contax I has a coupled rangefinder but a separate viewfinder.
- d. With a non-coupled but built-in rangefinder as in the Contina 35 wherein the eye must be shifted to the viewfinder after your image has been brought into pre-set focus by means of the rangefinder. When you are satisfied that the image is in sharp focus, compose your picture, wait for the peak of action or expression, and then squeeze the release. The click of the shutter and the flash of light from the lamp tells you that a flash picture has been taken!

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

These instructions are simple. The only judgment required on your part is to wait for a bright sunny day or to measure your subject-to-camera distance for flash photography. If you will follow these proven elementary instructions, you can be certain of fine results. Because of this simplicity, the beginner will realize quickly that picture taking with any Zeiss 35mm camera is an easy routine which will guarantee a picture at all times if the basic elements are controlled and standardized without leaving anything to chance. So, if the subject in front of the camera is lighted and exposed correctly, you know that you will get a picture!

Zeiss cameras may be used under greatly differing light and distance conditions. The next four chapters will show you how to change the basic settings so that your camera can meet all the possible changes in subject and operating conditions which are essential in making a picture.



Action pictures should be pre-set.

CAMERA AND STANDARD LENS	STANDARD LENSES LARGEST f/OPENINGS	SHUTTER SPEED	RANGEFINDER	DOUBLE-EXPOSURE PREVENTION COUPLED FILM AND SHUTTER WINDING	TWO OR ONE CASSETTE LOADING	ACCESSORY VIEWFINDER FOR INTERCHANGEABLE LENSES	INTERCHANGEABLE LENSES	BUILD-IN A.S.A. EXPOSURE METER	FILTER SIZE, SCREW-IN FOR STANDARD LENS	FILTER SIZE, PUSH-IN FOR STANDARD LENS	SPECIAL NEAR FOCUSING DEVICE SYNCHRONIZED FOR ALL FLASH	BELLAWS, FOLDING	RIGID LENS MOUNT	SELF-TIMER
Contax I 50mm	f/3.5 f/2.8 f/2 f/1.5	1/2 to 1/1250	2 window coupled	X	X	X	X	X	27mm 40.5mm	42mm 42mm	X		X	X
Contax II 50mm	f/3.5 f/2.8 f/2 f/1.5	"	one window coupled	X	X	X	X	X	27mm 40.5mm	42mm 42mm	X		X	X
Contax III 50mm	f/3.5 f/2.8 f/2 f/1.5	"	"	X	X	X	X	X	27mm 40.5mm	42mm 42mm	X		X	X
Contax IIa 50mm	f/3.5 f/2 f/1.5	1 to 1/1250	"	X	X	X	X	X	27mm 40.5mm	42mm 42mm	X	X	X	X
Contax IIIa 50mm	f/3.5 f/2 f/1.5	"	"	X	X	X	X	X	27mm 40.5mm	42mm 42mm	X	X	X	X
Ikonta 35 45mm	f/3.5 f/2.8	1 to 1/300* 1 to 1/500		X					27mm	32mm	X	X		*
Contessa 35 45mm	f/3.5 f/2.8	1 to 1/300* 1 to 1/500	2 window non-coupled	X					27mm	32mm	X	X		*
Contessa 35 45mm	f/2.8	1 to 1/500	one window coupled	X				X	27mm	32mm	X	X		

*Prontor SV only.

The shutter of your camera may be compared to the control governing the opening of a water faucet. When the faucet is opened, water will flow through it. Similarly, when the shutter is opened, light entering the lens will reach the film. The longer the shutter remains open, the more light will enter. The amount of light determines how long it is necessary to leave the shutter open. When there is little light, you must leave the shutter open for a longer time than if a large amount of light is available. The amount of light available depends upon the illumination in which you wish to take the picture and the setting of the lens opening (iris) which we will study later.

The slower speeds permit the use of narrow iris openings while faster speeds require wider ones. The correct opening is often an important point in making or breaking a picture since a small opening will deliver a greater amount of foreground-to-background sharpness than a large one. As an example, landscapes usually require a small opening to produce overall sharpness. A portrait, on the other hand, may require an out-of-focus background so a wide opening is needed.

A SIMPLE SHUTTER SPEED RULE FOR BEGINNERS

Still (inanimate) subjects may be taken with the slowest speed available, 1/2 or 1 second, even B or T to secure the greatest amount of subject sharpness by stopping down the lens.

Living (animate) subjects require a shutter speed of 1/50 second to 1/1250. To be on the safe side, sports or action pictures should be taken, if the available light allows it, at the fastest speed your camera has so that the action is stopped. Standardize all fast shots at 1/300 (SV), 1/500 (Compur) or 1/1250 (Contax).

PANNING

If your highest shutter speed is still too slow to stop the motion of a rapidly moving object from a set position, then you'll have to "pan" your camera to stop the subject's motion. Panning means swinging or moving the camera in line with the direction of the motion of your subject. This is done generally by swinging your camera in an arc as the subject moves past you. When you snap your shutter under these conditions, the object will be sharp, but the background will be blurred.

SHUTTER SPEEDS FOR MOVING SUBJECTS

LINE OF MOTION

SUBJECT AT 25 FEET	↑↓	↘	↙
Walking at 5 miles per hour	1/25	1/50	1/100
Children playing	1/50	1/100	1/150
Street activity	1/50	1/100	1/150
Swimmers, skaters	1/50	1/100	1/150
Vehicles at 20 m.p.h.	1/100	1/200	1/300
Football, running	1/100	1/200	1/300
Vehicles at 40 m.p.h.	1/200	1/400	1/600
Tennis	1/300	1/600	1/900
Horse race	1/500	1/1000	1/1500
Airplanes	1/500	1/1000	1/1500

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 ($1/100 \times 4 = 1/25$).

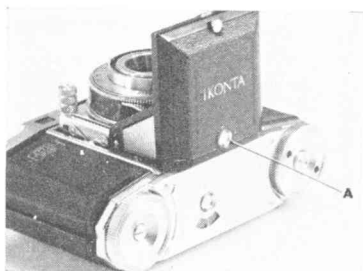
HAND HELD EXPOSURES

Use a 1/50 second speed setting or faster for all hand held exposures. Slower speeds should be attempted only with a tripod since body vibration will be transmitted to the camera and will show on the picture as an overall blur. To limit the possibility of blurring a hand-held picture, brace yourself in this fashion: Place your feet about two feet apart and parallel to each other. Hold your camera firmly against your forehead. Take a deep breath and exhale partly. Shortly after the exhalation, you will note that you are at your steadiest. At this point release the shutter with a smooth, gentle motion.

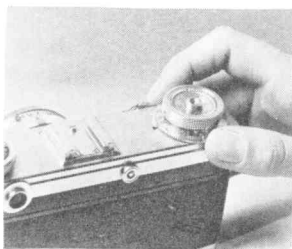
Practice releasing or cocking and releasing the shutter a number of times without film. Some release levers depress more than others before the shutter is activated. You should know at what point your shutter trips. Correct releasing pressure is understandingly important for action pictures and baby portraits that require split second timing to capture the once-in-a-lifetime expression. Practice releasing the shutter before a large mirror. Stand fairly close and look through the viewfinder as you release the shutter. Be on the lookout for any movement on your part.

Cable Release

Another important aid for minimizing camera movement is a cable release. It prevents vibration from your finger pressing the



A



B



C

A. The plug must be unscrewed to use the tripod socket.

B. Contax speed-setting dial

C. Delayed action lever of the Contax

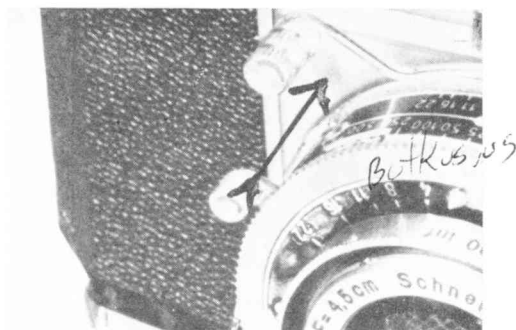
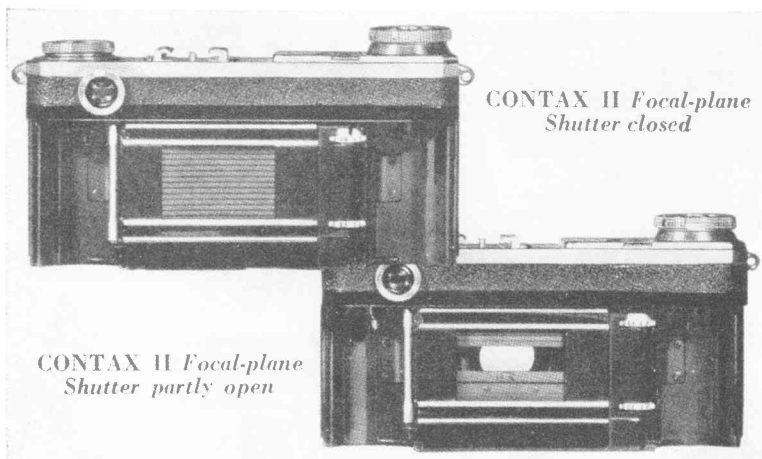
camera release and should always be used when your camera is on a tripod. If the release is stretched taut, your body action may be transmitted to the camera. A loose, uninked cable release prevents it.

Delayed Action (Self-timer)

This device, built into all cameras but the Contessa, may be used either to set off the shutter when no cable release is available or for the camera operator to get into the picture himself. The Contessa 35 may have a removable type added whenever needed. It must be adjusted carefully, else your shutter can be broken.

Between-the-Lens Shutter (Contessa 35, Contina 35, Ikonta 35)

The shutter speeds of your Synchro-Compur shutter generally are 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. The B (Bulb) setting will keep the shutter open only as long as there is pressure on the release. If you want to make extra long exposures, purchase a locking cable release that is built with a set screw or automatic clamping disc to hold the plunger. Place so that the leaves will



Shutter-cocking lever of the Compur shutter

remain open at the B setting until you release the screw or disc. The shutter is cocked by moving the cocking lever and you are ready for your exposure.

Caution: The 1/500 speed setting must be made before your shutter is cocked. Do not attempt to move your speed dial to 1/500 of a second after the shutter is cocked. You may break the shutter. It is better to lose a frame by releasing the shutter, winding to a new frame and then re-setting the shutter for 1/500 speed.

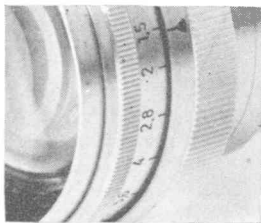
The Prontor SV shutter of the Ikonta 35 is similar to the Compur type but has a top speed of only 1/300 second.

THE CONTAX FOCAL-PLANE SHUTTER

The Contax shutter is of metal focal-plane construction. It operates at the rear of the camera directly before the film and is similar in action to a window shade. The shutter has a slit in it which can be varied in size to change exposures. It exposes the film uniformly from corner to corner. The Contax has a range of speeds of T, B, 1/2, 1/5, 1/10, 1/50, 1/100, 1/250, 1/500, and 1/1250. The shutter is wound automatically when the film is advanced. The shutter speeds can be set or changed before or after the winding of the film.

CHAPTER 3 / A—THE APERTURE (IRIS)

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



Iris setting indicator

DEPTH OF FIELD FOR A LENS OF SHORT FOCAL LENGTH

An inherent quality of a 1 4/5- or 2-inch lens of short focal length is its remarkably large depth of field (area of subject sharpness) even when the iris is wide open compared to cameras using lenses of longer focal length. These Zeiss lenses at $f/4$ have the same depth of field as a 4-inch lens at $f/8$ or an 8-inch lens at $f/16$. When your light is constant, this knowledge is very valuable. With a 2-inch lens set at $f/4$, you will be able to get a picture which has adequate depth under certain set minimum lighting conditions. Since a lens of

longer focal length would require an opening of $f/16$ for the same depth, your picture would be either hopelessly underexposed or you couldn't take a picture at all because the exposure would have to be 16 times that at $f/4$. The depth of field possible with a lens of short focal length and a wide opening often is the critical difference between a failure or a successful picture.

FULL-STOP MARKING		RELATIVE LIGHT INCREASE, IF ONLY THE IRIS IS WIDENED
$f/1$	1	These are full stop openings with a 100% difference in light transmission between two adjoining stops. If the indicator is moved approximately half way between the two markings, the iris is opened $\frac{1}{2}$ 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 $f/9$.
$f/1.4$	2	
$f/2$	4	
$f/2.8$	8	
$f/4$	16	
$f/5.6$	32	
$f/8$	64	
$f/11$	128	
$f/16$	256	

HALF-STOP OPENINGS

$f/3.5$	1	These specific numbers produce a difference in light transmission of 50% from one mark to another.
$f/4$	$1\frac{1}{2}$	
$f/4.5$	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 $1/25$.

Focusing is the process of insuring the maximum amount of image sharpness. To estimate the correct subject-to-camera distance and to insure the sharpest image possible, you may use either an auxiliary rangefinder (Ikonta 35), a non-coupled rangefinder that is integral with the camera (Contina 35), or a coupled rangefinder (Contax, Contessa 35). At various times, it may be expedient to use a pre-measured string or a tape measure for close-ups, or even to guess the distance. Distance guessing is useful only at longer distances where your depth of field will cover any small errors. But your depth of field becomes very shallow as you approach your subject. Your total depth may be as little as a half to one inch. In guessing the longer distances, you can secure a high measure of accuracy by taking advantage of either the depth of field or the hyperfocal distance settings of your lens. It must be emphasized, however, that the closer you come, the greater is the need for a rangefinder or some other accurate measuring instrument. This is especially true for distances of 7 feet and closer.

The beginner must remember that his picture will be as sharp overall as the viewfinder image only when the lens is stopped down. If the lens is opened wide, the depth of field will be shallow and all but your subject will be fuzzy and indistinct.

THE HYPERFOCAL DISTANCE

If you are trying to photograph a moving object which proves a difficult subject to focus upon, such as a playing child or a group of football players, it's a good idea to know something about hyperfocal distance. Lenses of short focal length have a great depth of field. This means that very large areas will be sharp even though you focus your camera on a single object. Depth of field is dependent upon the lens opening and the distance setting. The further away the point of focus, the greater the depth of field. The narrower the lens opening, the greater the depth of field. If your lens is set at infinity and the opening at $f/4$, the point of nearest acceptable focus will be 42 feet. At $f/8$, the near point will be 21 feet. A curious relationship occurs if you set the focus at either 42 feet at $f/4$ or 21 feet at $f/8$. You will discover that everything will be in focus from 21 feet (half of 42 feet) to infinity for the former, and from $10\frac{1}{2}$ feet (half of 21 feet) to infinity for the latter. If you list all the near focusing points at infinity for the different f / openings, the result is known as your hyperfocal dis-

∞ Infinity (As far as you can see)

L—Long distance (Background)

I—Intermediate (Middleground)

N—Near distance (Foreground)

E—Extra close (Close-up)

Ultra close-up

1. OVER-ALL SHARPNESS

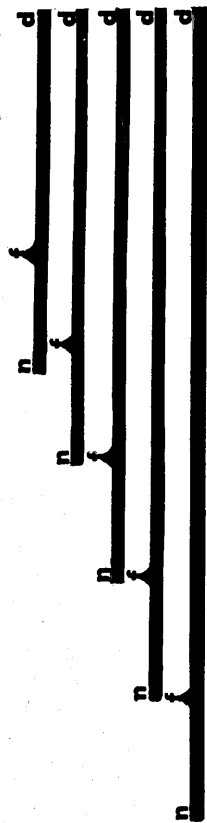
f/2

f/4

f/8

f/16

f/32

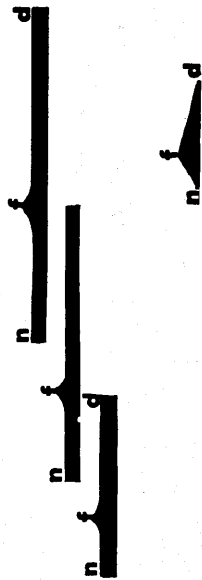


2. SECTIONAL SHARPNESS

f/8

f/8

f/8



3. CRITICAL (RAZOR EDGE) SHARPNESS

f/4 or wider

f/4 or wider

f/4 or wider



N = Near

F = Focusing Point

D = Distance

HYPERFOCAL DISTANCE CHART

FOCAL LENGTH → // OPENING ↓	28mm		35mm		45mm		50mm		85 - 90mm		135mm		180mm		300mm		500mm	
	FOCUS at	DEPTH	FOCUS at	DEPTH	FOCUS at	DEPTH	FOCUS at	DEPTH	FOCUS at	DEPTH	FOCUS at	DEPTH	FOCUS at	DEPTH	FOCUS at	DEPTH	FOCUS at	DEPTH
f/2	-	-	-	-	76'	38'- ∞	84'	42'- ∞	144'	72'- ∞	224'	112'- ∞	300'	150'- ∞	-	-	-	-
f/2.8	-	-	45'	23'- ∞	57'	29'- ∞	63'	32'- ∞	108'	54'- ∞	166'	84'- ∞	225'	112'- ∞	-	-	-	-
f/4	22	11'- ∞	30'	15'- ∞	38'	19'- ∞	42'	21'- ∞	72'	36'- ∞	112'	56'- ∞	150'	75'- ∞	252'	126'- ∞	210'	105'- ∞
f/8	12'	6'- ∞	15'	8'- ∞	19'	10'- ∞	21'	11'- ∞	36'	18'- ∞	56'	28'- ∞	75'	38'- ∞	126'	63'- ∞	210'	105'- ∞
f/16	6'	3'- ∞	8'	4'- ∞	10'	5'- ∞	11'	6'- ∞	18'	9'- ∞	28'	14'- ∞	38'	19'- ∞	63'	32'- ∞	105'	53'- ∞

* For the Ikonta 35, Contessa 35, Contessa 35

tance scale. This scale is most useful out of doors because light conditions permit narrow openings that make the hyperfocal distance settings operable. At an $f/16$ opening and set at $10\frac{1}{2}$ feet, everything from $5\frac{1}{2}$ feet to infinity will be in focus. Taking any outdoor picture is really a matter of true simplicity because you need set your distance for $10\frac{1}{2}$ feet, and as long as your subject remains at least $5\frac{1}{2}$ feet away or further, everything will be sharp. Thus to make use of hyperfocal distance:

1. Set your lens at infinity.
2. Read the point of closest sharpness from the camera on the depth-of-field guide on your lens mount.
3. Re-set your lens at this distance. Now everything will be in focus from *half* this distance setting to infinity, and your subject may move anywhere in this area without a camera setting change.

Disregard your central rangefinder image when using a hyperfocal distance setting.

SPEED FOCUSING WITH THE DEPTH-OF-FIELD TABLE

The depth-of-field table shows the area of sharpness when your focusing scale is set at any distance and used with the various $f/$ openings. The depth-of-field scale is valuable particularly for pictures where a definite amount of front-to-back sharpness is wanted, e.g., in a room. As an example, if everything must be sharp in a room from 3 feet to 15 feet, the depth-of-field table engraved around the lens mount tells you that your focus should be set at 6 feet and your iris at $f/16$. To make the exposure, take your light reading and then find the exposure time needed for $f/16$.

All lenses have a depth-of-field table engraved and arranged symmetrically around the focusing mount, e.g., a lens of 2-inch focal length, focused on 12 feet used at $f/8$ will have a sharp depth-of-field range from 8 feet ($2\frac{1}{2}$ meters) to 28 feet. If the picture will be enlarged to great dimensions, narrow down, if possible, the iris additionally to the opening suggested by the table, e.g., $f/8$ to $f/11$, etc.

ACTION PRE-SET FOCUS

Pre-set focus for action pictures within a limited area requires setting your focus scale with the Contax lens of 2-inch focal length for either:

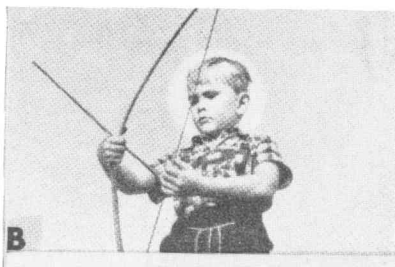
- 30 feet— $f/8$ for subject sharpness from 15 feet to infinity.
- 10 feet— $f/8$ subject will be in focus from 7 to 15 feet.

CONTAX EXTENSION TUBE INFORMATION

<i>Extension</i>	<i>Subject distance (front of lens)</i>	<i>Field Size</i>	<i>Exposure factor</i>	<i>Depth of field at f/11 in MM</i>	<i>Scale</i>
5 mm	25" (61.8 cm)	240 x 360	1.2	96	1:10
7 mm	13" (31.5 cm)	160 x 240	1.3	44	1:7
10 mm	12" (30.0 cm)	120 x 180	1.45	24	1:5
15 mm	9" (24.5 cm)	80 x 120	1.5	11	1:3.4
20 mm	7" (17.5 cm)	60 x 90	2	6	1:2.4
22 mm	6-1/2" (16.5 cm)	57 x 85	2.1	5.7	1:2.3
30 mm	5-2/3" (14.5 cm)	40 x 60	2.5	3.4	1:1.7
45 mm	5" (12.5 cm)	28 x 40	3.6	1.8	1:1.1
50 mm	4" (10 cm)	24 x 36	4	1.4	1:1
60 mm	3-9/10" (9.9 cm)	20 x 30	4.8	1.2	1:2.1
65 mm	3-1/2" (8.9 cm)	19 x 29	5.3	1	1:3.1



A. Out of focus



B. In focus

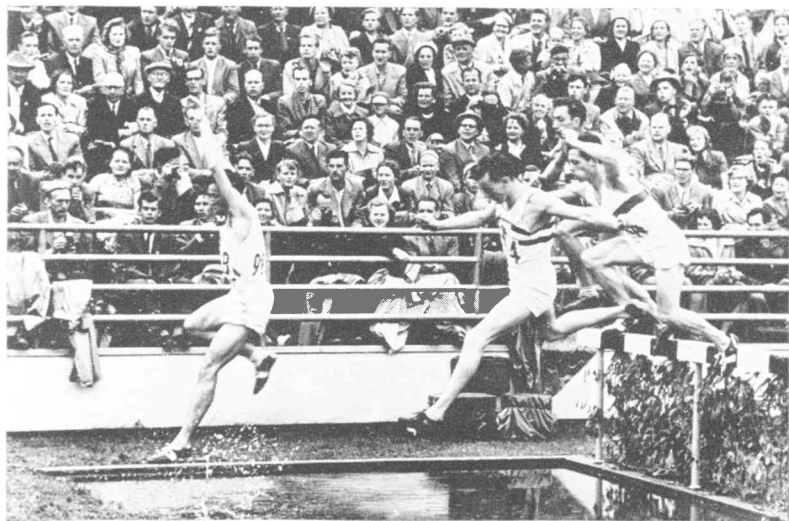
The Contessa 35 and other Zeiss cameras with a 45-millimeter lens need only one setting: The exclusive red dot setting is used to make everything in focus from 8½ feet to infinity at f/8. Line up the red dot of the shutter, the aperture, and the focus with each index mark.

CRITICAL (RAZOR-EDGE) FOCUSING

A rangefinder is a simple triangulating device used to estimate distances by forming a geometric pattern of your subject from two separated points of view. When the two different images which are seen from these different points of view are brought together by a movable mirror to form a single continuous image. The exact subject distance is read from an engraved scale calibrated to measure the amount of mirror movement needed to bring the subjects together.

Rangefinders are used with the Zeiss cameras in the following ways:

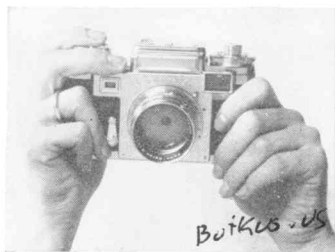
1. An auxiliary rangefinder as used with the Ikonta 35. An auxiliary rangefinder can be detached from the camera and carried separately. Placed on the camera, it is used in a manner similar to the method used with the Contina 35.
2. Non-coupled but integral (built-in) rangefinder—Contina



Pre-setting captures the peak of an activity.



One finger focuses and one releases the shutter.



The Contax lends itself to one-hand focusing and shutter release.

35. The auxiliary rangefinder is built permanently into this camera but is not coupled with the lens mount. Either the Ikonta 35 or the Contina 35 may be used with the pre-set method so that the results will be as sharp as if the rangefinders were coupled. To do so:

a. Set your auxiliary rangefinder at the distance of the expected action, e.g., 10 feet, or choose the subject distance from the charts in Chapter 1.

b. Set the focus of your camera lens at 10 feet. This coordinates the focus of your rangefinder and camera.

c. Your shutter and iris settings must be ready for instant picture taking.

d. Look through the rangefinder and walk forward or back until the rangefinder image shows your subject in sharp focus.

e. With your subject in focus, shift your eye to the viewfinder. When the subject reaches the peak of action or expression, release the shutter. With this method, your camera attains the same high accuracy of the coupled rangefinder models.

3. The Contax I has a coupled rangefinder but a separate viewfinder. Once the focusing distance is set, the method for use is the same as the above, starting at 2c.

4. The Contax IIA and IIIA and the Contessa 35 have a superimposed image type of rangefinder wherein one image overlaps the other. The entire subject is seen at all times, but the center area (a small circle for the Contessa 35 and a rectangle for the Contax models) will show two images when the subject is out of focus. When the lighter, ghost image is brought over the darker image to form a continuous non-separable subject, the subject is again in focus. These cameras have the rangefinder and viewfinder combined so you look

through the same eye window for focusing and composing the picture simultaneously.

VIEWFINDING AND COMPOSING

The viewfinder or the combined viewfinder-rangefinder is generally a reverse Galilean telescope and shows the correct field of view from infinity to most middle near distances. At close distances parallax (the error between what the lens sees and what the viewfinder shows) is an important problem and is discussed further in Chapter 9, Close-ups and Parallax Control, where a number of methods are detailed for minimizing or eradicating this optical problem. At the moment let us say that the top of your subject must have plenty of room under the top edge of the viewfinder for all 7 foot or nearer distances to avoid parallax cut-off (cropping through the forehead, etc.). Practice altering your camera settings for different conditions of shutter speed, iris opening and distance so that they will become a matter of second nature.

WHEN TO PRE-SET

Pre-setting has its limitations. By studying the indications for its proper use you will be able to use it efficiently for pictures with greater variety and interest. Pre-set under the following conditions:

1. Flashlamp, flashtube, and floodlight exposures must be pre-set because an accurate exposure is possible only when the lamp-to-subject distance is exact.

2. Rapidly moving subjects preclude fast focusing. Pre-set for an area where the action will occur and wait until the subject moves into that position.

3. Pre-set the camera when your picture must show a fixed ratio of reduction or enlargement, as for medical photography. Once the setting is made, move the camera back and forth for correct focus rather than by moving the focus scale.

DO NOT PRE-SET

1. If your subject moves so slowly that follow-focus is possible. Follow-focusing increases picture interest because the subject may be taken wherever it may be throughout its movement.

2. A wide-open lens requires continuous sharp focusing because of the shallow depth-of-field.

SHARP PICTURES

Always try to take the sharpest picture possible. You can soften the effect of sharpness by the later use of diffusion screens or diffusion lenses if you wish. Remember: It is impossible to take an out-of-focus image and make it critically sharp. But a sharp image may be softened at any time.

To recapitulate:

The hyperfocal settings are used for subjects that have large areas of depth.

The depth-of-field scale is used for subjects of moderate dimensions.

Precision focusing with the rangefinder is necessary for extremely close subjects or when the front-to-back measurement is small or shallow.

Whatever focusing system is used, secure a sharp image.

HOW TO FOCUS CORRECTLY FOR VARIOUS EFFECTS

Sharpness

Increase sharpness by:

- a. Narrow the lens opening
- b. Increase the camera to subject distance
- c. Use a wide-angle (short focal length) lens (discussed later)

Decrease sharpness by:

- a. Widen the lens opening
- b. Decrease the camera-to-subject distance
- c. Use lenses of long (telephoto) focal length (discussed later)

At the same opening, the closer the camera-to-subject distance, the shallower will be the depth-of-field.

Focus is distributed approximately $1/3$ in front and $2/3$ behind the critical focusing point.

Speed Focusing

1. *Over-all Sharpness* of unlimited background depth: Use the hyperfocal setting. It is recommended for any scene that has a background of great depth such as outdoor scenics, large auditoriums, etc.

Viewfinding: An optical viewfinder shows the hyperfocal field as it will actually appear.

To use the depth-of-field scale marked on the lens for a hyperfocal reading, bring the infinity point opposite the f /opening setting

at which the picture will be taken. Then, read the distance at the same f/opening on the opposite side of the scale. The distances between the two similar f/openings show the entire field of sharpness. Looking at both sides of the scale indicates that the narrower the lens opening, the greater the area of field sharpness.

2. *Sectional Sharpness* of limited areas: The depth of field scale outlines the intermediate zones of sharpness. To produce an area of sharpness within limited measurements: Set the Near to Far distance points desired between two similar f/openings on the lens' depth-of-field scale. If a picture is now taken with this f/opening, the entire limited area will be sharp. If a depth-of-field chart is used, set the distance and f/opening recommended. Use this method for rooms in a home, such shallow outdoor areas as a swimming pool or wherever the front to back area is limited.

Viewfinding: An optical viewfinder is not recommended because it shows an over-all sharpness rather than that of a limited area.

Precision Focusing

3. *Critical (razor-edge) Sharpness*. The lens iris is at a fairly large aperture and focus is set at the exact distance. It is ideally suited for black and white portraits because the subject will be sharp while the background is out-of-focus. Critical focus can be used both outdoors and indoors. It must be used for ultra-close-ups because the closer the subject, the shallower is the depth-of-field.

Converting Your Meter Scale To Feet

METER	FEET	TOTAL INCHES
0.8M	22 ² / ₃ '	32"
0.9M	21 ¹¹ / ₁₂ '	35"
1.0M	31 ¹ / ₃ '	39"
1.1M	31 ¹ / ₂ '	43"
1.3M	4 1 ¹ / ₃ '	52"
1.5M	4 5 ¹ / ₆ '	58"
1.7M	5 2 ¹ / ₃ '	67"
2.0M	6 1 ¹ / ₂ '	78"
2.5M	8 1 ¹ / ₆ '	98"
3.0M	9 5 ¹ / ₆ '	--
4.0M	13'	--
6.0M	19 2 ¹ / ₃ '	--
10.0M	39 1 ¹ / ₃ '	--
20.0M	78 2 ¹ / ₃ '	--

Now that the picture taking mechanics have been described, integrate this knowledge and prepare to take your picture. It's a simple matter. Since you now know how to set your shutter, iris and focus, the only thing remaining is to decide on what exposure is wanted. Outside of flash, which requires a different exposure determination technique, there are three general methods for determining correct camera settings when lighting conditions are normal and used with Daylight (D) outdoor lighting or with Tungsten (T)—Photo-flood or regular illuminating lamps.

1. *Use the instruction sheet packaged with every roll of film.* The D on a chart refers to daylight, while a T signifies Tungsten or artificial light. You will find on it, recommendations for shutter and iris settings for different light conditions. If you follow these suggestions you will usually get pictures exposed satisfactorily.

2. *The exposure chart in this chapter standardizes the setting procedure so that only one variable remains—the iris opening.* The shutter speed, film speed are always the same. The different iris openings are derived by the use of simple arithmetic. First choose the number allocated to the different light conditions and then multiply it by the suitable subject classification number. The product of the multiplication is your iris setting. For example, if you are using a film with an ASA 50 and a shutter speed of 1/100 second, then when your subject is average (Class 3) and is multiplied by a hazy sky lighting (Class 2), the result will be 6. If you set your iris at f/6.3, your exposure will be "on the button". Practice this system for different subjects and different lighting conditions and you will find that it is mastered easily. This chart gives you iris openings for one set shutter speed only, but you can change the settings at will to maintain the same volume of light-time of exposure relationship. The f/ number chart of Chapter 3 will help you figure the different shutter speeds that are required as the iris is narrowed or widened.

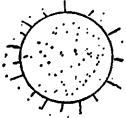
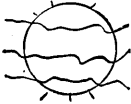


3. *The photo-electric meter is an accepted means for measuring light accurately when computing the correct exposure.* While a chart may be used for outdoor settings which are illuminated uniformly and broadly, only the photo-electric meter is recommended for use with artificial lighting or for outdoor conditions wherein extreme accuracy is needed if the lighting is tricky, has great contrast or shines at unusual angles. The Contessa 35 and the Contax IIIA's exposure meter is adjusted for black and white film to give a fully exposed nega-

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

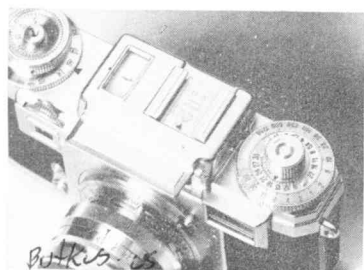
Shutter Speed—1/25th

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 <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;"> COLOR Basic recommended setting 1/50th at 6.3 </div>	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.



The built-in exposure meter



Ikophot removable incident-light converter

tive with normal fine grain development, which is the standard commercial development for such films. For Color—IMPORTANT: It is recommended that the speed ratings given by both Eastman and Ansco for color film, be advanced either two-thirds or one full step on the ASA scale of the Contessa 35 or the Contax IIIA's exposure meter; for example, if the rating is 10, the meter should be set for either 16 or 20 ASA. This is due to the angle of light acceptance of these two meters.

There are three accepted types of photo electric meters: Reflection, incident light or a combination of the two.

a. The reflection type. The reflection type measures the amount of light reflected from the subject. It is pointed at the subject for a reading. The Ikophot IA is a separate meter that can be used for both reflection and incident light readings. The Contax IIIA and the Contessa 35 have integral reflection type light meters. The latter has a baffle for use in bright light. The baffle is lifted when a dim light reading is needed. The Contax IIIA and the Contessa 35's meter is attached to the camera for quick reading.

For use outdoors: Compose your picture and then take your reading.

For use indoors: All the lights should be the same strength for best results. Set up your main light and then add your fill-in lights.

Rule for cameras with built-in meters: First place and balance all your lights, then take the meter reading at the camera position. If possible, a neutral tone reading is desired because the black and white portions of the subject will fall in the exact order as a gray scale and will produce every tone accurately. You can secure a neutral tone (mid-point of the gray scale) exposure for any light by taking a

reflection reading from the palm of your hand. In doing this keep the meter at a distance that is approximately as large as the diagonal of the palm. A gray card should be used in preference to your palm, wherever possible, because of its greater uniformity in shape and color. A gray card, you can ask for it at your camera store, is a cardboard coated with a neutral gray tone to reflect a fixed amount of light. A reading is made by holding up the gray card in the subject position so that it faces the camera lens and then reading the reflected light from it with your meter. The gray card must be large enough so that only the reflection from the gray card will influence the meter. If the gray card is too small, then the meter will pick up outside light sources which will interfere with the accuracy of the reading.

b. The incident light type. This meter measures the light falling directly on a scene or a subject. The incident type generally has a collecting sphere (like half a table tennis ball) diffusing glass or a grid screen type hood. These differ radically from type A in that they take a reading by pointing their collecting devices at the camera instead of at the subject. The collectors integrate light beams of different strength show automatically the settings for the mid-point of a gray scale. These minimize the possibility of too high readings when a spotlight or other intense light source shines directly on the subject. If the middle gray is correct whether it be read with either type meter, your skin tone will be correct and your white and black portions of the scale will photograph as they appear.

c. The Ikophot IIA is quickly made into an incident type meter by the addition of the convenient diffusing glass which is hinged to the meter's baffle opening. When a reading is taken with either type meter, bend your body away from all light that falls on the scene or take a knee bend to hold the meter free and clear of any light blocks.

IN-BETWEEN EXPOSURES

Both type meters still require some judgment on your part even after the exposure scale has been read. If dark objects predominate in your scene, the iris may be opened a half stop, while the iris may be closed one half stop if very light objects or surroundings are in the picture.

The Zeiss exposure meters are calibrated either in the American A.S.A. or the European DIN system. Should a film be used which is calibrated in a different system than your meter may have, use these comparison ratings to set your meter correctly.

A.S.A.	—	DIN
10		12/10
12		13/10
16		14/10
40		18/10
50		19/10
80		21/10
100		22/10

Learn the exposures for different light conditions with one film. As an example, f/6.3 at 1/50 is the basic recommended setting for color film outdoors. If sky predominates, the opening is closed to f/8; if dark objects or ground, the iris is opened to f/5.6. If another film is used which has five times the speed of color film daylight, it is best to increase the shutter speed to 1/250 and continue to use your basic setting and basic changes without the need of learning a completely new relationship.

FLASH LAMP AND ELECTRONIC FLASH EXPOSURE FACTORS

The exposure settings for flash lamps and electronic flash are totally different from those determined by either of the above-mentioned methods. With them, the exposure guide number is the important thing. Every flash lamp or electronic flash tube is supplied with an exposure guide number chart by the manufacturer. This chart gives you different guide numbers when different film speeds and different shutter speeds are used. Once you know your film and shutter speeds as well as the lamp that will be used, the only remaining unknown will be the iris opening. The iris opening is found by simply dividing the camera to subject distance into the specific guide number for the film shutter speed and lamp. If, for example, your flash lamp has a guide number of 110 with an ASA 40 film at 1/100 second, when your subject distance is 10 feet then the division of 110 by the 10 foot distances produces the answer of 11. The iris opening of your lens is now set at f/11. If the subject is 20 feet away the division will produce f/5.5. On the other hand, a guide number of 56 is used at 6 inches ($\frac{1}{2}$ foot) then the $\frac{1}{2}$ is divided into the 56 and the indicated iris opening would be f/112. Should this be the case, your problem will be to get this f/ number since most camera lenses narrow only to f/22. In this case use a number of layers of thin handkerchiefs or white linen cloth to reduce the light intensity of your flash so that it will be

correct for your narrowest lens opening. One thin handkerchief reduces the light by one half. Two handkerchiefs reduce the light to one quarter, three handkerchiefs reduce the light to one eighth and four handkerchiefs reduce the light to one sixteenth. This is further explained in Chapter 8. Standardize with one flash lamp at the beginning so that you know its characteristics well.

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	height	8	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.

- List the camera and lens.
- Name of Film and the number of the exposure.
- In the Illumination box, top half names the lamp used, the bottom half the ratio of light balance.
- Record the angles of your light to the subject.
- Gradation box: top half for the lamp used, bottom half for the ratio of light balance.
- Angles of the Gradation light.
- Accentuation: top half for the lamp, bottom half for the light ratio.
- Angles of Accentuation light.
- Separation light: top half for the lamp, bottom half for the light ratio.
- Angles of the Separation light.
- Filter
- 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!

Loading a camera simply means inserting fresh film into it. This operation is easily performed with all Zeiss 35mm cameras. The film is packaged in standard 35mm cartridges and contains either 20 or 36 exposures. The camera may be loaded and unloaded in daylight but I strongly urge that it be loaded in subdued light. If no subdued light is available, as in the open country, turn your body away from the sun and hold the camera so that your body shades it.

First thread the end of the film into the take-up spool or under the triangular lip of the special take-up spool used for the Contax, and then pay out sufficient film from your cartridge until you can place it in its chamber. This method reduces the amount of leader to the barest minimum. Be sure that the leader is held securely by the spool or the engaging lip.

If your perforations engage the sprocket cleanly the film will automatically align itself properly on the take-up spool. Check the film to see if it is parallel across the back frame. In loading, try to take every precaution to assure little contact of the emulsion with any part of the camera. Since every frame is enlarged for viewing, the slightest scratch or pin mark will become noticeable and distracting in the enlargement. The Contax avoids the possibility of scratch marks when your film is wound and rewound by the use of a special Contax cartridge (cassette) which can be used in the take-up position so that re-winding is unnecessary. This will reduce the chances of scratching by fifty percent.

Check your camera's locking catch to be sure that the back is fastened securely. Otherwise, your camera back may suddenly fly open at the most inopportune time and spoil all film which was exposed with such great pains and expense.

The Contax, after closing the camera back, is wound and released twice, the frame counting indicator turned by its setting ring either left or right to zero and the shutter wound once more. It is now ready for the first exposure. The other cameras are readied by setting the frame counter on the diamond and then turning the film winding knob in the direction of the arrow until it stops. The counter will now read one. Set the shutter and the camera is ready for the picture.

You will know that the end of the film has been reached by the exposure counter. Do not force the winding knob if it becomes stiff. Since 35mm film is different from the usual roll film because there is

LOADING

The Contax

1. Pick up the camera with the left hand, the top towards the palm.
2. Turn the locking key farthest from the body clockwise and the nearest key counter-clockwise.
3. Slide the back off the camera.
4. Fix the film to the take-up spool.
5. Place the take-up spool in its groove, pay out film, then slip the magazine under the teeth of the rewind key.
6. Wind the film until the sprocket gears engage the sprocket holes.
7. Slide the back onto the camera body.
8. Lock the back by turning the farthest key counter-clockwise and the nearest key clockwise.
9. Wind and release the shutter twice. Turn the counter to 0. When the film is wound now, it will be at 1 and ready.
10. The rewind knob should turn as the film is wound, indicating that the camera is loaded correctly.

The Contessa 35, Contina 35 and the Ikonta 35

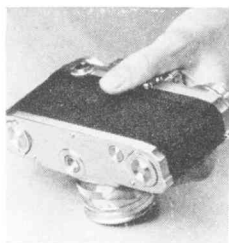
1. Pick up the closed camera, and place the top in the palm of your left hand.
2. Press down the safety tab and catch and lift up the back.
3. Pull the rewind knob down.
4. Fix the leader to the take-up spool.
5. Pay out film and then drop the magazine into its chamber.
6. Push back the rewind key.
7. Turn the winding knob counter-clockwise until the sprocket gears engage the sprocket holes.
8. Replace the camera back and lock the safety catch.
9. Turn the frame counter to the diamond mark.
10. Turn the winding knob until it stops.
11. The rewind key should turn as the film is wound, indicating that the camera is loaded correctly.

UNLOADING ALL THE CAMERAS

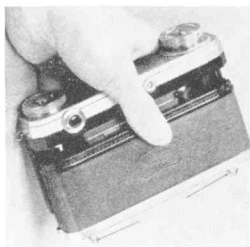
1. Press the rewind button on the bottom of the camera and turn the rewind knob until the winding knob stops turning.
2. Open the camera back and remove the magazine.

CONTAX CASSETTES ONLY

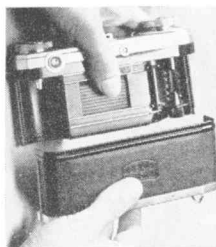
The Contax cassettes were designed to eliminate rewinding. When the end of the roll is reached, continue winding until the last frame is within the cartridge (wind two exposures after you feel the film resisting). Open the back.



Turn the Contax locking keys.



Separate the back.



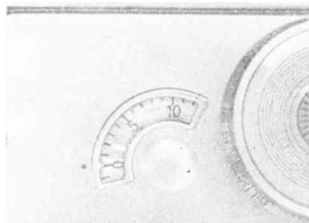
Remove it.



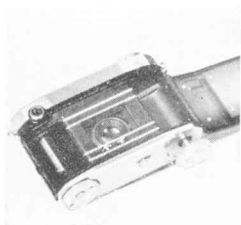
Fix film leader to spool.



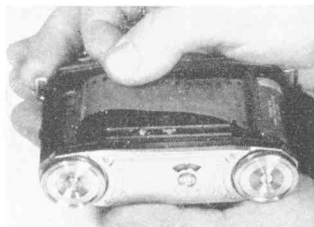
Wind film to sprocket.
Replace the back.



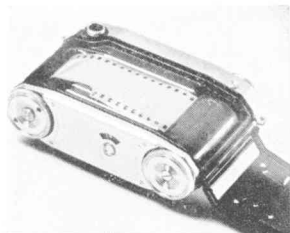
Wind and release shutter twice;
set on 0.



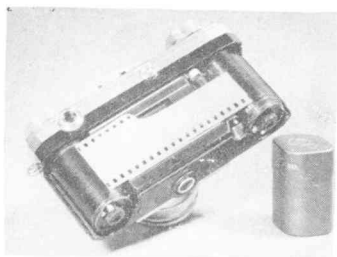
The Contessa opened for
loading.



Leader is fixed to take-up spool.



Turn take-up spool to secure
leader.



The Contax cassette eliminates rewinding the film.

no paper backing, do not open the camera back when the end is reached because your film must be wound back into the standard cartridge. Note: If a Contax cassette is used instead of the Contax take-up spool, then no rewinding is necessary. Otherwise, press the release button for rewinding the film and turn the rewind knob in the direction indicated by the arrow until you will find that there is a sudden loss of tension. A simple way for determining whether the film has been completely rewound is to observe the winding knob on the camera. It will turn as long as 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 tearing the end from the slot by too great an effort or due to an error in setting your exposure counter, it will be necessary to go into a dark room, open your camera, remove the cartridge and take it apart, re-secure the last portion of your film to the center core with cellulose tape, replace the core in the outer shell of the cartridge, snap on both sides, replace it in the chamber, close the back and then rewind the cartridge. Always wind your film smoothly. A jerking motion will produce friction scratches and cinch marks.

FILM ADVANCE AND SHUTTER SETTING INTERLOCK

Only the Contax has an automatic interlock between the film advance and shutter setting. The other cameras require two distinct steps for first advancing the film and then cocking the shutter to get it ready to take the picture. Therefore with them, wind your film just before taking the picture, set the shutter and you will always be ready for the next picture. Double exposures are prevented by built-in safeguards which prevent re-cocking the shutter after an exposure. Only when the film has been wound to the next free frame with these can the shutter be cocked again.

TELL-TALE FILM TYPE INDICATOR DIAL

Set the tell-tale indicator disc for the type and ASA speed of the film in your camera. This will help you remember the type of film with which your camera is loaded. Setting the dial eliminates all doubt.

CHAPTER 7 / WIDE-ANGLE AND TELEPHOTO LENSES

Your regular camera lens is known as a normal lens. The normal lenses of your Contessa 35, Contina 35, and the Ikonta 35 cameras are non-removable and non-interchangeable. The Contax is more versatile. It has provision for interchanging lenses of seven varying focal lengths. A change in focal length is desirable to produce a change of perspective, a change of pace in your pictures or change the effective size of the subject.

A wide-angle lens shows more of an area from the same viewpoint than does a normal lens (generally has a focal length that is equal to the diagonal of your picture area's rectangle—50mm or 2" for the 24x36mm negative). A telephoto (or long focal length) lens, on the other hand, while it covers a smaller area, enlarges the size of the subject image so that it fills your film frame completely. While you see less of a subject with a telephoto lens, the smaller area is so magnified by the telephoto lens that it fills more of the frame.

The illustrations illustrate the areas covered by wide-angle, normal and telephoto lenses.

WIDE-ANGLE LENSES

(Two such lenses are available for the Contax)

The Tessar 28mm, f/8. An extreme wide angle lens with an unusually large, 76 degree, angle of acceptance. Useful for architectural and interior photography where space limitations prevent one from moving back far enough to take in a whole room or an entire building.

The Biogon 35mm, f/2.8. The new Biogon fits the Contax IIA, IIIA, II and III but not the Contax I. The old Biogon fits the Contax I, II, and III but not the IIA or IIIA. A moderately wide angle lens with an approximately 65 degree angle of acceptance. It is the recommended all-around wide angle lens for interiors, shooting for an entire area, and for color (the f/2.8 opening permits exposures under

CONTAX LENSES

Lens	Full aperture	Focal length	Magnification or reduction compared with 2" lens	Angle of field (Diagonal)	Diameter of mount for slip on filters, etc. mm.	Diameter of mount for screw in filters, etc. mm.
Tessar ¹	f/8	2.8 cm. (1 $\frac{1}{8}$ ")	0.54	75°	42	40.5
Biogon.....	f/2.8	3.5 cm. (1 $\frac{3}{8}$ ")	0.67	62.5°	42	40.5
Tessar.....	f/3.5	5 cm. (2")	1	45°	27 & 42	25.5
Sonnar..... (Collapsible Mount)	f/2	5 cm. (2")	1	45°	42	40.5
Sonnar.....	f/1.5	5 cm. (2")	1	45°	42	40.5
Sonnar.....	f/2	8.5 cm. (3 $\frac{3}{8}$ ")	1.6	28°	51	49.5
Sonnar.....	f/4	13.5 cm. (5 $\frac{1}{4}$ ")	2.6	18.4°	42	40.5
Sonnar ²	f/2.8	18 cm. (7 $\frac{1}{8}$ ")	3.5	13.6°	80	77
Zeiss Tele-Tessar ²)	f/4	30 cm. (12")	5.8	8.2°	46
Zeiss Tele-Objective ²)	f/8	50 cm. (20")	9.6	5°	70

¹ Not coupled to the distance meter.

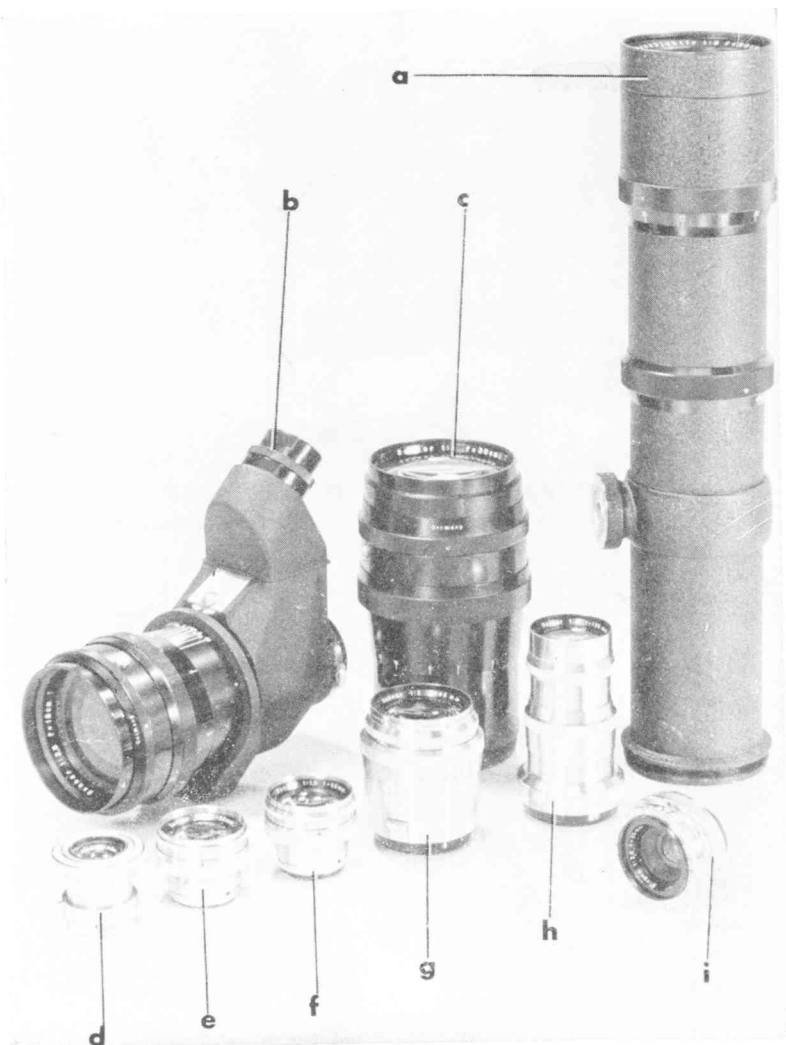
² These three lenses are not placed in the camera, but the camera is attached to the lens instead. The distance meter naturally cannot be coupled to so large a lens. Focusing is done by the Flektoscope (mirror-reflex) which is furnished with the lens. The 30 and 50 cm. lenses are delivered complete with light yellow filter and a screw in lens hood.

dimly lit conditions, while the short focal length has a great inherent depth of field. While the opening is wide, the depth of field is still adequate because of the short focal length).

TELEPHOTO LENSES

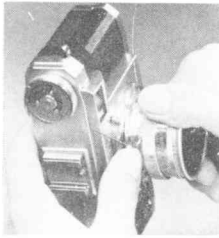
(Four such Zeiss lenses are available for the Contax)

The Sonnar 85mm, f/2. The acknowledged favorite of existing light photographers (Chapter 21) who want a large image combined with ultra-high speed. The perspective is ideal for portraits since the long focal length prevents elongation of the foreground. It is also useful for stage and sports photography where either a fast shutter speed is needed to stop action (remember a fast shutter speed necessitates a

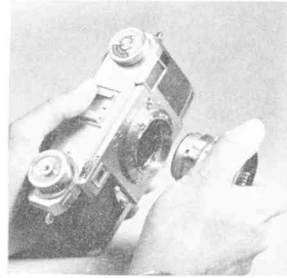


a. 500mm Fernbildlinse f/8
 b. 300mm Sonnar f/4
 c. 180mm Sonnar f/2.8
 d. 50mm Tessar f/3.5
 e. 50mm Sonnar f/2

f. 50mm Sonnar f/1.5
 g. 85mm Sonnar f/2
 h. 135mm Sonnar f/4
 i. 35mm Biogon f/2.8



Press set spring, rotate,
and lift lens.



Lift out.

wider opening) or where dim lighting requires the widest opening to wring every minute amount of light from the situation.

Sonnar 135mm, f/4. Excellent for sports photography, distant landscapes, large portrait heads, sea scapes and mountain scapes. Its long focal length gives the photographer ample working room (almost 3x the normal lens) between the subject and camera.

The Flektoscope. It is a single lens reflex mirror device used with *Fernobjective 50 centimeter (20 inch) f/8* and with the *Sonnar 18 centimeter (7-1/8 inch) f/2.8* for finding, focusing, viewing and composing the image simultaneously. The longer focal lengths require a reflex viewing system because the extremely narrow angle of view and otherwise minuteness of the image. With the Flektoscope, the ground glass image is magnified for easy viewing with the single-reflex system, and you will get what you see.

AUXILIARY VIEWFINDERS

The normal viewfinder of the Contax IIA and IIIA is matched to a lens of 2" focal length. When a lens of different focal length is interchanged for the normal lens, a positive viewing provision must be made to see the new field of view. Otherwise, your viewing area will differ from the taking area. There are two types of auxiliary viewfinders available:

1. Mechanical. The field of view of the 85mm lens and the 135mm lens may be masked mechanically:

a. Masking Viewfinder attachment for both the 85 and 135mm lenses.

b. The rectangular light spot of the Contax rangefinder approximates the field of the 135mm lens.

Mechanical masking shows a smaller area of the normal field.



2.8 cm.



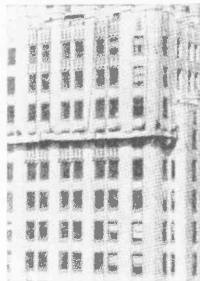
4.25 cm.



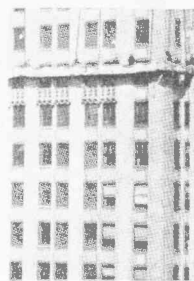
5 cm.



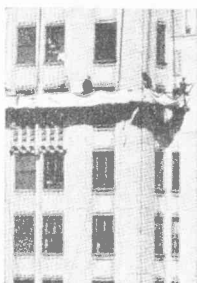
8.5 cm.



13.5 cm.



18 cm.



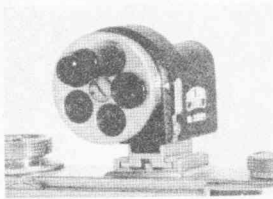
30 cm.



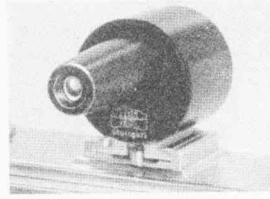
50 cm.

Photographs of same object taken with lenses of different focal lengths

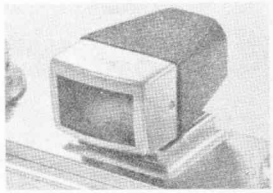
CONTAX VIEW-FINDERS



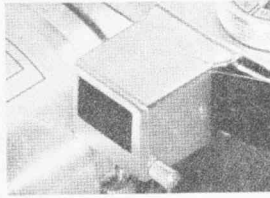
*Universal view-finder for
2.8, 3.5, 5, 8.5 and
13.5 cm. focal lengths*



*Multiple view-finder for 8.5
and 13.5 cm. focal length*



*Wide-angle view-finder for
3.5 cm. focal length*



*Finder attachment with
parallax control for 8.5 and
13.5 cm. focal lengths*

The image is smaller and composition often difficult with the minute dimensions that remain.

2. Optical. For better classification, optical viewfinders may be further divided:

a. Single. The finder for Biogon 35mm wide angle lens can be used only with the Biogon lens. It fits into the accessory shoe on the top of the camera.

b. Dual. The multiple finder for the 85 and 135mm Sonnar lenses is useful only with both the two lenses mentioned.

c. The Universal Viewfinder for 28, 35, 50, 85, 135mm lenses is an ideal precision instrument for use with any of the focal lengths mentioned and has the strong point in its favor of showing a magnified larger image of the subject for the longer focal lengths. This is naturally preferable to a mechanical masking method, because a small image is difficult to see while a larger image gives you a sufficient workingsize to indicate what your final picture may be.

A PICTURE STORY

Observe the technique of a motion picture or television story to set your pattern for the best type of shot in taking a series of pictures.

You will see that the first picture generally establishes the locale. This is usually done with a wide angle or telephoto shot. Then the attention is drawn to a small area or a group of individuals. For most middle distances your regular lens may be used. Finally, the center of interest is established by the use of the close-up taken with your regular lens or with a telephoto lens when greater working room is needed. You can provide a great variety of angles and a change of pace by inter-mixing wide angle, normal and telephoto shots. If only the normal lens is available as with the cameras that have non-interchangeable lenses, then you must move back and forth to get the same effect. Using these different lenses logically will make your story interesting. If you wish to do a story, write a short scenario of the important points to be photographed. Then break down each scene to a long distant, medium and close-up shot. You will develop more points of view and interpretations of your subject. An additional factor will be the change of emphasis to the story itself so that one or two poor shots can be used if they fill a gap whereas they would be entirely discarded otherwise. You, yourself, know that it is far more interesting to see a picture story than to view countless pictures, even assuming that they are perfect, without a connecting link. Since you yourself like a story better, try one. Your interest in photography will increase a hundredfold.

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.



Some outstanding Contax pictures



This is the modern age of packaging. It is natural, then, to expect that flash lamps and electronic flash tubes should be available in a packaged, portable, convenient form. By their use the photographer carries his light with him, at all times. The strength of these "light packages" is so great that color pictures are possible any place even though their emulsion speed is very slow and no other light source is available.

FLASH LAMP CHARACTERISTICS

To the eye, a flash lamp may seem to ignite instantaneously but there is a short time required for the combustible material to heat up to the burning point, and the duration of the burning point varies. The purpose of synchronization is to match the opening of the shutter at the point when the lamp is burning at its peak. To better understand the process, let us study the cycle. At 1/25 second all flash lamps and flash tubes will synchronize with every camera. You need never worry if you leave the shutter set at X and at 1/25 because you are then always in synchronization for all flash.

The Class F Lamps (SM or SF) are fast igniting, there being a delay of only 5 milliseconds (1/200 second) before the ignition point and the flash peak duration also is 1/200 second. For this reason a Class F lamp may be used at any speed from 1 to 1/25 second, and its effect would still be similar to that of a shutter speed of 1/200 second. No filter is required when you use Kodachrome Film, Type A; a V15 filter is needed for Ansco Color Tungsten Type.

The Class M (⌘5 or ⌘25) lamps are medium igniting, with a delay of 20 milliseconds (1/50 second) and here the flash peak duration is 1/50 second. Were this lamp synchronized at 1/5 or 1/10 of a second shutter speed, the action will still be stopped as if 1/50 second had been used. These lamps are more powerful than Class F lamps. They require light-balancing filters with all indoor film.

The Class FP (Focal Plane) ⌘6.26 Lamps are used only at 1/25 second with the Contax. They require light-balancing filters with indoor color film.

Flash Tubes (Speedlight)—use daylight color or black-and-white film—no filter.

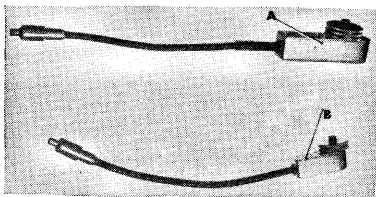
Electronic flash (speed lights) may be used both with the standard Prontor SV and the Compur M-X or the Contax focal plane shutter. The speed light has evolved from the desire of inventors to produce a

PRONTOR SV ONLY	CLASS F	CLASS M	ELECTRONIC FLASH
Synchro-Switch on Red Dot in position X	1 to 1/50 sec.	1 to 1/25 sec.	1 to 1/300 sec.
Synchro-Switch on Yellow Dot Cock and move the delayed action lever to F	1 to 1/100 sec.	N.R.	N.R.
Synchro-Switch on Yellow Dot Cock and move the delayed action lever to M	N.R.	1/50 to 1/300 sec.	N.R.

N.R. - Not recommended

The SV's delayed action mechanism can only be used when the synchro-switch is on "X".

Note: M-X Shutter Synchronizing Chart on page 127.



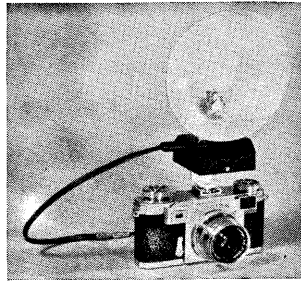
A. Contax strobe synchronizing cord
B. Contax flash synchronizing cord

source of enhanced light that would yield a number of flashes without burning up in the manner of the flash lamp. The electronic flash tube is the answer. This light type of flash consists of a bottled under pressure rare gas which glows brightly only when a high voltage current courses through the tube. The duration of the glow is much shorter than with the flash lamp, usually from 1/1000 to about 1/5000 second. However, their color guide numbers are in the low thirties so that they must be used at short distances only. The newest units are quite light in weight and can be used with house current or from an auxiliary battery pack.

Taking flash pictures with any Zeiss camera is a simple matter. All the newer cameras have flash contacts built into the shutter mech-



Contax flash synchronizing receptacle



Flash set-ups are compact and lightweight.

anism. Older model Contax I, II, III, or now-synchronized between-lens shutters may be synchronized with built-in contacts (ask for A.S.A. standard plugs) by your dealer.

The Compur shutters may be used with any flash lamp and at the speeds suggested by the charts. However, set it at one speed, the 1/25 as a start, so that any lamp or tube will always be in synchronization. The Contax should be synchronized at the 1/25 second speed.

CONTAX IIA AND IIIA SYNCHRONIZATION

	M lamps—1 to 1/25 sec.
Contax Flash Cable Attachment	F “ —1 to 1/50 sec.
	FP “ —1 to 1/25 sec.
Contax Strobe Attachment	Zero Delay—1/25 and 1/50 sec.

Leave your shutter at 1/25. The simpler the settings, the less room for error and the results will increase in uniformity.

FASTER SYNCHRONIZING SPEEDS

If too slow a shutter speed is used with a strongly backlighted image, a ghost image may appear on your film. A ghost image, in this case, really is a double exposure. Briefly this may happen when a flash tube is used at 1/25 second. The first exposure is with the flash tube and lasts 1/1000 of a second but should the subject move rapidly during the 1/25 exposure, a strong backlight will record his movement during the time remaining in the 1/25 second for the second exposure. Therefore, use the chart's fastest speed to synchronize your flash lamps or flash tubes properly if your subject moves at very rapid speeds or reduce the volume of the backlight.

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. 1:3-1½ stops less light compared to the *f*/4.5 main light is needed. *f*/28 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.

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	3½	2½
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.

EFFICIENT USE OF GUIDE NUMBERS

You may note in reading a table of flash guide numbers that the guide numbers given for Class M lamps up to a speed of 1/50 second is always the same. It changes only at faster speeds. Similarly, as Class F guide number may be the same for all speeds up to 1/100 second. If rapid subject movement is not a factor, then the choice of correct synchronizing speed may do much to help your picture. The I-G-A-S formula (Section 4) tells us that it is necessary to balance your light in order to meet the relative contrast and sensitivities of your film emulsions. So, if the amount of light provided by your flash lamp is one unit, then your background light should also provide one unit to have a 1:1 ratio. However, your background light of one unit need not be necessarily flash. It may be a flood light to save the price of a flash bulb. Assuming that it is a flood light, then the distance location of your flood light is directly related to the shutter speed. At 1/25 second, the flood light may be placed twice as far away as at 1/100 second. The further back your light is placed, the more uniform the illumination will be and there will be less heat on the subject. In a similar manner, if you are using your flash lamp 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 under-exposed $\frac{1}{4}$. So, the selection of one of a variety of speeds available with a single guide number must be understood to light your picture efficiently and economically.

SINGLE LAMP FLASH FOR DISTANCES IN DEPTH

When only one lamp is available and it must cover a subject that has a great front-to-back depth, compute your exposure in this way:

1. Determine the actual depth of your subject, e.g., if the subject depth is from 8 to 24 feet, the total subject depth is 16 feet.
2. Focus for $\frac{1}{3}$ the subject depth. $\frac{1}{3}$ of 16 is approximately 5 feet. Add this figure (5) to your near point (8), and so focus at 13 feet.
3. The flash aperture is estimated by adding half the subject depth to the near point ($\frac{1}{2}$ of 16 equals 8, then $8 + 8$ equals 16). The guide number is divided by 16, e.g., guide number 64/16 equals f/4.
4. This places the correct exposure at the mid-distance. If the foreground is more important, close the iris one stop. If the background is more important, open the iris one stop.

5. Aim the light if it can be removed, or raise the camera if the lamp is fixed to it so that it is high and pointing down toward the center of the field. This produces a more uniform illumination.

6. For a basic setting in an average 15-foot room, focus at 8 feet and base your aperture for a 12-foot distance. Then you need only adjust your aperture. Close it one stop for near subjects and open it one stop for distant subjects.

The single flash will cover the subject depth with as uniformly exposed lighting as is ever possible when one lamp is used.

The beginner and professional must make every picture count. As a definite help for a sure-fire, push-button type of photography, I urge the beginner to try the Safe-Set Method with the flash unit right on the camera. With this method, all variables are eliminated. Your distance, your iris, your shutter speed are all pre-set. All you need to do is to merely approach your subject, get the focus, compose your subject and as soon as the peak of expression can be anticipated or seen, release the lever. You must get a perfect picture.

A most interesting unexplored frontier for the beginner is in the field of photographic close-ups. First, let us find out exactly what is a close-up. As most camera lenses focus down to approximately $3\frac{1}{2}$ feet, we can call a close-up any distance nearer than the focusing near limit of your regular lens. The term close-up, then, will mean to us that distance from the near limit, e.g., $3\frac{1}{2}$ feet, down to 10 inches which is considered the normal reading distance. At distances nearer than 10 inches, we are in the field of macro close-ups which will be discussed in Chapter 10.

A close-up is indicated whenever you wish to show the fullest amount of detail possible in a subject. In addition, a close-up may be used in a story sequence, after a long or medium shot to emphasize the point of a story. Finally, a close-up may introduce a sequence story by showing you immediately what will be the center of attraction. For these reasons, the close-up should be of added interest to the beginner because his regular camera limits him to distances which are too far to produce effective pictures to bear out these points.

HOW TO TAKE CLOSE-UPS

Two problems are inherent in taking close-ups, namely close-up focusing and close-up parallax control. The former requires the change in the focusing effect of the camera lens by the use of extension tubes (Contax only) or close-up or portrait attachment lenses. The lenses have a positive power and alter the regular effective focal length of your camera lens so that it may be focused to a nearer distance. The Contessa 35, the Ikonta 35, the Contina 35, as well as the Contax's may be corrected for close-up in this manner. The lenses come in different strengths: the No. 1 corrects for from 40 to 21 inches, the No. 2 corrects for from 20 to 14 inches and the No. 3 will correct for from 13 to 9 inches.

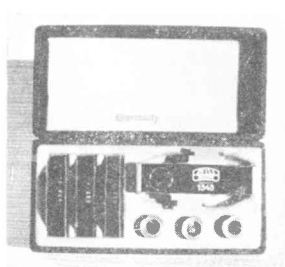
The second half of the problem involves the need for correcting your viewfinder so that it will see the exact same field as the lens. The viewfinder on your standard camera body has been designed to frame your subject accurately at infinity and at most middle distances. Therefore, some provision must be made to correct for parallax (the difference of viewpoint between the camera lens and the viewfinder) as you come nearer to the subject. The closer you approach the subject, the greater will be the amount of parallax because the angles formed between the viewfinder, the lens and the subject become more



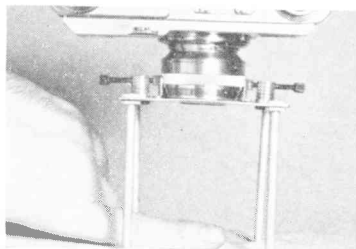
The Contameter set for 50cm and 30cm.



Turn the Contameter for the 20cm position.



The complete Contameter



A focal frame is used for one set distance.



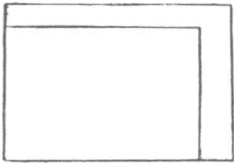
The Panflex is used for close-ups and copying.



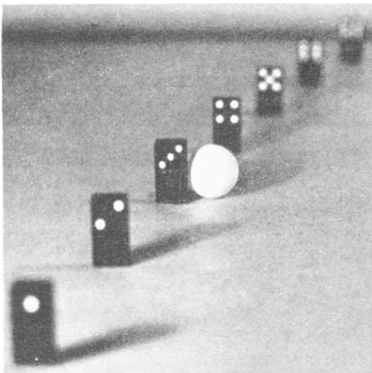
The Contameter is moved back and forth until the subject is in focus.

Masking Chart

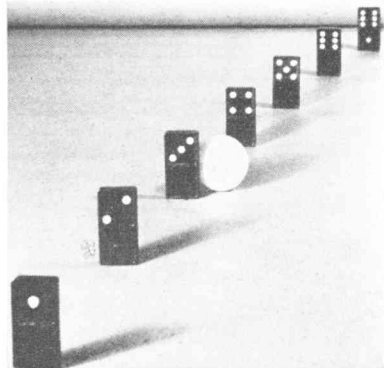
Camera	+ 1		+ 2		+ 3	
	Top	Edge Side	Top	Edge Side	Top	Edge Side
Contessa 35 Mask in rim →	2.5	7.5	4	10	7.5	15
Contina 35 Konta 35	1.3	—	1.7	—	2.5	—
Contax	0.8	2.2	1.2	3.3	1.6	4.4



Parallax control mask



Camera lens wide-open, shallow depth-of-field



Camera lens stopped down to increase the depth-of-field*

CONTAMETER

<i>Contameter supplementary lens and matching rangefinder eyepiece</i>	<i>Reduction ratio</i>	<i>Field size</i>	<i>Front lens to subject distance</i>
"50"	1:10	10" x 15"	20"
"30"	1:65	6½" x 10"	13"
"20"	1:4	4" x 6"	9"

acute. Composition is most important with color, because the after-correction is impossible because most amateurs do not enlarge their color transparencies. If you do want to mask out unimportant color details, you can do so but it will be at the expense of your film area which will be made smaller because of the masking. You must correct for parallax, otherwise you chance cutting your subject right through an important part, e.g., a forehead in a portrait, or composing the subject so poorly that the proportions of its composition will be most displeasing.

The simplest method to correct parallax is with the use of a parallax correcting mask. Make this mask from a piece of clear acetate or lucite and inscribe two lines on it similar to the pattern that is illustrated. The top line corrects for up and down or vertical parallax, while the side line corrects the left to right parallax. Inscribe a number on the lower edge of the mask so that you know which mask matches its equivalent close-up lens. You are now ready to use it:

1. Place the matching correcting mask over the viewfinder after the equivalent close-up lens has been slipped on or screwed into the taking lens.

2. Measure the lens to subject distance with a pre-measured string or ruler.

3. Compose your picture in the full viewfinder, disregarding the parallax correcting lens for the moment.

4. When the composition is ideal, then move the camera up and to the side so that the outline of your subject is within the borders of the engraved lines.

5. Now, you can take your picture at any time because it will be both in focus and parallax corrected.

This method is limited to still, inanimate subjects because it is

otherwise difficult to keep a subject in focus and corrected for parallax at the same time.

The correction for focusing and for parallax can be performed at one time. The camera lens must be corrected for close-up distances with the use of supplementary lenses and the viewfinder must be corrected for parallax as in former method.

The Ikonta 35, the Contina 35, the Contessa 35 and the Contax cameras can be corrected by such a method with the use of a focal frame. A focal frame is a form made from metal or wire which outlines the field sizes of the subject and at the same time keeps the camera to subject distance correct. The focal frame is recommended for fixed distances with living subjects because you need merely rest the frame on the subject to know that you are both in focus and corrected for parallax. If your lighting is ideal then the shutter can be released at any time to take the perfect picture. With a focal frame, you will get what you see, instantly.

THE CONTAX CONTAMETER SYSTEM FOR SIMULTANEOUS CORRECTED CLOSE-UPS

The Contameter, near focusing equipment, consists of three different close-up lenses which are used for three specific distances of 20, 12 and 8 inches along with a special rangefinder device that fits into the accessory shoe on top of the camera and has three sets of interchangeable prisms that fit into small cylindrical mounts. Each supplementary lens is marked to match a similar cylindrical prism. They must be used together. The Contameter is used after the close-up lens and the Contameter rangefinder are mounted and matched by moving the whole camera back and forth until the images seen through the rangefinder fuse. When this occurs, the subject is both in focus and corrected for parallax at the same time. If the desired effect is seen, simply squeeze the release to take the picture. Please note that the Contameter is used in the same way as I have advocated with the Safe-Set Method in that everything is pre-set beforehand and the entire camera is moved back and forth until the subject is in-focus framed and so ready for the picture. As the Contameter acts as a combined rangefinder and viewfinder no focal frame or measuring string is needed with it.

THE PANFLEX

The Panflex is a mirror reflex attachment that is placed between your lens and the camera to show both the focus and the field size

at the same time by means of a ground glass. The reflex image can be studied until the exact picture taking instant. The combined prisms and magnifying lenses over the ground glass show a magnified image which is natural in appearance in that the subject is correct vertically and the lefts and rights are in their true positions. The longer focus Contax lenses are suggested for use with the Panflex.

The Panflex is used best with a focusing bar after the subject size and focusing distance has been decided. The entire Panflex unit is moved back and forth until the ground glass image is sharp. When speed of operation is at a premium it is best to focus and take your pictures with the lens wide open, otherwise too much time is lost in narrowing the lens iris before the exposure. However, if the object is still (inanimate), you can first focus wide open and then bring the iris back to the pre-selected narrow stop that will give you the best depth of field. Both the Contameter and the Panflex methods may be used with active subjects because you can follow focus your object as it moves about any area.

CLOSE-UP FACTS

When close-up lenses are used with these cameras, keep these points in mind:

1. Close-up lenses do not alter your exposure factor.
2. Since the depth of field is shallow at short focusing distances, your lens to subject distance must be measured accurately.
3. Your body or camera must not shield the light source from the subject at exposure time.
4. Avoid head-on pictures because your depth of field is shallow and only parts of the subject will be in focus. Try to compose your subject as parallel to the film as is possible in order to lessen its front to back depth. This technique is needed especially for portraits of human subjects to prevent disturbing distortions.

HOW TO TAKE A CLOSE-UP

At this point it is wise to tell you how to actually take a close-up. You can do so easily by pre-planning these four factors:

1. Measure the area of your subject in length, width and depth.
2. Determine the Contameter, focal frame, Panflex or extension tube setting (the latter will be explained in Chapter 14) that will be needed for the field size (length and width) that you have just measured by consulting the close-up tables that are available in the book.

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

4. While the exposures remain the same for the Contameter, focal frame or supplementary close-ups measured with a string or ruler, you must increase the exposure for the Panflex or for the extension tubes, which can be used by Contax owners only.

Avoid countless calculations. Follow your close-up tables implicitly. Pre-set everything and move the camera into place with a focusing bar on a tripod so that when the focus and composition are exact, the shutter can be quickly released for a successful close-up.

CHAPTER 10 / MACRO-CLOSE-UPS

Macro-close-ups are taken at subject to camera distances of 10 inches or less to a limit of a 25x film image enlargement of the subject. Macro-close-ups are generally taken with the use of extension tubes only because of the unavoidable distortions that are caused through the use of high-powered supplementary lenses that are needed for such extremely near distances. As the Contax is the only camera with interchangeable lenses, it is the only camera that can be used for macro-close-ups.

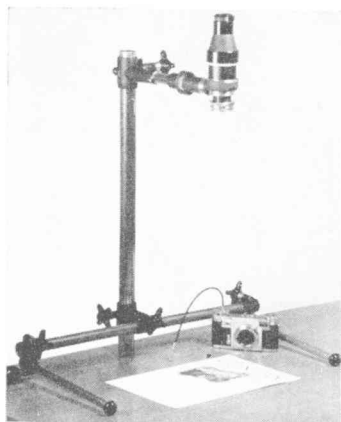
The macro-close-up field is usually very small. Its focus is difficult to determine by measurement and its field of view is too small for a focal frame. Therefore, some means of ground glass focus must be used. To do so, Carl Zeiss, Inc. have designed two different interrupted systems:

1. *The focusing head and focusing screen.* This entire unit is attached to an upright column of a reproduction stand, field device, etc. It is used by focusing the subject on the ground glass of the focusing screen after which the focusing screen is removed and the Contax body is placed in its former position.

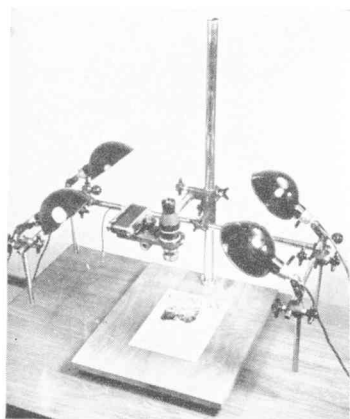
2. *The focusing revolver.* The Contax and the focusing screen are placed together on a revolving flat plate. Once focus is established on the screen, the plate is rotated quickly through a 180 degree angle to bring the Contax into the taking position. It is far more rapid than the focusing head method.

SIMULTANEOUS MACRO-CLOSE-UPS

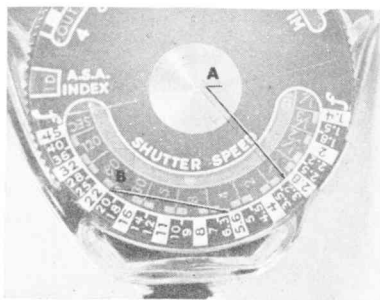
The Panflex can be used for macro-close-ups because you can both focus and see your subject on the ground glass. The picture can



Zeiss Small Reproduction Stand with the Contax Focusing Adapter



The Zeiss Focusing Revolver used with the Zeiss Copying Stand



Use the exposure meter scale for exposure factors: set the focal length of the lens (where the $f/$ number usually is) opposite the regular exposure time. The new exposure time is read opposite the new extension. a) 3" lens=1 second; b) extended to 6"=4 seconds.

be taken immediately without any replacement or plate turning as in the above methods. The Panflex is the most rapid method of all.

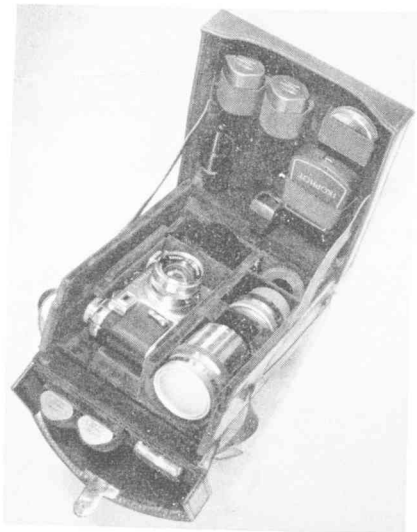
Using Extension Tubes for Macro-Close-ups. As the subject is brought closer to the camera, the lens must be extended away from the film for accurate focus. As most lenses of short focal length extend approximately five to ten millimeters only, some means must be found to produce the added length. This is done by means of an extension tube. An extension tube is merely a tube of definite length that is placed between the lens and the camera body to permit your

focus. Extension tubes come in varying lengths from approximately five millimeters to as much as one or two feet. With extension tubes, you must remember to increase your exposure because your light has a much longer path to travel. The increased exposure time is listed as part of the depth of field tables, and can be secured from Carl Zeiss, Inc., 485 Fifth Avenue, New York, N. Y. Tables are used in the following manner:

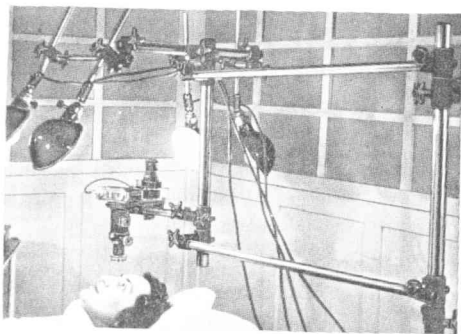
Measure the size of your subject, then read your table to find out what extension tube is needed with your camera for this field size. With the extension tube in place, check your focus on whichever ground glass device is available, and then select the iris opening for the best depth of field. After determining the regular exposure with a meter, etc., multiply it by your extension tube factor before you set your shutter speed. As an example, if your normal exposure is $f/8$ at $1/10$ second, then your extension tube factor is $10x$, then your new exposure will be $f/8$ at 1 second. This exposure increase must be given for correct exposure. Otherwise there will be a ruined picture because it would have been under-exposed at least 10 times. To say the least, a $10x$ under-exposure, especially with color, would be disastrous. Therefore, check yourself again by saying the word *SAFE*: S-Shutter, A-Aperture, F-Focus, E-Extension Tube Factor.

CHAPTER 11 / USEFUL ACCESSORIES

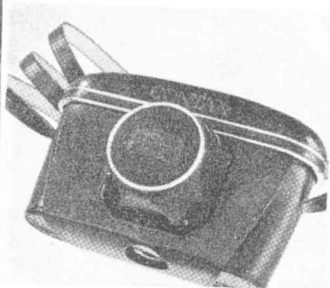
The Zeiss 35mm cameras are essentially simple in construction and simple to use. At least 90% of your normal picture taking requirements may be met without adding a thing to the camera in the way of intricate attachments of any sort. However, there are specialized occasions when they must be adapted to meet a specific condition. The interchangeable lens features of the Contax IIA and IIIA in particular have made them so versatile that they have been adapted into every possible phase of photography from taking pictures through microscopes, to making distant telescopic pictures of the moon. Although the other cameras have fixed normal lenses, they can be adapted for close-up work by adding supplementary portrait lenses to your camera lens so that its focus is extended to as little as nine inches. To solve these and other problems you must use additions to your camera. When you do so, you have an accessory. Accessories are many in number and may be further divided for description into two broad categories: Convenient and functional.



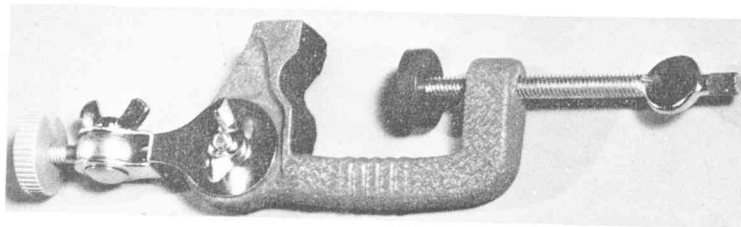
Carrying case for camera and accessories



The Zeiss Large Reproduction Outfit



The Eveready Case protects your camera.



Kodak Flexiclamp for holding camera

1. **Convenient.** These accessories are helpful in that they simplify your picture taking effort, protect the camera, or help standardize every step of your procedure. Convenient accessories that are always useful are: an elevating tripod, a carrying case for protection of your camera, a cable release, etc. In other words, any similar device as these mentioned which aids in picture taking without performing a truly photographic function of its own.

2. **Functional.** These accessories are primarily photographic in nature and in some way aid or alter the formation of the film image. These basic attachments may be pyramided one on top of the other by the use of either push-on or screw-in mounts. Their accepted order of attachment is:

1. *The Supplementary (close-up) Lens.* These must be first quality, perfectly centered, and ground and polished to the highest standards. The fine quality of your taking lens should be given a supplementary lens of high quality to maintain the exacting standards of fine definition to which your prime lens has been computed. The close-up lens may be screwed into your taking lens mount, or it may be pushed on the outside rim. Either system is acceptable as long as the mount is parallel with the film plane.

2. *The Filter.* The Zeiss filters are also of the push-on or screw-in type so that we can stack the filter over the portrait lens by adding the filter in an appropriate mount over the Proxar lens. All Zeiss filters are dyed in the mass glass. They are of solid first quality optical glass and will not deteriorate or fade in color under normal use. Besides being uniform in color, they are ground and polished so that both surfaces are perfectly flat and parallel to each other. A filter must be perfectly parallel in order to eliminate any possible chance of image distortion that can occur because of a wedge (prism) effect that would otherwise be caused.

3. *Polarizing Filter—Bernotar.* This filter possesses the unusual property of permitting light rays shining at certain angles to enter the lens while excluding most others.

4. *Lens Hood.* This accessory is extremely useful to prevent light flare which is caused when rays of light enter the lens from oblique angles. A correctly designed lens hood eliminates this stray light so that colors are purer and contrast between the tones of an image is increased. If all items are used, this is the proper order of sequence. But you may use any two units of this group as long as they are in arithmetical order, e.g., 1 and 4; 2, 3 and 4; etc. Incidentally, it is possible to combine close-up lenses for a closer effect. Do not overdo

this because if too many supplementary lenses or filters are added, the over-all length of the added accessories will perform as if a narrow extension tube were added and the corners of your film will be cut off.

The accessory story is a story without an end. Every problem requires special adaptation of your camera to make your picture taking efficient. Save whatever adapters you may have. Never throw anything out because that special extension tube that you may have had made, etc., may prove useful for a new problem that will present itself at some future time. Basically, however, your camera is still the prime unit around which any accessory must be designed.

You have now learned to use your Zeiss 35mm camera by means of the simple SAFE-SET METHOD. It is the method of standardization, a method of pre-setting all your factors beforehand. It is the method to minimize error because picture taking will become a matter of routine. You will have the confidence of knowing that you can "always take" a good picture at any time with this world famous camera. Once your worries about taking a picture are eliminated, the next step will be to "get" a picture. Taking a picture is merely a matter of mechanical routine. Making a picture results from the use of human judgment and human skill. A camera takes a picture, while it is only you who can make the picture.



1. Universal Carrying Case
2. Combination Case
3. Eveready Case
4. The 50mm f/2 pouch
5. The 50mm f/1.5 pouch
6. Pouch for 5cm lenses
7. Reinforced case for 5cm lenses
8. 85mm f/2 reinforced lens carrier
9. For 85mm or 135mm f/4 lenses

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.
- 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.
- 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 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.
- HYPHO**—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 adjacent shades of color.
- 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.
- 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.