EXAKTA GUIDE

COMPLETE CONDENSED CORRECT

THE CAMERA GUIDE

This is a *Camera Guide*. It deals with one make of camera, but it is not boosting it. The *Camera Guide* is a Focal Press publication. It is not sponsored or censored by manufacturers, or dependent on them in any way. The *Camera Guide* is as scrupulous in fully describing the camera and advising on its use as the very best type of manufacturer's booklet of directions. It is, however, more critical than they could be. No *Camera Guide* will attempt to camouflage the limitations of a camera or make efforts to sell an endless chain of accessories. It is straightforward, practical and devoted to the questions of how to take the best photographs with a particular camera, rather than to the praise of that camera itself. Every *Camera Guide* is compiled by an author who has had long experience in handling the camera in question. It represents at the same time the gist of all available literature collected by the *Focal Press Circle of Photographers* and filtered through their considered judgment. Both authors and publishers have one aim only: to be fair to every camera and candid to the reader.

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EXAKTA GUIDE

How and Why with the

VP EXAKTA—KINE-EXAKTA I, II, V, and VX, EXA—EXAKTA JUNIOR and the 2¼" × 2¼" EXAKTA

By W. D. EMANUEL

Twelfth Edition

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EXA—A

CONTENTS

CRITIQUE OF THE EXAKTA

During the last two decades camera designers made three basic contributions towards photographic progress: 1925 saw the advent of the range-finder focused camera for 35 mm. film (*Leica*); 1930 the twin-lens reflex camera (*Rolleiflex*) appeared; 1933 brought the single-lens miniature reflex (*Exakta*).

Nothing is ever a hundred per cent. new under the sun. The Leica was clearly based on ideas inspired by cinematography. The Rolleiflex was arrived at by turning a stereoscopic camera into an upright structure. The Exakta is just the "streamlined" version of the older reflex principle.

Both the advantages and the limitations of that design have long been known.

The chief point of its strength undoubtedly is that the lens taking the picture on the plate or film also serves for viewing and focusing it on a glass screen. Sensitive material and focusing screen are at equal distances from the lens, though at a right angle with each other. A mirror that can be swung into the path of the light coming from the lens will *reflect*—hence the name "reflex"—the picture on to the screen or clear the way for making an exposure on the sensitive emulsion. *Whatever lens we use and whatever be our distance from the subject, the area, the relative brightness and the definition of the picture on the viewing screen will be strictly the same as that actually taken on the film or plate.*

There is far from being anything so simple in other designs for hand cameras. There the taking apparatus and the viewing-focusing device are always essentially independent units more or less efficiently coupled with each other. Thus if interchangeability of a set of taking lenses is desired—and the range of any camera is defined by the range of its lenses—the viewing-focusing device, too, will have to be made interchangeable or at least adjustable within equally wide limits. This either leads to restrictions in the scope of the optical equipment—as is the case with the twin-lens reflex cameras, the range of which thus suffers serious limitations—or to a seemingly never-ending list of gadgets and accessories—as most owners of range-finder focused cameras will reluctantly testify.

Further, as the taking and the viewing-focusing devices are *separate units* necessarily having *separate points of view* in any but the single-lens reflex hand-cameras, they cannot be expected to record the "same" image in the strictest sense of the word. Displaced view points must result in different views. This difference is negligible as long as fairly distant subjects are viewed from bases that are a comparatively little distance apart, but it grows rapidly as we approach the subject. Anybody can check on this fact by looking first with the right eye and then with the left one at some distant scenery; as he closes one eye and opens

the other he will see two slightly different pictures. If he now looks in the same alternating fashion at an object in the near foreground—say, at a pencil held at arm's length—he cannot but be impressed by the way in which the area of his picture "jumps" while its perspective—that is, the relative position of the various elements in depth—seems to undergo amazing changes. The same thing happens in a camera that views and takes the "same" picture with two different eyes as it were—although the camera-eyes may be displaced to a different degree and in a different direction than are human ones. This *parallax*, as it is called, can become considerable and annoying when taking close-ups, unless it is warded off by some optical or mechanical expedient. Various forms of these are used in all kinds of cameras. Most of them, however, will work only at given subject distances and so are of restricted usefulness. In fact, the only reliable assurance against parallax is freedom from parallax, and the only camera to assure that freedom is the single-lens one.

The single-lens reflex camera is free from parallax because both the viewing and the taking are done by one and the same lens. But is it possible to do two jobs with the same tool and at the same time? Obviously it is not. In fact, in the actual moment of taking the picture the reflecting mirror is swung out of the path of the light entering through the lens, thus exposing the plate or film. In other words, once the shutter is released the picture on the viewing-focusing screen is blotted out; it slips out of control. *The freedom of spatial parallax is thus offset by something that could be called "parallax of time".* Still, the bargain is worth while. Its disadvantages on the side of the single-lens reflex camera could seriously be felt only by the photographer who goes in for sequences of rapid-action studies. In any other field, where swift minute changes of subject movement or expression are not the most important matter, the sudden blindness of the viewer in the very moment of exposure will hardly be a handicap.

Wellnigh unlimited optical range on one side—restricted choice of lenses on the other; parallax of time on one side—parallax of space on the other, defines the efficiency of the single-lens reflex camera as compared with the twin-lens reflex. It is a type of *very considerably wider range* and of *slightly slower operated speed.*

Presently we shall see that a comparison with the other modern type—the range-finder focused 35 mm. camera—reveals the single-lens reflex to be a *safer picture-getting instrument*, but, though of similar range, certainly *less versatile.* This is the outcome of a negative shape and a taking position peculiar to reflex cameras in general.

Reflex cameras—just think of the equal distances lens-negative and lens-viewing screen—lend themselves to taking square pictures. Now, the world in front of the camera appears but seldom four-square. The human figure, trees, buildings—in fact most "individual" subjects—tend to fit best into upright shapes. Landscapes, groups, events—in fact most "scenic" subjects—tend to fit best into oblong shapes. This is no

mere "question of taste" or some mystical dogma of æsthetics. Rather it is a time-honoured experience of representing any subject in a manner that is economically most suitable or, if one prefers the word, more "functional". Painters, at least, generally worked on these lines; comparatively few square canvases can be found in art galleries.

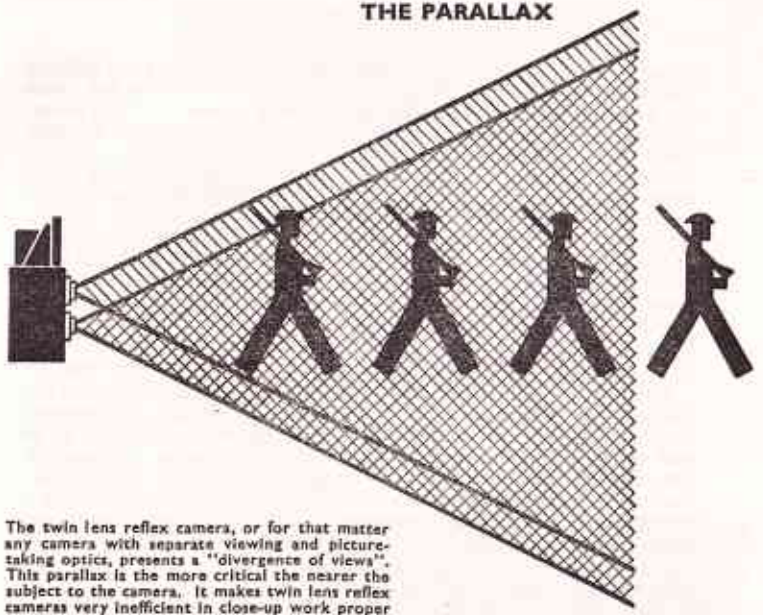
Whether, however, the same rules of space economy and functional presentation are applicable to photography is, to say the least, doubtful. The lens draws a circular image whatever be the shape of the subject in front of it. *The rectangular shape utilising the circular image most efficiently is the square.* Both upright and oblong prints can be got from a square negative without undue waste of anything but the unused margins of the negative. In exchange, there is the advantage that as the square negative does not offer any temptation to turn the camera one way or the other the technique of taking becomes much simplified.

But the ghost of painting always will appear and appeal to photographers like the saga of a noble though illegitimate ancestor to a family of commoners. The shadow of its traditions looms irremovably in the back of their minds and—square pictures are just not popular. Designers of old-time reflex cameras supplied camera-backs within the frame of which rectangular plates could be turned in an upright or oblong direction according to choice. The designers of the Exakta, being unable to repeat that trick with roll-film, decided, perhaps somewhat hastily, for the oblong-shaped negative. The fact that the latest model of the camera reverted to the square may be taken to indicate that the revolutionaries in the realm of reflex-photography have not been entirely happy with their revolution. It is easy to see that the oblong-shaped negative can only produce upright prints either by being given about 40 per cent. greater degree of enlargement than would be necessary with a square negative taken with the same lens, or by turning the camera at right angles, which cannot very conveniently be done.

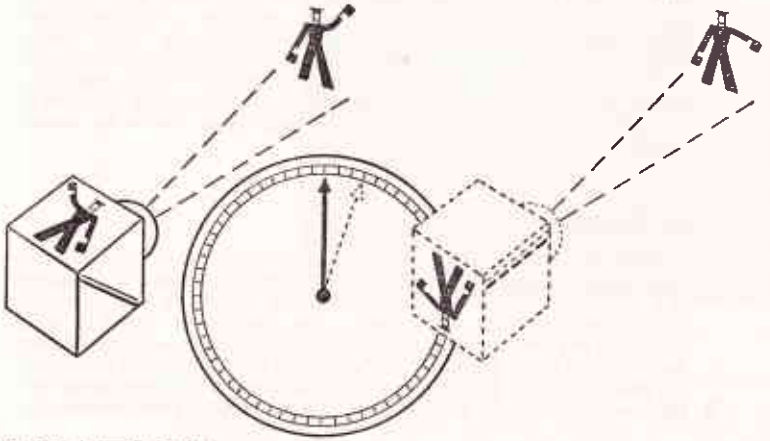
The viewing-focusing screen lies on top of the camera; it is logical that it should be there, as the sensitive material would face the lens, and we know that the plane of viewing has to be at right angles to it. That implies looking down on to the screen and thus chest level or even a lower position for the camera. This may not be convenient when the subject in front of the camera is tall or the lens has no view open to it at such a level. But any attempt to raise the reflex camera to eye level or to turn it in some way will succeed at the cost of the viewing and focusing efficiency. *The more a reflex camera is moved out of its standard position the more the viewing-focusing screen will get out of control*—if not entirely out of sight. Auxiliary viewers and approximative methods of focusing will have to be relied on, and manufacturers' literature usually abounds in their praise. No doubt they all have their value and are practicable to a degree, but their working results can hardly be equal to products of reflex work proper; if they were, one would be justified in questioning the technical supremacy of the reflex principle altogether.

Neither is the argument sound that, deprived of the benefits of

THE PARALLAX



The twin lens reflex camera, or for that matter any camera with separate viewing and picture-taking optics, presents a "divergence of views". This parallax is the more critical the nearer the subject to the camera. It makes twin lens reflex cameras very inefficient in close-up work proper (p. 5).



The single lens reflex is free of such weaknesses, but in exchange has to put up with the loss of a split second between the moment of viewing (*left*) and taking (*right*). At the moment of exposure focusing and viewing are not possible (p. 5).

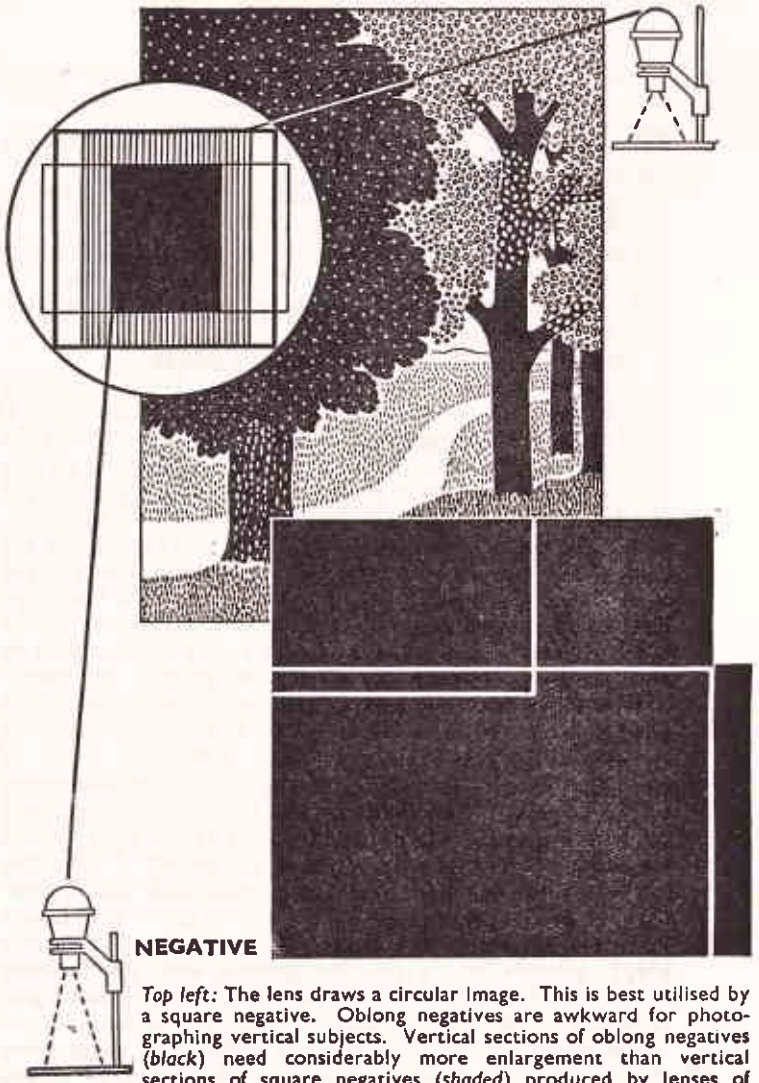
reflex viewing and focusing, the reflex camera is still little less efficient than other designs which never use "direct" methods to find and define the picture. Cameras discarding the focusing screen from the outset can be given almost any shape to be held in any position. Well-designed reflex cameras, however, are meant to work held with the reflex grip in the reflex position. *The same reflex principle that leads to the square negative also results in a rigid cubical camera body* which but seldom can be handled very conveniently and safely at extravagant angles. Replacing the traditionally square negative by one of oblong shape, the makers of the Exakta very logically arrived at a body that is less deep and has a wider front than the typical reflex box. This "streamlined" shape gives more freedom of choice in gripping the camera and thus enhances the possibility of using it at unorthodox levels and angles. This advantage, however, is probably offset by the relatively increased need to resort to non-reflex positions because of that very oblong shape of the negative.

From whatever angle we may enquire into the ifs and whens of the single-lens reflex design, we shall always be referred back to the sound simplicity of the fundamental idea: it is of enormous advantage to be able to see and focus the very image that will appear on the negative. This principle—just as any other—translated into terms of optical and mechanical design reveals limitations of its own. To overcome them is possible only by sacrificing the principle to some degree. You cannot have it both ways. No camera can do it both ways.

It is easy to choose a camera according to one's temperament. It is very difficult to adjust the temperament of any camera to one's own. It is more likely that one's photographic temperament will settle down gradually to the technical peculiarities, the whims, the outlook of the camera. This seems to explain the fact that almost every photographer believes that his camera is "better" than any other one. People once accustomed to handle the highly versatile but pictorially "blind" range-finder cameras will more and more tend to think in terms of "shots"—while the imagination of those who handle a "clumsy" reflex, presenting the finished image before it is made, cannot help working in terms of "pictures". And who would have the audacity to decide for others which is preferable?

A Warning

The Exakta is not a box camera. It is not foolproof in the sense that those cheap cameras are. Frankly, it is a complicated camera and sensitive to a degree. It is of utmost importance that it should be handled strictly in accordance with the instructions. One should train oneself to avoid accidental and false movements which could damage the camera mechanism. Read the next pages attentively. If you follow them the Exakta will not let you down. It is an excellent camera; unsurpassed when intelligently employed—particularly for close-up work, in which so many other cameras fail.



Top left: The lens draws a circular image. This is best utilised by a square negative. Oblong negatives are awkward for photographing vertical subjects. Vertical sections of oblong negatives (*black*) need considerably more enlargement than vertical sections of square negatives (*shaded*) produced by lenses of similar focal length (p. 6). The actual Exakta negative sizes are indicated, *bottom right.*

THE EXAKTAS

There are three different types of Exakta Camera on the market distinguished by their negative size.

The Standard Exakta (also called "V.P. Exakta") for roll-film $2\frac{1}{2} \times 1\frac{5}{8}$ in. (4 × 6.5 cm.—V.P. size);

The Kine-Exakta, Exakta V, and *VX,* and the *Exa,* for 35 mm. cine-film, taking $1\frac{1}{2} \times 1$ in. (24×36 mm.) pictures.

And the *Square Exakta* $2\frac{1}{4} \times 2\frac{1}{4}$ in. (6 × 6 cm.), for roll-film $3\frac{1}{4} \times 2\frac{1}{4}$ in. (6 × 9 cm.) size.

They are all built on the same basic design.

All Exaktas are single-lens reflex cameras. The actual taking lens serves both for focusing and taking the picture and is used to form the image on the film as well as to reflect the picture to be taken on to a ground-glass focusing screen. Film and focusing screen are for all intents and purposes at the same distance from the lens but in different positions: at a right angle with each other. The film runs along the back of the camera while the focusing screen is on the top of it. Thus the light entering through the lens has to go alternately in two directions: once to the focusing screen and once to the film. This two-way traffic is controlled by a mirror on point-duty. By setting the shutter, the mirror is introduced into the path of the light-rays between lens and film, thus reflecting the image on to the focusing screen, showing exactly the same outlines, definition, depth of focus and relative brightness of the subject as will appear on the negative. The image on the screen is the right way up, bright, and permits critical focusing (aided by a built-in magnifier), as well as adjustment of the extent of definition towards both the fore- and background and, lastly, composition of the photograph before the negative is exposed. With the release of the shutter for exposure the mirror snaps upwards into a position parallel with the focusing screen which gets covered by it. The camera is now light-tight and for the picture the path clear to the film.

The shutter of the Exaktas is a *self-capping focal plane* shutter travelling from right to left. "Self-capping" means

that it remains closed while being wound up; "focal plane" means that it moves right in front of the negative material, thus ensuring full protection to it. With this type of shutter lenses can be changed while the camera is loaded. The Exakta shutter has the widest possible range of speeds. Besides the instantaneous speeds from 1/25 to 1/1000 sec., automatic time exposures from 1/10 to 1/2, 1 sec. up to 12 secs. can be set. A delayed-action release (self-timer) is built-in and coupled to the shutter, allowing all speeds from 1/1000 to 6 secs. to be released with a delaying time of about 12 secs. (for exceptions see Exakta "Junior" and "A"). This very wide choice of longer automatic shutter speeds is unique for miniature cameras and comes in usefully under specialized working conditions. On the other hand, this shutter is more complicated than those of most of the other miniature cameras and needs careful handling. Shutter winding is automatically coupled with film transport and the swing of the mirror into focusing position. Shutter release is coupled with the swing of the mirror out of the taking path.

Exakta lenses comprise the best-known Zeiss-Tessars, Schneider-Xenars, as standard lenses, besides a wide range of more specialized lenses by other manufacturers. The lenses are *interchangeable,* allowing the use of tele-photo, wide-angle and particularly fast lenses. One unique feature of the single-lens reflex type is that, whatever lens is used, *no special finders* are required, as the reflex finder shows in every case the correct image with the lens employed. The interchangeability of the lens allows of the straightforward use of *extension tubes* for close-ups without the least complication of focusing. The same goes for using the camera in photomicrography, etc.

The reflex-finder hood allows of normal reflex image viewing and focusing as well as eye-level viewing and focusing by means of a built-in secondary mirror (not in the Kine-Exakta and the Square Exakta) and finally incorporates a direct vision frame finder to be used for viewing only. A hinged-on *magnifying glass* permits critical focusing of the reflex-image.

The body of the Exaktas is of trapezoid shape, all metal, leather-covered, and is, in spite of housing the focal plane shutter, reflex arrangement and fast interchangeable lenses, comparatively small. It has also a tripod bush, connection socket for flash-bulb synchronizer and hooks for neck-strap.

Focusing is effected by a rapid helical focusing screw, which in the case of Exakta A, B and C is part of the camera body; with Kine-Exakta and 2¼ × 2¼ in. Exakta, part of the lens-mount; while Exakta Junior is focused by the front-cell of the lens. A focusing scale is found on all models indicating the distances from infinity down to 4 or 3 ft. There are also scales provided for reading off the depth of field.

Early Exakta models are now obsolete and have been replaced by new ones. For the sake of completeness we still list the older models; they are marked ●

Exakta Models

● EXAKTA MODEL B is for 8 exposures 2½ × 1⅝ in. (4 × 6.5 cm.) on standard roll-film for this size, also called "V.P.K.", "27", "127", or "A.8." film. It conforms with the general description given before, including shutter-speeds from 1/1,000 to 12 sec., built-in delayed action release for speeds from 1/1000 to 6 sec., interchangeable lenses. While the first models of the Exakta B were fitted with a film transport knob, and had black enamelled finish of the metal parts, later models were equipped with a film transport lever instead of the knob, and finally the latest pattern shows chromium finish of the outside metal parts.

● NIGHT-EXAKTA is in construction and performance the same as Exakta B, with the only exception of the lens holding helical screw mount, which is slightly modified in shape so that ultra-fast lenses for work under unfavourable lighting can be easily manipulated.

● EXAKTA MODEL A is as Exakta Model B, with the exception of shutter and delayed action release. The shutter of the Exakta A allows for speeds from 1/25 to 1/1,000 sec., as well as B. (Ball) and T. (Time) exposures. There is no delayed action release built into the camera. This model has only been supplied in black finish of the metal parts.

● EXAKTA JUNIOR is as Exakta A, with the difference that the lens is not in a helical focusing mount but on a telescopic tube and the actual focusing is done by turning the front cell of the lens. The shutter speeds range from 1/25 to 1/500 sec. besides B. and T. The outside metal parts are either black enamelled or chromium finished.

● EXAKTA MODEL C is as Exakta Model B, with the addition of a plate back adaptor, allowing for the use of plates and ground glass screen focusing, for specialized work. The reflex-image is *not* in register when working with plates and can only be employed with roll-film in the Exakta C.

EXAKTA CAMERAS COMPARED

Model	Size with lens	Weight with lens	Picture Size	Picture Number	Film size	Film transport and shutter	Shutter speeds (seconds)	Delayed action
Kine I and II	6" × 3¼" × 2¾"	35 oz.	1 × 1½ in.	36 exp.	Cine	Fully coupled	12 to 1/1000	Yes
V and VX	6" × 3¼" × 2¾"	34 oz.	1 × 1½ in.	36	Cine	Fully coupled	12 to 1/1000	Yes
Exa	4⅞" × 3¼" × 2¾"		1 × 1½ in.	36	Cine	Connected	1/25 to 1/150	No
A	6" × 2½" × 2"	27 oz.	1⅝ × 2½ in.	8	127	Connected	1/25 to 1/1000	No
B	6" × 2½" × 2"	27 oz.	1⅝ × 2½ in.	8	127	Connected	12 to 1/1000	Yes
C	6" × 2⅝" × 2"	28 oz.	1⅝ × 2½ in.	8	127	Connected	12 to 1/1000	Yes
Junior	6" × 2½" × 3"	27 oz.	1⅝ × 2⅛ in.	8	127	Connected	1/25 to 1/500	No
2¼ × 2¼ in.	6½" × 4" × 4½"	46 oz.	2¼ × 2¼ in.	12	120	Fully coupled	12 to 1/1000	Yes

Interchangeable lenses	Standard focal length	Lens mount	Depth of field calculation	Finders	Finish of metal parts	Accessories available
4 to 50 cm. by bayonet	5 cm.	Non-collapsible helical focusing	On lens mount	Reflex and frame	Chrome	All, built-in cutting knife
4 to 50 cm. by bayonet	5 cm.	Non-collapsible helical focusing	On lens mount	Reflex and eye-level reflex	Chrome	All, suitable for any type of flash
4 to 50 cm. by bayonet	5 cm.	Non-collapsible helical focusing	On lens mount	Reflex and eye-level reflex	Chrome	All, suitable for any type of flash
5.5 to 36 cm. by screw	7.5 cm.	Collapsible helical focusing	None	Reflex, eye-level reflex, frame	Black	All
5.5 to 36 cm. by screw	7.5 cm.	Collapsible helical focusing	None	Reflex, eye-level reflex, frame	Chrome or black	All
5.5 to 36 cm. by screw	7.5 cm.	Collapsible helical focusing	None	Reflex, eye-level reflex, frame	Chrome or black	All, with plate back
None	7.5 cm.	Collapsible front cell focusing	None	Reflex, eye-level reflex, frame	Chrome	All
By bayonet	8 cm.	Non-collapsible helical focusing	On lens mount	Reflex and frame	Chrome	None (at present)

● KINE EXAKTA is for 36 exposures at 1½ × 1 in. (24 × 36 mm.) size on standard 35 mm. cine-film. It conforms with the general description of the Exaktas given before, including shutter speeds from 1/1000 to 12 sec. and built-in delayed action release for the speeds from 1/1000 to 6 sec. The Kine-Exakta has a die-cast body with all outside metal parts satin-chrome finished. The visual reflex image is automatically 2× magnified to 2½ × 1⅞ in, and of increased brightness owing to the fact that the "focusing screen" is a plano-convex lens. There is no eye-level reflex finder. Film transport and shutter wind are fully automatic and coupled (while with the previous models the film has to be wound on beyond the point where the shutter is fully wound). Rewinding and film cutting devices (for cutting off exposed ends) are part of the camera. The lenses are interchangeable in bayonet fitting, which carries depth of field calculators. The shutter is automatically locked when the camera is closed.

● EXAKTA 2¼ × 2¼ in. is for 12 exposures 2¼ × 2¼ in. (6 × 6 cm.) on standard 3¼ × 2¼ in. roll-film, known as "120", "20", "B2", or "Brownie 2" film. It conforms with the general description of the Exaktas given before, except it has no eye-level reflex finder. Film transport and shutter wind are fully automatic and coupled. The lens is in bayonet mount which carries a depth of field calculator. All outside metal parts are satin-chrome finished.

● KINE-EXAKTA II is the post-war version of the Kine-Exakta. It is very similar to the original model, but incorporates a few minor alterations in the design of the film transport and film counter.

● KINE-EXAKTA V 1950 (sometimes called Exakta-Varex). The basic construction and handling of this new model remains the same as for the Kine-Exakta II. The reflex finder hood of the Exakta V is, however, removable and can be replaced by a prismatic eye-level focusing finder. Changing from reflex to eye-level prism finder is accomplished by one simple manipulation.

The Exakta V carries two flash contacts, one marked "V" with built-in delay for flashbulbs, the other, "E", for electronic flash.

KINE-EXAKTA VX 1951 has further improvements. The outer housing together with the film aperture consists of one casting. The camera back is hinged on and has an improved catch. The right-hand side film chamber has been somewhat enlarged to accommodate a take-up cartridge. This allows working from cartridge to cartridge without rewinding the film. The film-counter counts the exposures *after* they have been made. The film transport incorporates a warning signal to check whether the film has been wound on—or rewound—correctly. The tripod bush flange is enlarged to offer increased tripod support. Basic construction and handling remain the same as for Kine-Exakta II.

THE EXA is the "little sister" of the Exakta V, based on the same principles as the V but simpler in construction. All Exakta V accessories are usable (except the ever-ready case). Telephoto and wide-angle lenses can be used. Focal lengths above 10 cm. will however produce some cut-off on either side of the picture. The double finder system of the V is applicable to the Exa. The shutter is rather simpler, consisting of a drum, and is set to the shutter speeds of 1/25, 1/50, 1/100 and 1/150 second as well as B, by a lever. Film transport and shutter tensioning are coupled and set by a transport knob. The two cassette system and two flash contacts are incorporated as in the VX. Apart from the above indicated simplifications the Exa is handled like the Kine-Exakta II.

HANDLING THE EXAKTAS

To start with, we take it for granted that we have our Exakta, together with a film, in front of us. Our first task is to load the camera with film.

Loading the Exaktas

Loading the Model A, B, C and Junior

1. **Open camera-back.**
2. **Insert empty film spool on film transporter side.**
3. **Insert roll-film in camera.**
4. **Fix paper end on empty spool.**
5. **Wind film transporter one turn.**
6. **Close camera-back.**
7. **Wind film transporter until No. 1 appears in film window.**

1. The camera-back is opened by holding the instrument in the left hand, while pressing with the forefinger of the right hand the camera-back lock in the direction of the arrow. With thumb and middle finger of the right hand the back can now be pulled away from the main body.
2. The empty roll-film spool (take-up spool) has to be inserted into the compartment below the film transporter. The empty spool shows on one end a groove, while the other end is solid. The grooved end has to point towards the film transporter; consequently the solid end shows towards the base of the camera. When inserting the spool, its groove has to engage in the bush with bar on top inside the spool chamber, while on the bottom part the small bolt springs into position as the spool is fully pressed down.
3. The paper seal has to be broken, seal (ends as far as not firmly stuck to the film backing paper) removed, and roll-film inserted into the empty spool chamber (on the opposite side of the film transporter), so that the coloured (red or green) side of the film backing paper is up and shows in the direction of the empty take-up spool. The roll-film is pressed down with its spool ends into the guide grooves of the spool chamber until it is automatically held in position by the bent sprint lever, which has first to be held back to allow the spool to be pushed into the film chamber.

4/5. Just sufficient paper is unrolled from the roll-film to allow its wedge-shaped end to be pushed as far as possible into the wider slot of the empty take-up spool. After inserting the film-end on the take-up spool, turn the film transporter once to prevent the paper end from slipping out. At the same time *make sure that the paper runs perfectly straight from spool to spool.*

Loading (p. 16)

Insert empty film spool on film-transporter side, insert roll-film, fix paper end.

Wind film-transporter one turn.

Shooting (p. 33)

Screw out lens mount to ∞ position.

Wind film transport until No. 1 appears in film window.

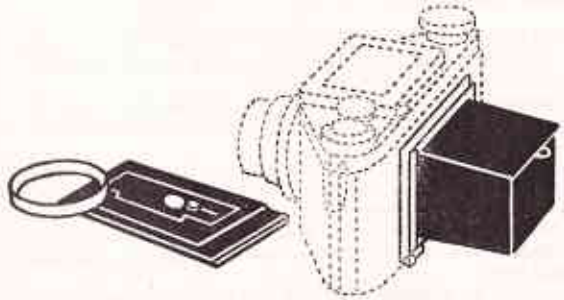
Set shutter speed, focus, determine picture frame, set stop, release.

Unloading (p. 38)

Wind paper end off.

Remove film, transfer empty spool.

Exakta "C" (p. 41). While in construction and handling exactly like the Exakta B, Exakta C has in addition provision for taking a ground-glass screen



in the camera-back and allows of single exposures on plates. An extension ring compensates for different focusing plane.

For detailed view of the VP EXAKTA see back cover

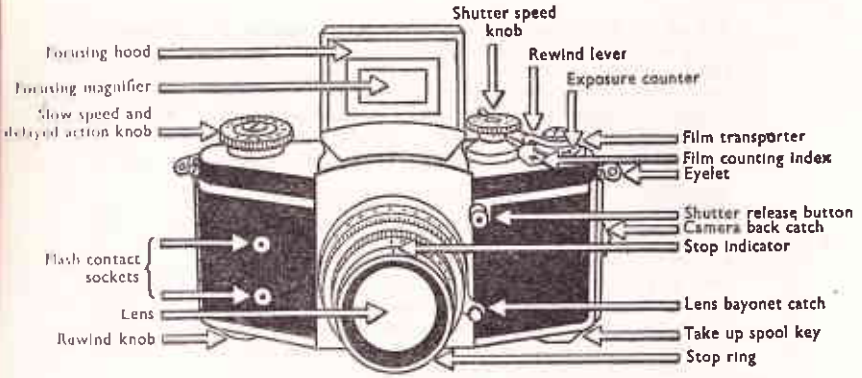
6. When closing the camera back, observe that the catch of the camera-back locking device springs back and verify that the back is locked.
7. Hold film window cover open with thumb of your left hand, while winding with the right hand the film transporter until No. 1 appears in the film window. Where the film transporter consists of a lever, this is moved in the direction of the arrow up to the stop, when the lever returns automatically to its starting position. The procedure is repeated until No. 1 appears in the window. *After a few turns on the film transporter one will feel a resistance and the film movement is rendered rather more difficult. This is quite in order and no attention need be paid to it.* The reason will be found in the fact that film transport and shutter wind are coupled, and as soon as the shutter is fully wound (but not the film) a braking device begins to act which prevents overwinding the shutter.

Loading Kine-Exaktas I, II, V, VX, and Exa

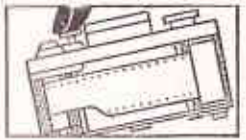
with a filled film cartridge (for other types of film holders as well as loading film into containers, see page 44).

1. Set re-wind lever so that the letter "V" is visible.
2. Remove camera-back.
3. Insert film.
4. Fix film on take-up spool.
5. Close camera.
6. Open finder hood.
7. Make sure that shutter is not set to "Z".
8. Transport film twice and release.
9. Wind film-winder once more and set picture-counter to No. 1.

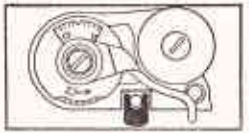
1. In place of the re-wind lever of Model I, Kine Exakta II has a folded over lever which is automatically pushed into the correct position (folded down) on working the film transport.
2. Remove camera-back simply by pressing the camera-back lock in the direction of the base of the camera, when the whole back can be removed.
3. The re-wind key is pulled out as far as it will go, then place loaded film cartridge into right-hand side film chamber (below slow speed and delayed action knob) with its hollow part towards re-wind key. The mouth of the cartridge with the film end has to point towards the take-up spool. The re-wind knob is now fully pushed back and its flap pushed over.
4. Hold the cartridge in position with the left thumb, while pulling with the right hand 4 to 4½ in. (10 to 11 cm.) film from it. The free



Loading (p. 18)



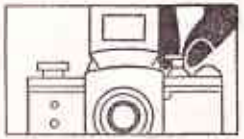
Rewind lever to "V", camera back removed, film inserted, fixed, camera back closed.



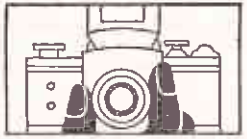
Film transport of model II automatically pushes rewind lever in correct position.

Open finder hood, verify shutter not set to "Z", transport film twice, release, wind transporter again, set picture counter to No. 1

Shooting (p. 35)



Set shutter speed.



Determine picture frame and focus, set stop, release

Film counter of model II is set by milled edge, clicking at each division.

Unloading (p. 38)

Turn reversing lever so that "R" is seen.

Rewind film into cartridge.

Remove cartridge.

end of the film is pushed under the spring tongue of the take-up spool of the camera (below the film winder). The take-up spool can be turned on its axis to bring the spring tongue into the most convenient position for inserting the film. While fixing the film under the tongue the spool should be prevented from turning by holding it still with one finger. Before closing the camera-back, make sure that the perforation of the film engages in the teeth of the film transport sprockets.

When working with two cassettes with the Exakta VX or the Exa, trim the free film end square. Open the take-up cartridge (p. 43), remove any cut-off film end from the centre spool, and attach the end of the fresh film to the centre spool of the take-up cartridge (No. 4, p. 43). Assemble the take-up cartridge, and insert it in the take-up chamber. The slit of the take-up cartridge must point towards the film aperture of the camera. Make sure that the perforation of the film engages in the teeth of the film transport sprockets, and close the camera back.

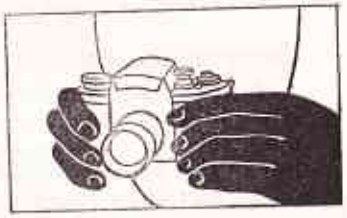
5. Close camera by holding it in the left hand. The back is held in the right and replaced. While doing so, *care must be taken that the circular peg inside the camera connected to the re-wind key is pushed firmly into the interior of the camera.* This is best done with the ball of the left thumb. The camera-back, held in the right hand with its locking-key upwards, is hooked with its lower end into the groove on the body of the camera, and the back itself pressed lightly towards the body until the locking-key snaps into position. The re-wind key must be allowed to catch in the camera-back so that it is clamped to the camera and cannot be pulled out when the back is closed.
6. The finder-hood springs open by pressing its catch in the middle of the back base of the hood.
7. Should the shutter be set to Z, it is essential to move it to another setting (any, other than Z).
8. This action implies that the film has been moved forward the first two frames, which have been exposed to light while inserting the film into the camera. These two wasted frames do *not* count as part of the 36 exposures.
9. The third film-wind brings the *first* unexposed piece of film into position, at the same time pulling the film tight. After winding on, the exposure counting disc is set to No. 1 by moving it in the direction of the engraved arrow until No. 1 points to the picture counting mark (small black triangle). *On no account must the counting disc be turned backwards* (against the arrow), as the subsequent exposure numbers would not be indicated correctly.

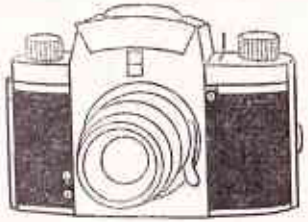
Loading the Exakta 2¼ × 2¼ in.

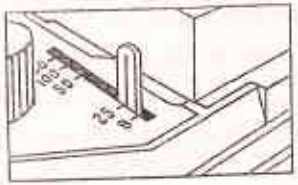
The procedure of loading the 2¼ square Exakta is practically the same as stated for Exakta A, B, etc.

The Kine-Exakta V with the reflex finder (*right*) and the prism finder (*below right*). The VX model also has an enlarged tripod bush and a hinged-on back (*below*).

Holding the Kine-Exakta V when using the eye-level prism finder.







The Exa (*left*) is a simplified version of the Exakta Varex.

The Exa shutter (*left*) is set by a simple lever.

If a number is visible on the film counter, the transport lever has to be cranked to and fro and shutter released (after opening the focusing hood!) until after No. 12 and "F" a red dot is visible. Now the shutter is locked, at the same time locking of the film transport lever is released, so that it does not need to be moved correctly from start to end, but can be cranked at will. When the red dot is in the film counter aperture, the camera has to be opened, the new film inserted into the chamber below the normal speed disc, and the backing paper end fastened on the take-up spool in the opposite film chamber in the usual way. The backing paper is tensioned by slightly turning the film spool. *The following points are important.—*

A. Along the lower edge of the film gate runs a film transport claw, which is open, if the film transport lever is in its original position and the two red dots inside the camera are opposite each other. The backing paper has to be inserted between the jaws of the claw. The backing paper is slightly lifted and pushed into the open claw. This is important, otherwise the film transport will not function properly. Now the camera back has to be closed.

B. By cranking the film transport lever until the No. 1 appears in the film window and pressing the film counter release lever in front of the film counter window the No. 1 will appear and the camera is ready for the first exposure.

C. Make sure to push the film transport lever *always* back into its original position after use. Under no circumstances must the shutter release knob be pressed while starting to move film transport lever.

Carrying the Exaktas

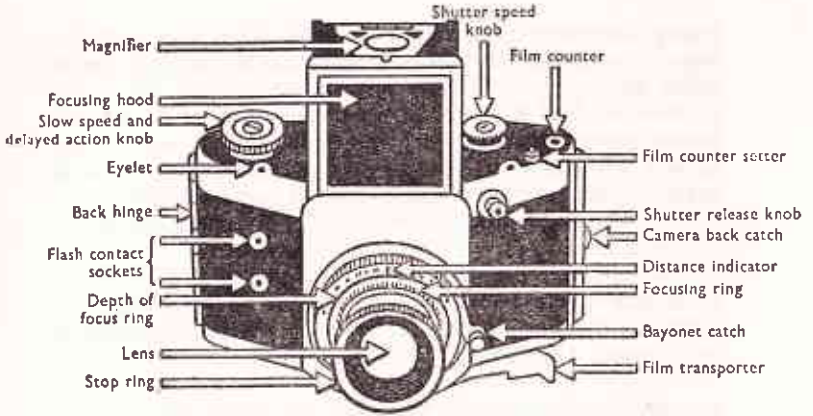
However elegant it may be to carry the camera on a long strap hanging from the shoulder, this position is quite unsuitable for quick action. Many a good shot has been lost in this way. A better method is to carry the Exakta on a short strap round the neck, so that it lies on one's chest—in the right position ready for work. Opening the case and finder hood is then a matter of a split-second.

There are a number of different types of cases available for the Exaktas:

The Ever-ready case carries the Exakta ready for use, and there is a holding screw which prevents the camera from falling out of the opened case.

Outfit cases in several variations are available to take the Exakta, together with auxiliary lenses, filters, films, etc. Also separate cases for one lens or any of the other Exakta accessories are also on the market.

Generally, it is of foremost importance *to acquire sufficient experience in manipulating all parts that eventually lead to*

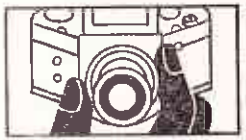


Loading (p. 20)

Insert film spool on take-up side, insert roll-film, fix paper end.

Wind film transporter one turn, close camera-back, set picture counter.

Shooting (p 35)



Set focus, determine picture frame.

Set shutter speed.

Set stop.

Unloading (p. 38)

Wind paper end off.

Open camera-back and remove film, transfer empty spool.

taking the picture by getting thoroughly acquainted with the ways in which to work them before actually setting out to make photographs. Surely one should try the gears, the accelerator, the brakes and even the horn of a new car before going "all out" with it. Going all out with a new camera without being able to do the "right thing" almost automatically is not less dangerous. It may be less wasteful of lives—but it is not less wasteful of live pictures, if not of the camera itself.

The following are the mechanical points that must be particularly watched when using Exaktas: (1) Opening and closing of the finder hood. (2) Winding the film and setting the shutter. (3) Releasing.

Viewing through the Exaktas

The reflex finder and the eye-level mirror are viewing-focusing devices. The frame finder is purely a viewing device.

THE REFLEX FINDER is the ground-glass screen on to which the image entering the camera through the lens is reflected by a mirror. The reflex image is only visible after the film has been wound on, and it disappears once the shutter is released. It has a twofold purpose: first to show *the outlines of the picture*, next to allow of getting the best *definition*.

There should be no difficulty in getting the outlines as exact as required. It is advisable to *view the picture first with fully-opened aperture* to ensure the brightest possible reflex-image. The finder hood extension (p. 101), keeping stray light from the screen gives additional brilliancy to the picture. In spite of the fact that one is likely automatically to hold the camera quite *level*, one should make sure that the vertical lines of the picture run parallel with the sides of the ground-glass frame, if intentional tilting is not aimed at.

The second purpose of the reflex finder, obtaining the best definition, is at the same time one of the most important factors ensuring good results. The less experienced user of the reflex screen is apt to accept, all too hastily, a seemingly sharp impression of the image as best

definition. There are, however, different degrees of sharpness even at full aperture, which one should make use of in determining the best possible definition. The best way to arrive at critical definition is to *turn the helical focusing mount to and fro* while observing how the main object at which one intends to focus accurately becomes more and more sharp up to a certain point, beyond which it will again lose definition. It is at this "beyond" stage that we reverse the movement of the focusing mount. The degree of movement of the focusing mount is slowly narrowed down until one unmistakably arrives at the point of the very best definition. It is a case of "encirclement" *from the sharp surrounding to the critical sharp point.* It must be repeated that, before and beyond the point of maximum definition, the image still appears sufficiently sharp, but no one should be deceived by this fact: it is not good enough for enlarging.

The built-in magnifying-glass swung into position will assist in determining the critical focus. Having found this, the magnifier should be folded back and the whole image on the screen surveyed before release. The camera, which had to be raised when using the magnifier, should now be lowered again. Otherwise—with the magnifier in front of us—we may get excellent definition but are bound to lose sight of the picture as a whole.

Plastic Magnifiers of rectangular shape are on the market, which can be usefully employed in the V.P. Exakta. All one has to do is to file or cut off the two plastic flanges on the bottom of the magnifier to allow it to drop on to the reflex ground-glass of the Exakta. Viewing the image through this magnifier gives not only about 3 x magnification of the image but also allows it to be viewed in its entirety from the normal chest-level position.

The picture on the ground-glass screen appears *upright but reversed.* Similarly, movements are also shown reversed and *the camera will have to be turned against the apparent movement of the object to follow it.*

THE EYE-LEVEL MIRROR is placed in the finder hood parallel with the one in the camera to produce a second reflection of the image to be observed in a horizontal direction. While allowing to observe the

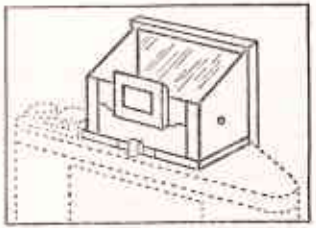
reflex image at eye-level, it is less suitable for focusing, as it is bound to be rather *less bright* owing to the double reflection. It also necessitates holding the Exakta *at some distance* from the eye, which again renders critical focusing more difficult. Finally, the image is not only reversed but also *upside down*, which does not improve things either. Nor does the double reflex image permit comfortable adjusting of the outlines. In most cases one will find it more convenient to employ the frame finder if eye-level viewing is required.

THE FRAME FINDER consists of a frame provided by the front of the viewing hood and a sight in the rear. The frame when viewed through the sight will define the outlines of the picture aimed at. When using the frame finder one must not attempt to turn the camera to the right or the left, away from the eye, nor must the eye be moved from the centre of the back frame to find the limitations of the field of view. This *spying "round the corner" is deceptive*, as only the section seen in the finder, when holding the eye close to and in the centre of the opening while looking straight ahead, will appear on the negative. The frame finder needs masking when used with other than standard lenses (see p. 53); and it cannot be expected to be free of parallax.

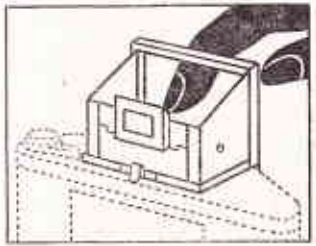
The frame finder *cannot be used for focusing*, apart from guessing the distance of the subject as based on the size of its appearance within the frame and then setting the focusing scale of the lens mount accordingly; only very experienced photographers will be safe from serious errors when applying this method. It is safer first to use the reflex finder for focusing and then to change over to the frame finder for viewing. Both these procedures are unsuitable for photographing moving objects. The frame finder will more efficiently be used for distant photography where infinity setting only is required; or, with subjects nearer to the camera, by using "zone focusing" methods, which, by pre-setting the lens, ensure that a certain depth of field —within the limits of which the action is expected—will be recorded sharp all over (see p. 81). This last method of viewing and focusing is, in fact, preferable to any other when dealing with rapidly moving subjects in front of a reflex camera. It is almost impossible to catch and shoot fast motion when one is looking down with one's attention fixed to the mirror that shows the direction of motion laterally reversed. With the frame finder it is easier to follow movement and keep the (other) eye on it, even before it becomes visible within the finder frame.

The Finders of the Exakta A, B, C, Junior and $2\frac{1}{4} \times 2\frac{1}{4}$ In.

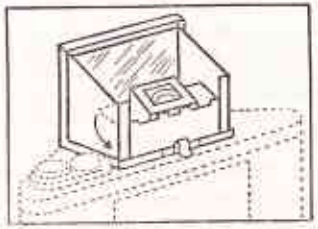
REFLEX FINDER. On top of the camera is the finder hood, folded down. To bring it into working position the catch on the back of the hood has to be pressed inward, when the hood automatically opens into working position, allowing of observation of the image on the ground-glass screen up to the moment of exposure (after the shutter has been set), as explained on p. 24. The hood should be opened gently; insert finger to hold down sides until front is up, otherwise mirror of V.P.



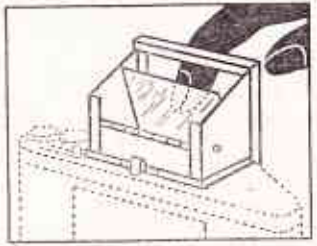
Reflex hood opened, normal position for reflex finding (p. 25).



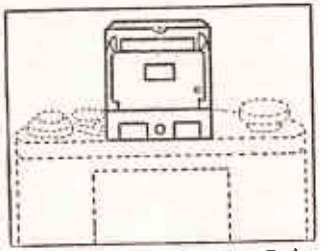
Reflex finder front pressed inward, finder used at eye-level as frame finder (p. 26).



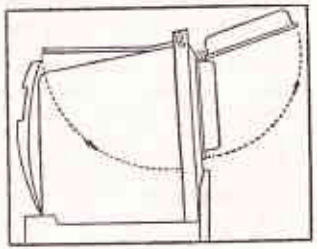
Frame finder back sight is pressed down.



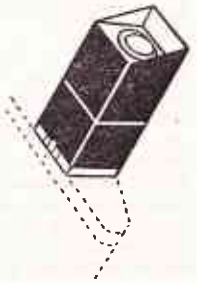
Mirror pressed inward until it catches in the upper catch of the retaining lever to use the V.P. Exakta with eye-level reflex finder (p. 28).



Equivalent position for Kine Exakta (p. 29).



To use the magnifier of Kine Exakta II, tilt up the lever at the side; to use the frame finder swing the protective cover forward in addition.



Light hood extension with magnifier (p. 101).

Exakta may be scratched. In poor light and for exact focusing, the use of a light hood extension is advisable (p. 99). For critical focusing the built-in magnifier should be employed. The magnifier springs into position by slightly depressing the small stud in the right-hand bottom corner on the back of the light hood. The centre of the image on the ground-glass screen appears now about three times enlarged.

FRAME FINDER. When the magnifying glass springs into position, as described before, it brings up at the same time the back sight of the frame finder. Now by pressing the mirror (which forms the front wall of the light hood) inward until it catches automatically on a built-in hook, the front sight of the frame finder is opened. Holding the camera at eye-level and looking through the backsight, the image seen through the front frame is identical with the picture one gets on the negative. This image serves for viewing purposes only and is not focusable.

EYE-LEVEL. The finder hood is opened without releasing the magnifying glass, the mirror (which forms the front wall of the light hood) is pressed inward. By pressing the little stud on the right-hand side wall of the finder hood, the mirror will spring half back. If the camera is now held at eye-level, one can see the ground-glass screen image reflected by the mirror, allowing of focusing and picture-frame control. The brightness of the reflected image is considerably decreased by the double reflection (inside the camera and by the second mirror of the finder), and therefore it will be found rather more difficult to focus accurately. Also the second reflection necessarily turns the image in the viewer upside down.

CLOSING THE LIGHT HOOD can only be done when mirror has been allowed to spring back into its upright position, by pressing the mirror release stud on the right-hand side wall of the light hood. The magnifying glass and back sight of the frame finder must be folded inward. The walls of the hood can now be folded down by *first* folding the back, *then* the right and then the left wall, *finally* the front part.

The Finders of the Kine-Exakta

REFLEX FINDER. To bring the finder hood of the Kine-Exakta into working position the catch on the back of the finder hood has to be pressed down, when the hood automatically opens up, allowing of observation of the ground-glass screen image up to the moment of exposure. The screen of the Kine-Exakta is actually one side of a plano-convex lens, the lower side of which is matted to form a ground-glass screen, which also acts as a powerful magnifier. Therefore the reflex image seen in the finder hood is bigger than the actual image on the negative, while—naturally—the outlines and definition remain identical. For more critical focusing a built-in magnifier may be employed in addition to the magnifying ground-glass. The magnifier is erect in the front wall of the finder hood; to bring it into position, it is simply pressed inward towards the reflex image, where it will be automatically held by a catch. Looking down, the reflex image appears further enlarged, so that it may be focused with ease and accuracy.

While the first edition of the Kine-Exakta was fitted with a circular magnifier, showing only a comparatively small circular central section of the field, the later models have a bigger, rectangular-shaped magnifier, allowing almost the whole field to be viewed. The magnifier is released from its horizontal position by pressing the small stud in the right-hand bottom corner on the back of the finder hood.

The magnifier of the Kine-Exakta II has a protecting cover which guards the glass against scratches and at the same time excludes stray light from the focusing screen. The magnifier itself shows the whole image, so that the camera can be used without lowering it after critical focusing.

THE FRAME FINDER is brought into position by pressing the magnifying glass in front of the finder hood inwards. The rectangular aperture in the back wall of the finder hood, together with the open frame in the front wall, form a direct vision frame finder for eye-level.

To use the frame finder of Kine Exakta II lift up the magnifier and also the protective cover (p. 27).

THE PRISM FINDER of the Kine-Exakta V, VX, and the Exa gives an eye-level view of the upright and right-way round image on the screen. To change from the reflex to the eye-level finder on the Varex, the sliding bar on the front plate is depressed, while the finder housing is lifted up bodily and replaced by the other finder housing.

Holding the Exaktas

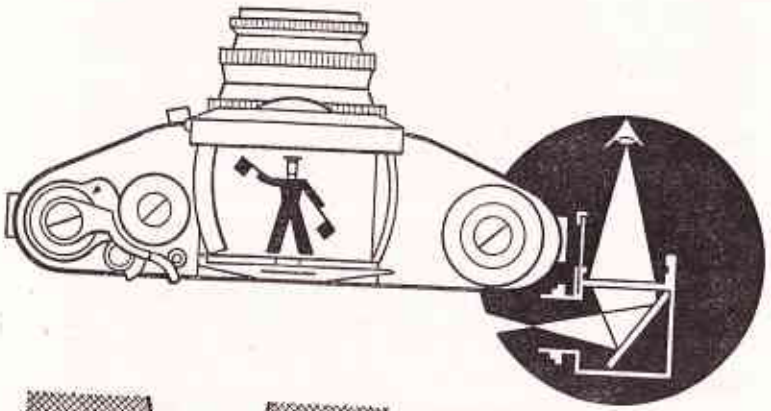
It is obvious that the camera should be held as steady as possible, as the slightest shake, even if not seen in the original negative, will become visible in the enlargement. It is advisable to stand always with your legs apart.

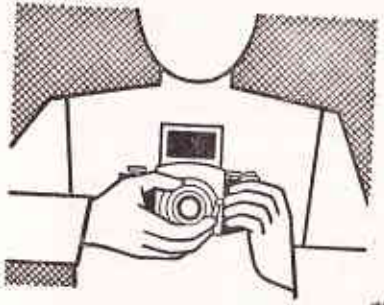
A particularly steady hold of the camera is necessary when working with long-focus lenses (page 58). In this case the centre of gravity is further forward and therefore it is desirable to hold the camera by grasping the helical focusing mount with the right hand, while the left hand steadies the camera and operates the shutter-release.

As the Exaktas are all horizontally built, they obviously lend themselves most simply and naturally to photographs in this position.

When working with the reflex finder at chest-level, the camera should be firmly held with the left hand, the index finger of which should be in position on the release knob, while the right hand supports the camera from underneath the camera-body, which should rest against the palm of

HOLDING THE EXAKTA (p. 29)

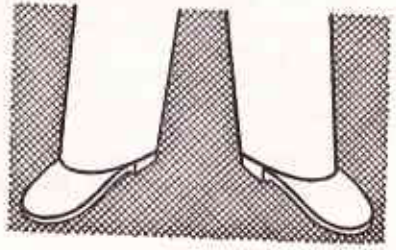




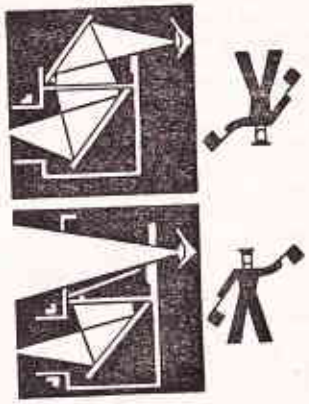
The reflex ground-glass shows an upright side-reversed image of the object to be taken (p. 25).

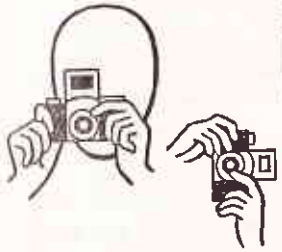
Right hand operates helical focusing mount, while the left holds the camera, the index finger on the release button.

Stand with your legs apart (p. 29).

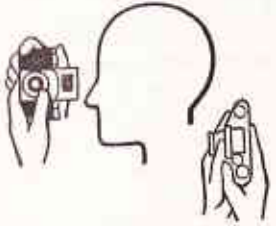


HOLDING THE EXAKTA (p. 29)





Eye-level finder (p. 28) produces a correct image.

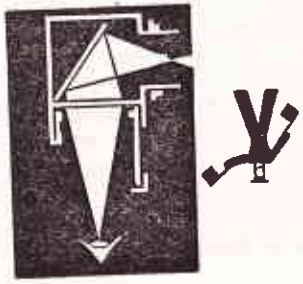


Holding the Exakta for upright pictures (where one works at right angles to the subject).

Photographing over crowd, ecc., by turning camera up-side-down and looking up into the reflex finder.

Shooting from behind a

wall, through a window



over an obstacle, while still observing the reflex image.

the hand, while thumb and index finger support and handle the focusing mount.

Vertical photographs cannot be taken at chest-level. The normal procedure is: hold and focus the camera horizontally, as described before, then raise it to eye-level position, turning it at the same time, so that the focusing screen is vertical and the eye examines the image on it at right angles to the object to be photographed. The lens rests in the fork between thumb and index finger of the left hand, while the right hand supports the camera body, so that its thumb comes to lie against the release knob. One actually works "round the corner".

Alternatively, we can use the eye-level mirror at 45 degrees, and look at and view the subject in the same direction. The image is reversed, but quite easily controlled. The prism attachment can usefully be employed with the Kine Exakta (p. 103).

When working horizontally with the frame finder of any Exakta model and the reflex eye-level finder of the V.P. Exakta, the camera is grasped with both hands, camera-body rested against cheek, keeping both elbows close to the body, the index finger of the left hand on the shutter-release button.

For taking vertical photographs with the frame finder, right and left hands are employed as advised for horizontal photographs, but the camera body is turned 90° to the left so that the right hand holds the Exakta from above and the camera is pressed against the forehead.

To release the shutter (p. 36) the shutter-release button should be pressed with the ball of the left forefinger. Use finger pressure only, keep the hand and its grip steady on the camera. The actual pressing down will have to be done slowly and smoothly. The slower the exposure time, the smoother must be the release. Keep your hand clear of the speed knob while releasing!

For slow exposures in the hand it is advisable, when working at chest-level, to inhale, hold the breath and release smoothly in order to avoid shake.

When using long exposures while holding the camera at eye-level, rest the elbows against some support or at least lean against something stable. In this way 1/10 or more can be risked without incurring camera shake.

When using large aperture and long-focus lenses (pp. 60, 61), stand the Exakta on a table or other flat surface.

Use of a tripod is necessary when taking time exposures and working with the delayed-action release, and it is

recommended for speeds from 1/10 to 1/2 sec. and instantaneous exposures of 1/25 sec. with long-focus lenses.

Shooting with the Exaktas

Shooting with the Exakta A, B, C

1. **Screw out the lens mount to infinity position.**
2. **Wind film transport to next number in film window.**
3. **Set shutter speed.**
4. **Focus and determine picture frame.**
5. **Set stop.**
6. **Release.**

1. The lens, in position of rest, is screwed back into the camera body. (To prevent accidental exposures in this position the shutter cannot be released.) The helical focusing mount has to be turned outward up to a definite stop, bringing the lens into infinity position.
2. The film is wound by the film transporter, while at the same time the film window on the back of the camera body should be observed. The window is covered by a light cover, which has to be pushed and held to the side while winding the film on. As soon as the next film number appears in the centre of the window the film is set. With this action the shutter is automatically wound up and the mirror set ready for focusing and exposure. As already pointed out the gradual winding of the spring of the shutter when transporting the film makes itself felt in a marked increase in resistance. Do not take any notice of this, but make sure that the next number appears in the centre of the window. Wind gently!
3. The shutter speeds from 1/25 to 1/1000 sec., as well as short (B., Ball) and long-time (Z) exposures, are set on the shutter-speed knob by lifting it up, turning the speed required opposite to the red dot on the fixed centre of the speed knob and letting it down again. *The numbers given on the knob indicate fractions of seconds*, so that 25, 50, 100, etc., mean 1/25, 1/50, 1/100 sec. Short time exposures are made by setting B opposite the indicator, when the shutter will remain open as long as the release bottom (used to be a ball on old-time cameras and hence the abbreviation) is pressed. Long time exposures are made by setting Z to the indicator when, on the first pressure of the release button, the shutter will open and a second pressure will close it again.

Exakta Model B and C have, in addition to the normal shutter speed knob, a second one: the slow speed and delayed action knob. This allows of the automatic exposure of speeds from 1/10 to 12 sec. and use of a delayed action release (self-timer) for all shutter speeds from 1/1000 to 6 sec. This is complicated in use and needs care.

TO OPERATE THE SLOW SPEEDS:

(*a*) Set shutter speed knob to B (or Z).
(*b*) Wind slow speed knob *as far as it will possibly turn* in a clockwise direction.
(*c*) Lift slow speed knob up, turn it so that required time in *black* figures comes to lie opposite *black* mark on knob centre and let knob drop back (*see Note on p. 35*).
(*d*) Release *smoothly*.

DELAYED ACTION RELEASE FOR SPEEDS FROM 1/25 TO 1/1000 SEC.:

(*a*) Set shutter speed knob to actual exposure time required.
(*b*) Wind slow speed knob *as far as it will possibly turn* in a clockwise direction.
(*c*) Lift slow speed knob up, turn it so that any *red* figure comes to lie against the *red* mark on the knob centre, and let knob drop back (*see Note on p. 35*).
(*d*) Release *smoothly*.

DELAYED ACTION RELEASE FOR SPEEDS FROM 1/10 TO 6 SEC.:

(*a*) Set shutter speed knob to B (or Z).
(*b*) Wind slow speed knob *as far as it will turn* clockwise.
(*c*) Lift slow speed knob up, turn it so that the exposure time required in *red* comes to lie against the *red* mark on the knob centre and let knob drop back (*see Note on p. 35*).
(*d*) Release *smoothly*.

The "delayed action" time in all cases is about 12 sec.

4. To focus at nearer distances than infinity, the infinity catch has to be pressed down, and it is then possible to screw out the helical focusing mount farther, setting the lens for nearer objects down to 4 or 3 ft. (according to the lens employed). A distance scale is on the front of the camera body, and a distance mark on the helical focusing mount points to the distance at which the lens is set. This arrangement for focusing may be used when the reflex arrangement is not employed for one or the other reason. The normal procedure of focusing, however, is that of focusing the image on the ground-glass screen, by looking into the finder hood and turning the focusing mount until the object is accurately in focus (see p. 24).
5. Adjust the diaphragm by turning the stop ring until the stop required is opposite the indicator. The purpose of the diaphragm is to adjust the effective opening of the lens. The smaller this opening (i.e. when the lens is "stopped down") the greater the depth of focus (p. 61). At the same time, as less light can pass through the lens in any given time, the exposure time must be longer (p. 88). The reduction in light means obviously a reduction in brightness of the reflex image with an increase of depth of focus. Both *loss of light and increased depth of focus make the accurate focusing on the ground-glass more difficult, therefore reflex focusing should always be done at full aperture and the lens stopped down afterwards.*

6. Release by pressing the shutter release knob *gently*, without shaking the camera. The release is blocked as long as the lens has not been set in working position (=to infinity).

◆ *Some Exaktas have one mark only; here slow speed (black) or delayed action (red) figures will have to be set against this mark.*

Shooting with the Kine-Exaktas and the Exakta $2\frac{1}{4} \times 2\frac{1}{4}$ in.

1. Wind film transport.
2. Set shutter speed.
3. Focus and determine picture frame.
4. Set stop.
5. Release.

1. Wind lever as far as it will go and let it spring back *with brake*. Wind *gently!* (With $2\frac{1}{4} \times 2\frac{1}{4}$ in. Exakta the lever has to be *cranked* back.)
2. As Exakta Model B, C (see p. 33, No. 3). On the Exa set the lever to the speed required.
3. Focusing is accomplished by turning the second (back) milled ring which bears the distance markings either until the distance required is opposite the distance mark or by the usual reflex image control (p. 22) until the object appears fully sharp.
4. The stop is set on the lens mount, where the milled front ring with the indication mark can be turned in line with the aperture figure engraved on the lens (see No. 5, p. 34).
5. Release by pressing the shutter release knob *gently*, without shaking the camera. The release knob is blocked as long as the finder hood is closed to protect against accidental release (see No. 1, p. 32).

Shooting with the Exakta Junior

1. Pull out lens.
2. Wind film transport to next number in film window.
3. Set shutter speed.
4. Focus and determine picture frame.
5. Set stop.
6. Release.

1. The lens tube is turned tightly in a clockwise direction and pulled out until it stops. To do this the lens should be held by the ring with the apertures marked on it, and when in this pulled-out position it is focused to infinity.

2/3. As described for Exakta Model A (pp. 32, 34, Nos. 2 and 3).

4. Focusing is done by turning the front cell of the lens either until the distance figure required points to the red tongue or the picture appears sharp on the reflex focusing screen (p. 22).

5/6. As described for Exakta A (p. 34, Nos. 5 and 6).

When testing the camera (or just playing with it) a mistake is frequently made which seems to suggest that there is something wrong with the camera. When the shutter is set to time (Z) and released by the shutter-release button and one turns now to an instantaneous exposure on the shutter-speed knob (for example, 1/50) and releases again after first having wound on, one will find that *the shutter remains open and stops work completely.* The mistake made, of course, is that one should have released twice when using setting Z, one time to open the shutter, the second time to close it again. The trouble may be rectified by turning the shutter-speed knob again to Z and pressing again the shutter-release knob.

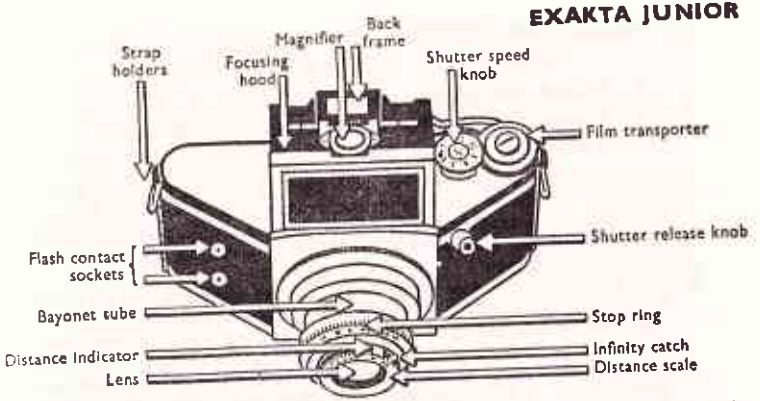
Should it be desired *to get two or more exposures on one film*—for instance in trick or commercial photography, or when by accident the shutter has been released with the lens cap on the lens, and one does not want to leave the frame in question unused, then it is only necessary to wind the shutter-speed knob without lifting it up in an anti-clockwise direction until it comes to a definite stop.

The same procedure may be employed when the shutter has been wound up and one finds that no exposure will be taken for some time. It is advisable to *release the shutter to avoid unnecessary tension* of the shutter-spring and re-set the shutter as directed above before taking the next exposure. This also applies to the other V.P. Exaktas.

The shutter-speed knob and, if used, the slow-speed knob *must be allowed to rotate freely*, responding to the release. Any interference—for example by accidental touch with finger or clothing—would spoil the exposure.

It is of paramount importance that the slow-speed knob, whenever it has to be employed, is wound (1) *after* the shutter has been wound (that is: the film been transported) and (2) is wound up *as far as it will go*, otherwise completely incorrect exposure times will be experienced.

After all exposures have been taken, the film has to be removed from the camera and replaced by a new one.



Loading (p. 16)

Insert empty film spool on film-transporter side. Insert roll-film, fix paper end.

Wind film transporter one turn.

Shooting (p. 33)

Pull out lens.

Wind film-transport to next number in film window.

Focus, determine picture frame, set stop, release.

Unloading (p. 38)

Wind paper end off.

Open camera-back, remove film, transfer empty spool.

Unloading the Exaktas

Unloading the Exakta A, B, C, Junior.

1. Wind off paper end.
2. Open camera-back and remove film.
3. Transfer empty spool.

1. After all eight exposures (or with the $2\frac{1}{4} \times 2\frac{1}{4}$ in. Exakta, 12 exposures) have been taken, the film transporter is wound on until the paper end disappears in the film window; finally, a further three turns on the film transporter are made to wind the paper fully on to the take-up spool.
2. The camera-back is now opened (p. 16) and the film will be found rolled fully on the take-up spool. The take-up spool with film is removed by depressing the small spool-holding bolt. In most cases the film spool will raise itself when pressing the bolt, and can then easily be lifted out. Otherwise it may be gripped with thumb and index finger of the right hand and lifted out. The spool is now firmly fastened by the gummed label adhering to it and is best wrapped up until it is developed.
3. The empty spool in the compartment opposite the film transporter has to be removed (p. 16) and be transferred to the compartment below the film transporter (p. 16).

The camera is now ready to be charged with the next film.

Unloading Exakta $2\frac{1}{4} \times 2\frac{1}{4}$ in.

1. Crank on until "F" appears in film counter window.
2. Release shutter.
3. Wind film off by cranking.
4. Open camera-back and remove film.
5. Transfer empty spool.

1. After all 12 exposures have been taken, one has to crank until "F" (=finish) is visible in film counter window.
3. By cranking on, the "red dot" appears in film counter window.
5. As above, No. 3.

The camera is now ready to be loaded with the next film.

Unloading the Kine-Exakta I, II and V

1. Turn reversing lever so that "R" is seen.
2. Rewind film into cartridge.
3. Open camera-back.
4. Remove cartridge.

5. Turn reversing lever back so that "V" is visible.

1. After the 36 exposures have been taken, turn the reversing lever on camera top plate (situated between film transporter and shutter-speed knob), so that the letter "R" is visible. With the Kine Exakta II fold up the reversing lever against the film transport.
2. Raise rewinder key on camera bottom (opposite film transporter) and turn it clockwise with thumb and index finger. This action winds the exposed film inside the camera from the take-up spool back into the film cartridge. Turn until a slight resistance is felt, *wind over this resistance* and give two or three more turns. The film end now comes off the spring of the take-up spool and is wound back into the film container.
3. Open camera-back (p. 18).
4. The cartridge with the exposed film can now be taken out by pulling the rewind key downwards as far as it will go.
5. Turn reversing lever back so that the letter "V" is visible. With the Kine Exakta II fold down the reversing lever.

The camera is now ready to be loaded with a new film (p. 18). The cartridge should be carefully wrapped up and is ready for developing.

Unloading the Kine-Exakta VX and Exa

When using two cartridges in the Kine-Exakta VX and in the Exa, the procedure is greatly simplified. After taking the 36 exposures, wind the film on several more times, releasing the shutter each time, until the film transport won't go any further. Then open the camera, cut off the film close to the feed cassette and remove the *take-up cartridge*. Transfer the feed cartridge to the take-up chamber, and the camera is ready for reloading.

Changing of Partly-Exposed Film

Replacing a partly exposed film by another one, as might happen if a few colour photographs were made in between some black and white pictures, or a slow-speed film be used instead of a fast one, is an easy matter in the Kine-Exakta. One will have to see how many frames of the film to be removed are taken, by reading the film counter. Now we rewind the film back into its original cartridge (see above No. 2).

One has to be *careful to wind only until a little resistance is felt.* (In the ordinary way this resistance would have to be overcome in order to tear the film end from the take-up spool, but to do so in this instance would be to run the risk of rewinding the whole film into our cartridge, when the film would have to be extricated in the darkroom in order to be able later on to re-insert it into the camera.) The rewound film has to be taken out of the camera. On the beginning of the film we note for reference the number of exposures taken and then put it into a container or wrap it up. Now we can load our camera with another type of film.

To use the partly exposed film again, it has to be loaded into the camera in the usual way (see p. 18). As many exposures as we have already had on the film must now be exposed with the lens cap on the lens. To be on the safe side it is advisable to allow one or two frames more than actually exposed to pass. When making "blind" exposures it is wise—in addition to covering the lens—to stop it fully down and to set the shutter to the highest speed.

With the smaller number of exposures of the V.P. and 2¼×2¼ in. Exaktas the necessity of changing film before one spool is fully used up will rarely arise. Should a change be required, then it is only possible to effect it in the dark-room, by opening the back, lifting the film with both spools out of their chambers and re-winding the film together with its backing paper on to its original spool. A note as to the number of exposures on the film should be made on the film backing paper and the film sealed with a sticky label or rubber band. The new film can now be inserted into the camera in the usual way.

When re-inserting the partly exposed film into a V.P. Exakta, one has only to wind the film transporter until the number of the first unexposed film appears in the window, to carry on with taking in the usual way. With the 2¼×2¼ in. Exakta, the method for re-inserting the film as described for Kine-Exakta (p. 18) is employed. No allowance need be made to be on the safe side for the number of frames exposed

Cutting Off Exposed Film Parts

While nobody will think of cutting off exposed film parts when working with eight or twelve exposure cameras like the Exaktas A, B, C, Junior and Exakta 2¼×2¼ in. and process them separately, i.e. before finishing the spool, the desire to process some of the 36 exposures of the Kine-Exakta without shooting or wasting the whole of the load in the camera might easily arise. For that reason the Kine-Exakta has been fitted with a built-in film cutting knife. The milled knob end of the handle of the knife is on the camera-bottom beside

the rewind knob and, to avoid accidents, screwed into the camera-bottom. To use the knife the milled knob is unscrewed and pulled downwards as far as it will go. This action will draw the knife across the film band and cut the exposed part from the unexposed film, leaving about 1 inch space behind the last exposure. If more space is required —for example, when film clips are used in processing—it is advisable to make one blind exposure before bringing the knife into action, which gives about 2½ in. handling space after the last frame. The camera must now be opened in the darkroom, as the exposed film is not protected when opening the camera-back to remove it. To remove the film, it is simply drawn from the take-up spool, rolled and wrapped up light-tight ready for processing. The end of the unexposed film in the camera is slipped under the spring tongue of the take-up spool. After making sure that the film perforation engages in the film transport sprockets of the camera, the back is closed. Finally one has to push the film counter forward by three divisions, thus allowing for the loss of exposures by cutting and re-inserting. The remaining strip can now be exposed in the normal manner.

If a spare empty cartridge is available, cutting off exposed film parts is very simple on the Kine-Exakta VX and Exa. Make two blind exposures (wind the film and release the shutter twice), open the camera, and cut off the film close to the take-up cassette. Remove the take-up cassette. Attach the film end to the centre spool of the spare cassette. Close the spare cassette and insert in the camera (p. 20, No. 4). Close the camera and carry on photographing.

Single Exposures with Exakta C

The Exakta C, while in construction and handling exactly like Exakta B, has in addition provision in the camera-back to take ground-glass screen and plate holders. It must, however, be clearly understood that when plates are being used the Exakta C does not act as a reflex-camera and *the reflex image in the finder hood cannot be used for focusing or picture finding.* The reason for this is that the plane in which the plate comes to lie is entirely different from that of the roll-film.

To permit the use of the focusing scale on the lens a metal ring is interposed between the lens and the helical focusing mount. When the Exakta C is used as a roll-film camera, the ring remains in position and this camera handled in every respect as the Exakta B. When, however, the plate-back is employed, its plane lies somewhat behind the roll-film plane, and the lens must recede this distance to make focusing scale and infinity position harmonize again. This is done by removing the intermediate ring. By turning the diaphragm ring of the lens to the left, the lens is screwed out, the intermediate ring can be removed and the lens replaced. To focus on the ground-glass screen, this is pushed on the plate-holder frame in the camera-back which normally holds the film pressure back, the shutter set to "Z" and opened. The image can now be focused on this screen. This done, the

shutter has to be closed, the film winder turned at least three times and the exposure time to be set. Now pull out the focusing screen, and the dark-slide loaded with a plate or cut-film can then be inserted instead. Finally, the slide-cover is removed and the exposure made. After re-inserting the slide-cover the plate holder is removed, and its exposed negative ready for processing. To change back to roll-film, the slide with film-pressure plate takes its place in the slide holder of the camera-back and the intermediate ring has to be re-inserted.

More Exposures on Roll-film

By means of a little trick it is possible to produce nine exposures on the ordinary eight-exposure film of the V.P. Exakta. One should proceed as follows: Instead of winding the film until number one appears in the film-window for the first exposure, one should only wind until the second dot (which precedes the film numbers) is in the middle of the window, and expose in this position. This procedure should be maintained for the eight exposures. When transporting the film to the eighth exposure, the number of turns will have to be noted and after taking the eighth picture, the transporter has to be wound on exactly the same number of turns as one has counted before. Now it is possible to make a ninth exposure.

13 Exposures with the 2¼ × 2¼ in. Exaktas: The automatic film counter is set when the first warning dot (before No. 1) appears. Then the exposures 1 to 12 are taken in the usual way. To get the thirteenth frame, one winds further to sign "F" and exposes there again. After that the film is wound off in the usual way.

EXAKTA FILMS

The V.P. Exaktas use the Standard Roll-film 2½ × 1⅝ in. (4 × 6.5 cm.), which is known as "Vest-Pocket", "127", "27", or "A8" film for 8 exposures.

The 2¼ × 2¼ in. Exakta uses the Standard 3¼ × 2¼ in. Roll-film, which is known as "Brownie 2", "120", "20", or "B2" film, for 12 exposures 2¼ × 2¼ in. (6 × 6 cm.).

The Kine-Exakta uses the standard perforated cine-film of 35 mm. width for 36 exposures 1½ × 1 in. (24 × 36 mm.).

While the films for V.P. Exakta and 2¼ × 2¼ in. Exaktas are only obtainable as the above-mentioned Standard spools, there are different possibilities of obtaining 35 mm. film for the Kine-Exakta. We shall devote most of this chapter to the latter subject.

DAYLIGHT FILM CARTRIDGE. The film is supplied in a cartridge of tin, cardboard or plastic material, which is light tight, so that it can be placed into the camera and removed in daylight. These daylight films are the same as used on *Leica, Contax, Retina* and similar cameras.

DAYLIGHT REFILL FILM. The film is supplied on a centre spool and covered with a front trailer to render it light tight. The daylight refills have to be used in an empty cartridge and can be loaded in daylight into the cartridge.

DARKROOM REFILL FILM. These are ready-cut film strips for 36 exposures, which must be loaded into an empty cartridge in the darkroom.

BULK FILM. Uncut 35 mm. film in lengths of 18 to 200 ft., from which lengths may be cut, trimmed, loaded into an empty cartridge (see p. 46).

While the insertion of the loaded cartridge is described on p. 18, we have to see how the cartridge itself is loaded with a suitable length of film in the darkroom.

Safelight

In the case of *panchromatic* films (p. 48) only the dark *green* "panchro-safelight" may be used, but it is safest to work in complete darkness. This is not difficult. It is,

however, advisable first to practise filling with a dummy film in daylight before starting darkroom work.

Orthochromatic films (p. 48) are only available in roll films; these need no darkroom anyway.

In the case of *positive* film (p. 49) *amber* light will do.

Handling, Winding and Trimming the Film

When handling the actual film, particular care must be taken *not to touch its emulsion (matt) side.* It should only be handled and spooled on to the centre spool of the cartridge by holding the film on either side of its edge, preferably between thumb and index finger (p. 45). At the same time, it is of no less importance that the spot on which the loading is done should be perfectly dry, clean and dust free. Only a spotless, clean negative will produce the desired result!

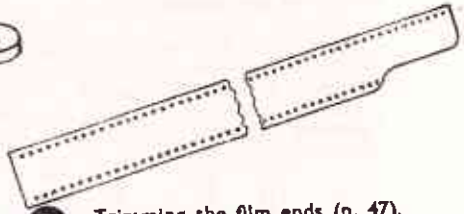
When using bulk film in loading cartridges, the edge of the work-bench can be marked with notches or drawing-pins to indicate various distances, let us say for 12, 24, 36 exposures of film. This considerably simplifies the measuring of film lengths in the darkroom.

The film ends need trimming. At the beginning of the roll of film make either a straight or wedge-shaped cut for the centre spool of the cartridge and measure off the required length of film (see table, p. 46). At the end of this make the curved cut for the take-up spool (p. 45). The curved cut should start between the ninth and tenth bottom perforation—when emulsion is towards you—and must not go through a perforation hole.

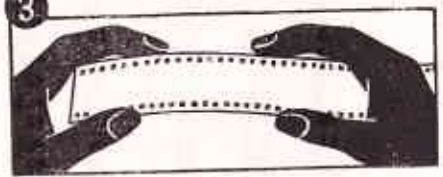
The ready-cut film is now spooled on the centre spool of the cartridge, as described on p. 47. One will have to make sure, while winding on, to hold the film only by its edges.

When winding the film on and off, care must be taken that no great pressure is put on the film, and that the film-ends are not squeezed when drawing through the hand. Failure to take the first precaution may result in fogging, while neglect of the latter precaution may give rise to peculiar kinds of exposure effects known as "lightning flashes", These are due to electrical discharges, and appear as dark.

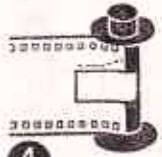
1 Complete cartridge (= cassette) shell, centre spool and top cover (p. 46)



2 Trimming the film ends (p. 47).



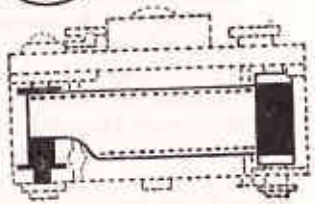
3 How to hold the miniature film (p. 47).



4 Fixing the inner film end on centre spool of cartridge (p. 47).

5 Winding film on centre spool (p. 47).

6 Inserting loaded centre spool into cartridge-shell (p. 47).



7 Inserting loaded cartridge into Kine Exakta (p. 18).

zigzag lines running from the edge of the film towards the centre of the picture.

LENGTH OF FILM REQUIRED FOR ANY NUMBER OF EXPOSURES

Number of Exposures	Length of Film Required		Number of Exposures	Length of Film Required		Number of Exposures	Length of Film Required	
	in.	cm.		in.	cm.		in.	cm.
1	11¾	30	14	31¾	80	27	51	130
2	13⅓	34	15	33	84	28	52½	133
3	15	38	16	34½	88	29	54	137
4	16¼	41	17	36¼	92	30	55½	141
5	17¾	45	18	37¾	96	31	57	145
6	19¼	49	19	39¼	100	32	58½	148
7	20¾	53	20	40½	103	33	60	152
8	22	56	21	42	107	34	61½	156
9	23¾	60	22	43¾	111	35	63	160
10	25¼	64	23	45	114	36	64½	164
11	26¾	68	24	46½	118	37	66	167
12	28½	72	25	48	122	38	67½	171
13	30	76	26	49½	126	Including trimming		

Loading Cartridges

The majority of cartridges consist of a centre spool which is in a shell with top and bottom cover. The film leaves the shell by a light-trapped slot (the cartridge-mouth). The centre spool can be removed from the shell by removing either top or bottom of the cartridge, according to the construction of the particular container.

Most of the cartridges are actually intended by their makers to be used once only, and with the film originally supplied in it. This refers particularly to *Kodak* and *Agfa* cartridges. A number of cartridges made from plastic material—for example, *Ilford*, *Gevaert*, *Mimosa* and others—are designed to be reloaded. Up to some time ago the question of reloading of cartridges rarely arose, as Daylight films were plentiful.

But under present conditions we have to face the fact that metal, labour, and production for non-essentials is reduced to an absolute minimum, and the photographer, too, has to economize to the limit in order to be able to carry on. When we suggest reloading cartridges, even if they are marked "not reloadable", it is for two reasons: (1) To overcome the present difficulties of supply, and (2) It is now an established fact that these cartridges *can* be reloaded many times, and will give perfectly satisfactory results—*if handled carefully*. The following table shows which daylight refills will fit the various cartridges.

RELOADABLE CARTRIDGES AND DAYLIGHT REFILLS

Make of Daylight Refills:	Ilford Plastic Cartridge	Ilford Metal (Old) Cartridge	Kodak Metal Cartridge	Gevaert Plastic Cartridge	Mimosa Plastic Cartridge	Agfa Metal Cartridge
Kodak	No	Yes	Yes	No	No	Yes
Ilford	Yes	Yes	No	Yes	Yes	Yes

Cartridges with Bulk film or Darkroom Refills

1. **Work in the darkroom in appropriate safelight.**
2. **Prepare film.**
3. **Open cartridge.**
4. **Fix film on centre spool.**
5. **Wind film on centre spool.**
6. **Insert centre spool into shell; the first 2 in. of film has to look out of the light-trap.**
7. **Close cartridge.**

2. As described on p. 44.
3. As described on p. 46.
4. If the centre spool is fitted with a film catch, thread the tapered end of the film into it. In cases where the centre spool is fitted with a spring, thread the end under it and fold it sharply back. If the centre spool is without any suitable fitting to hold the film, as is the case with most *Kodak* and *Agfa* cartridges, it has been proved best to wind a 1½ in. (4 cm.) piece of Cellophane tape (for example, *Kodak* Cellophane Lantern Slide Binding Tape) round the centre spool, so that on either side about ¼ in. tape is used to secure the film. (See p. 45).
7. When using *Agfa* cartridges, it is essential to fix top and bottom cover to the shell, preferably with a length of Cellophane tape.

Cartridges with Daylight Refills

1. **No darkroom is necessary.**
2. **Remove film wrappings and label of refill.**
3. **Open cartridge.**
4. **Introduce refill into shell of cartridge; the first 2 in. of paper-leader has to look out of light-trap.**
5. **Close cartridge.**
6. **Pull out paper-leader and 2 in. of film.**
7. **Cut off paper-leader.**

4. The actual centre spool of the cartridge is not needed.
7. When using *Agfa* cartridges (but *not* for *Kodak, Ilford, Gevaert, Mimosa*, etc.) it is essential to fix top or bottom cover to the shell preferably with a length of Cellophane tape.

The Choice of Material

There is no such things as a "best" film for any or every kind of picture. Each type of film has certain characteristics, especially with regard to colour sensitivity, speed, gradation, latitude, and, more particularly, grain.

ORTHOCHROMATISM AND PANCHROMATISM. The ordinary "silver bromide" emulsion is only sensitive to violet and blue light, and therefore bound to give an untrue black and white rendering when taking photographs of subjects containing yellow, green and/or red (as practically all objects do). An improvement has been made in the orthochromatic emulsion which is sensitive also to yellow and green, while the panchromatic film has been made sensitive not only to violet, blue, yellow and green, but also to red. Some particularly fast panchromatic films are oversensitive to red and will render this colour too light. The advantages of having a negative material sensitive to all colours—violet, blue, yellow, green and red—are so striking that it was evident that the genuine panchromatic film should displace the other film types for general purposes. Still, for subjects not containing red (green landscapes) or when lighting conditions tend to blot out reds too much (lips of portraits taken in incandescent light), orthochromatic materials come in very usefully.

INFRA-RED FILM. Infra-red film is a negative material which, unlike the orthochromatic and panchromatic films, is made sensitive to infra-red rays, which are not visible to the human eye. Special applications of this material: black-out photography, long-distance shots, mist penetration, scientific copying and research work.

ORDINARY FILM. Not made as roll-film, but only available as 35 mm. film for Kine-Exakta. For copying black and white objects (books, ledgers, etc.), a "positive film" of 3° to 10° Scheiner can be recommended. Besides its qualities of fine grain and high brilliancy, it possesses the further advantage that it can be handled in an amber darkroom light.

SPEED. The sensitivity of film materials to light in general is measured in *Scheiner, Hurter and Driffield, Weston or DIN* degrees. Scientists and manufacturers all agree that none of the methods employed to determine the speed of films is entirely satisfactory, and continue giving preference to one or the other of them. In any case, although speed is a very obvious asset, it is also a quality which must be paid for by possible disadvantages of the material in some other respect. To call the fastest film the best would be just as foolish as to select a racing car for daily motoring.

While a scientifically correct conversion of one speed rating system to another cannot be made owing to their different principles, the following list gives some guidance as to their practical relationship.

CONVERSION OF DIFFERENT SPEED DEGREES

BS & ASA Index (Logar.)	*BS & ASA Index (Arithm.)*	*European Scheiner*	*Weston Speed*	*G.E. Speed*	*DIN*	*H. & D.*
13°	1.5	14°	1.2	2	3/10°	60
16°	3	17°	2.5	4	6/10°	120
19°	6	20°	5	8	9/10°	250
22°	12	23°	10	16	12/10°	500
25°	25	26°	20	32	15/10°	1000
28°	50	29°	40	64	18/10°	2000
31°	100	32°	80	125	21/10°	4000

In this table each value represents twice as fast a film speed as the one immediately above it. In some systems this doubling of film speed means increasing the speed number by 3 each time. (Scheiner, B.S. Log. Index, DIN) while in others the film speed itself is proportional to the exposure required (B.S. Arith. Index, Weston, G.E., H. & D.).

Slow films of less than about 26° Sch. can be usefully employed

for scientific photography, copying, architectural details. Their main advantage is in their extremely fine grain making special development unnecessary. Their disadvantage is in their inability to cope with live subjects in other than exceptionally favourable lighting conditions, lack of latitude and mostly hard gradation.

Medium films of 26–29° Sch. are the right material for the beginner, and can be well employed for any of the average subjects. Their advantages are: reasonably fine grain without the use of too complicated methods of development, correct tone rendering, good resolving power. Disadvantages: further loss of speed if fine grain development has to be employed for the sake of big enlargements.

Fast films of 31° Sch. and over for high-speed sport shots, interiors, stage pictures and night photography. Advantages: increased sensitivity for red (artificial light), use of smaller apertures (depth of focus) which in their turn facilitate focusing under adverse conditions of lighting. Disadvantages: graininess which, however, can be improved by special methods of developing (at some cost of speed) and somewhat uneven tone rendering (reds too light).

GRAIN. Silver grains themselves form the picture in the emulsion. To the naked eye they form a compact, dark mass, but under the magnifying glass or microscope the separate clumps of grains are visible. Obviously, if the grain of a small negative (V.P. and Kine-Exakta) is coarse, it will soon become visible by moderate enlarging, and the finer the structure of grain, the more enlarging will it allow without showing any unpleasant granular effect in the print. As a rule, it can be said that the grain size is in direct relation to the speed of the film (p. 49). The faster the film, the coarser the grain and vice-versa. It may be pointed out at the same time that the grain can to a certain extent be influenced by development (hence fine-grain development), correct exposure, choice of paper, etc.

GRADATION. Each film has an ability of its own to reproduce various degrees of brightness on its emulsion. If the ability of a film is confined to only a small number of black-grey-white tones, we speak of a "high contrast" or hard negative material. If it is able to reproduce many delicate shades of grey between black and white, it is known as a "low contrast", or "soft" film. Generally speaking, low speed films of fine grain possess a higher contrast than fast films, which are softer.

LATITUDE. Latitude is the ability of the film to yield usable negatives, even with a certain amount of under- or (more often) over-exposure. Films praised for particularly wide latitude may facilitate exposure, but are likely to have less "resolving power", causing loss of definition which in big enlargements is just as unpleasant as graininess.

Our negative material has a number of additional properties which help towards good results. There is a special "protective coating", a hardened gelatine layer on top of the actual sensitive layer which protects against scratches. The base has been coloured, as a rule grey, in order to avoid reflection of the light coming through the emulsion on the film-back and thus causing halation.

CHARACTERISTICS OF SOME FILMS

Make	Type	Speed in Scheiner	Grain	Resolving Power	Gradation
Agfa					
Isochrom F	O	29°	fg	35	n
Isopan F	P	27°	ef	45	n
Isopan ISS	R	32°	mg	35	n/s
Dufay					
Ortho	O	28°	fg	35	n
Pan	P	28°	fg	35	n
Ensign					
F.G. Pan	P	27°	ef	45	n
Ultrachrome	O	29°	fg	35	n
Ultrapan	R	31°	mg	35	n/s
Ferrania					
Super Pancro	R	32°	mg	35	n/s
Ultracromatica	O	30°	fg	35	n
Gevaert					
Microgran	P	27°	ef	50	n
Panchromosa	R	32°	mg	35	n/s
Superchrome	O	29°	fg	35	n
Ilford					
H.P.3	R	32°	mf	35	n/s
F.P.3	P	29°	ef	45	n
Pan F	P	23°	uf	60	n
Selochrome	O	29°	fg	35	n
Kodak					
Panatomic X	P	27°	ef	45	n
Plus X	P	29°	fg	40	n
Super XX	P	32°	mg	35	n/s
Verichrome	O	29°	fg	35	n

Index of Abbreviations in above Table

TYPE: O=orthochromatic, P=panchromatic, R=panchromatic with increased red sensitivity.

GRAIN: ef=extra fine grain, fg=fine grain, mg=medium fine grain, uf=ultra fine grain.

RESOLVING POWER: Expressed here in lines per mm. These values are arrived at under standard conditions and development in D.76 Developer.

GRADATION: n=normal, n/s=normal tending to soft.

DIFFERENCE BETWEEN LARGER AND SMALLER FILMS. *While "120" size roll-films are sold under the same name as the "127" and 35 mm. films, they have as a rule somewhat modified emulsions. 35 mm. films are therefore generally treated as "Miniature" material, which has to stand greater enlargement than the roll-film made for larger picture sizes. The 1½ × 1 in. field of the Kine-Exakta is less than a quarter of that of the 2¼ × 2¼ in. Exakta, and will have to be enlarged considerably more to result in the same size print, and the miniature emulsions are therefore of somewhat finer grain and lower contrast than the "120" size film.*

Colour Film

There are two types of colour films suitable for the Exakta.

One is represented by Agfa Color, Ansco Color, Ektachrome, Gevacolor, Ilford Colour, and Kodachrome films with three emulsion layers, between each pair of which is an extremely fine membrane. The top layer records the blue part of the image, the middle one the green, and the lowest layer the red. It is the combination of the three images that reproduces the picture in natural colour.

Most of these are available only as 35 mm. film, and can therefore be used only with the Kine Exakta I and II models.

A variation is Kodacolor and Agfacolor Negative. These give a colour negative, that is to say, a film showing the colours complementary to the actual ones. From this colour negative colour or black-and-white enlargements can be made.

The second type, Dufaycolor, uses instead of the three separate layers one single panchromatic emulsion layer with a three-colour reseau printed on the base. This produces in the finished transparency a geometrical mosaic of blue and green squares separated by red lines. The single spots of colour are so extremely small that they appear to our eye to form an even-coloured surface. The coloured image is made up of these small colour elements.

From any of these colour materials both transparencies for projection and viewing in a colour transparency viewer as well as enlargements in natural colour or black-and-white may be obtained.

COLOUR FILMS ON THE MARKET

Film	*Type*	*Speed in Scheiner*	*Processing*	*Conversion Filter*	*Speed Sch. with Conversion Filter*
Agfacolor	Daylight	24°	Maker	—	—
Agfacolor	Tungsten	24°	Maker	—	—
Ansco Color	Daylight	24°	Trade, user	Ansco 10*	18°
Ansco Color	Tungsten	24°	Trade, user	Ansco 11**	23°
Dufaycolor	Daylight with filter	22°	Maker, user	—	—
Dufaycolor	Artificial light with filter	13°	Maker, user	—	—
Ilford Colour†	Daylight (Type D)	22°	Maker only	Ilford 315*	19°
Ilford Colour†	Artificial light (Type A)	22°	Maker only	Ilford 151**	21°
Kodachrome†	Daylight (Type D)	21°	Maker only	Wratten 80*	15°
Kodachrome†	Artificial light (Type A)	22°	Maker only	Wratten 85**	21°

Some films are available as 35 mm. film only (†). *Conversion filter to correct daylight film for use in artificial light, or ** artificial light film for use in daylight.

EXPOSING COLOUR FILM. The exposure latitude of colour film is very small. It is therefore important to ascertain the exposure time accurately with a reliable photo-electric exposure meter. Under-exposed and over-exposed films not only produce dense or weak transparencies but also the colour values are distorted. Over-exposure produces pale, diluted colours; under-exposure gives hard deep colours.

Avoid great contrast such as deep shadows; preferably have the light coming from behind you.

For photographs by daylight use daylight type film. Load your camera with artificial light film when taking pictures indoors by the light of high power electric bulbs (use Tungsten or Type B film) or Photofloods (use Type A film). Daylight film may be used in artificial light and vice versa with the special conversion filters recommended by the manufacturers (see table above).

DISPLAYING THE COLOUR PICTURE. The colour transparency can be viewed in a variety of transparency viewers. The simplest consists of a magnifying glass set in a frame into which the picture can be inserted. If the viewer is held against a bright background, the picture appears enlarged and well lit. More elaborate viewers have an artificial light source of their own.

Another way is to project the transparency in a projector which will throw a large image on a screen.

Finally, you can make colour prints from the transparencies. This is a comparatively complicated process, but there are firms who specialise in this service.

EXAKTA LENSES

A wide range of lenses has been fitted to the Exakta cameras. Practically any 7.5 cm. (3 in.) lens on the market could on application be had with the V.P. model. Some of these lenses were marketed by the manufacturers of the camera, some quite independently of them. For that reason one may find V.P. Exaktas with lenses not listed in this book. The author has come across: Steinheil-Cassars, Rodenstock-Trinars and Eurynars, Meyer-Plasmats, Friedrich-Coronars, Schneider-Radionars and others as "standard" lenses in the V.P. Exakta cameras.

The standard lenses of the Kine-Exakta are of 5 cm. (2 in.) focal length, those of the $2\frac{1}{4} \times 2\frac{1}{4}$ in. Exakta of 8 cm. ($3\frac{3}{16}$ in.). Here again more than one make will be found to appear as a "standard" lens.

Lenses of any focal length up to about 50 cm. and of any aperture can be interchanged with the "standard" lens in any of the Exakta cameras with the exception of the Exakta Junior, which is firmly fitted with a front cell focusing Exaktar *f* 4.5 7.5 cm. lens and does not allow of the use of other lenses.

A most important feature of the construction of the Exaktas is that, whatever lens may be employed, the correct image and perfect accurate focusing is obtained in the mirror reflex housing. Consequently no special finders are needed, as this at the same time does away with parallax (p. 5), no matter how short or how long the focal length of the lens.

This statement, of course, cannot hold good for the auxiliary *frame-finder* device. While the frame finder is correct only for the standard lenses it can be employed with a fair degree of accuracy when working with lenses of longer focal length by inserting masks into the front sight. These masks are in some cases supplied with the lenses in question.

The diaphragm on the Exaktas is adjusted by means of a milled ring engraved with the aperture figures on the lens mount.

The mounts of the lenses are arranged so that accessories (filters, supplementaries, lens hood) can be slipped on.

Setting and Changing Lenses

THE V.P. EXAKTAS carry their lens screwed into the front of the helical focusing mount. To bring the lens into working position it is essential to screw the focusing mount forward to a definite stop. This is the infinity setting of the lens. This preliminary procedure *cannot be forgotten*, as otherwise neither the reflex image would be visible (the built-in mirror diverting the light rays could not swing into position) nor could the shutter-release knob be operated.

To set the lens for nearer distances, the infinity catch has to be pressed down, when the helical focusing mount can be screwed further forwards, allowing near focusing down to about 3 ft. (the exact figure depending on the lens employed).

The distance figures—as a rule in feet, sometimes in metres—are shown on the back of the focusing mount, while the distance indicator is engraved on the focusing thread.

To remove and interchange the lenses, one simply has to hold the focusing mount, while at the same time turning the front of the lens mount anti-clockwise, when it will unscrew from its socket.

KINE EXAKTAS AND 2¼×2¼ in. EXAKTA use lenses in a focusing mount. That is to say, the lens itself is fitted with a helical focusing mount. When screwing the mount right back it is in infinity position.

The focusing for nearer distance is done simply by screwing the lens mount further out.

The focusing mount bears a distance scale, as a rule in feet, sometimes in metres, with an index indicating the distance to which the lens has been set.

To remove the lens, it has to be held firmly in the left hand, while at the same time pressing the lens catch lightly with the right hand and simultaneously turning the lens firmly to the left. After turning a few degrees, it will be found that the lens disengages and can be lifted from the camera-body.

To insert a lens, this procedure is reversed. The lens is held into the tubular mount of the camera-body, care being taken that the red dot on the lens comes to lie opposite the red dot on the camera-body. Now the lens and mount are turned firmly to the right until the lens catch is heard and seen to slip into the catch on the lens mount.

A *depth of field calculator* is engraved on the lens mount of the lenses for Kine and 2¼×2¼ in. Exaktas. On either side of the distance indicator the aperture values will be found engraved. After focusing with the mirror reflex arrangement or by setting the index mark to the distance required, one can read off opposite the left-hand side stop the depth of field to the foreground and the right-hand side stop the depth of field to the background (see p. 63).

The treatment and care of lenses is a matter of importance. On account of its chemical composition, optical glass of high quality is susceptible to the influence of moisture, and for this reason touching the glass with the fingers should be avoided. When not in use the lens should be protected by putting on the lens cover or at least by a lined case. Since complete protection is impossible, the lens surface should be cleaned occasionally with a clean, soft chamois leather.

The Choice of Lenses

The Exaktar f 3.5, Xenars and Tessars f 3.5 and f 2.8 can be regarded as "standard" lenses for the Exaktas and the most suitable for general use.

It is wrong to assume that the high correction of the large aperture lenses enables one to use them invariably at their full opening. It will be appreciated that the depth of focus (p. 63) of these high aperture lenses can only be comparatively small at their original aperture, so that, for instance, more often than not stopping down becomes necessary. *Large apertures are, however, a very welcome reserve to be used under adverse lighting conditions and, in any case, they ensure a bright focusing image on the ground-glass.*

The possession of one or more of the longer focal length lenses may tempt the owner to use them more frequently than necessary. It must be remembered that focusing a lens of long focal length has to be done more accurately, as, again, the depth of focus is considerably more limited than with lenses of shorter focal length. At the same time, owing to the longer axis, slow exposure speeds of 1/50, 1/25 with these lenses tend more easily to camera shake—if a rigid tripod is not used—than with lenses of normal focal length.

All standard Exakta lenses may be used in enlargers fitted with an Exakta flange.

The latest development in improving the performance of a lens is the process generally called coating or blooming. It consists of the application of a microscopically fine deposit of some inorganic substance on the glass surfaces, which reduces considerably the light reflection between glass to air surfaces in the lens. The gain will be fully appreciated if it is understood that for example in a Tessar f 3.5 the loss of light due to surface reflection is in the region of 30 per cent., which can be reduced by coating to about 5 per cent. Apart from the gain in speed of the lens which may be in actual practice 50 per cent. (half a stop) it is of rather greater importance that the scatter of light which

impairs the contrast of the image is eliminated, giving a more brilliant negative, especially in the regions where the tones are most subdued and where consequently brilliance and contrast are most needed.

A few lenses, manufactured very recently have been coated before assembly. Non-treated lenses can efficiently be coated by reliable optical manufacturers. The fact that a lens is coated can be recognized by observing a reflection in the lens of, let us say a lamp. It appears distinctly coloured, as a rule rather deep blue with a tinge of red.

Standard Lenses

TESSAR *f* 3.5 for Kine-Exakta of 5 cm. (2 In.) focal length, for V.P. Exakta of 7.5 cm. (3 In.) focal length and for 2¼ × 2¼ in. Exakta of 8 cm. (3⅛ in.) focal length may be called a universal type suitable for all average exposures including landscapes, portraits, street scenes, etc., except in conditions of poor light. At full aperture the definition at the edges of the picture is still needle sharp.

XENAR *f* 3.5 for V.P. Exaktas of 7.5 cm. (3 In.) focal length (not supplied for Kine-Exakta and 2¼ × 2¼ in. Exakta) is of similar performance to the Tessar, and in quality no difference will be found for all practical purposes.

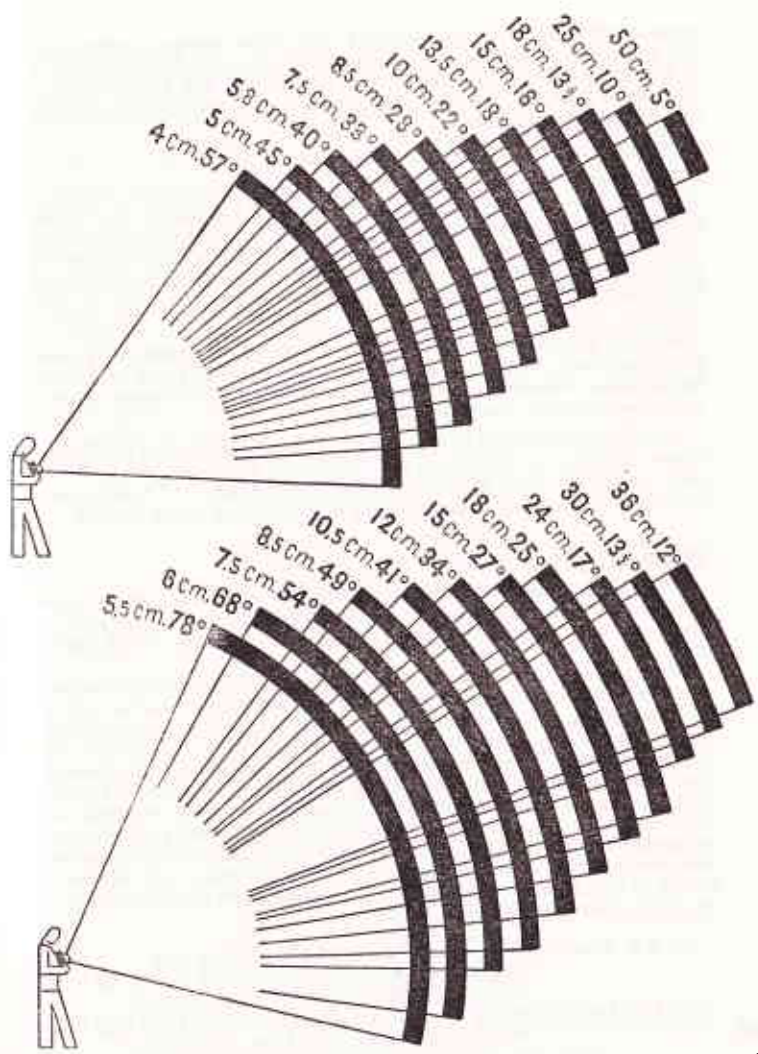
TESSAR *f* 2.8, of the same focal length as Indicated for the Tessar *f* 3.5, is similar In design and quality to this lens. It passes over 50 per cent. more light at full aperture than the former. It has a particularly even illumination all over the negative. Its field of application is similar to that of the other Tessar and it is also suitable for more unfavourable light conditions.

XENAR *f* 2.8 of 7.5 cm. (3 in.) focal length is only available for the V.P. Exakta. It is of similar performance to the Tessar *f* 2.8, and in quality no difference will be found for all practical purposes.

XENON *f* 2 of 8 cm. (3⅛ in.) focal length for V.P. Exakta, of 5 cm. (2 In) for Kine-Exakta (not available for 2¼ × 2¼ in. Exakta) may be considered as the all-round lens of wide aperture for the Exaktas. Apart from average subjects of all types, the particular field of its application is in artificial light work, Interiors, the theatre, as well as photography of rapid movements. The definition is to be considered as very good even with full aperture, and it has great brilliance and covering power. The correction remains undiminished at smaller apertures.

BIOTAR *f* 2 of 8 cm. (3⅛ In.) focal length for V.P. Exakta, of 5.8 cm. (2¼ in.) for Kine-Exakta (not available for 2¼ × 2¼ in. Exakta) is of similar performance to the Xenon *f* 2. The optical qualities are, if anything, slightly superior to the Xenon as regards even light distribution In the furthest corners of the image in the case of the V.P. Exakta and the retaining of fullest correction when fully stopped down.

PRIMOPLAN *f* 1.9 of 8 cm. (3⅛ in.) focal length for V.P. Exakta and of 5.8 cm. (2¼ in.) focal length for Kine-Exakta, has the largest aperture of all Exakta lenses. In spite of the increased aperture it has a good



The fields covered by the Exakta lenses (pp. 61-62) of various focal length. The lenses of the Kine Exakta are shown in the top drawing; the lenses of the V.P. Exaktas below.

standard of definition. It tends to a very slight degree of softness at full aperture and is gradually improved when stopped down to *f* 6.3. It will be preferred by photographers who need fast shutter speeds in artificial light, e.g. for night and theatre work; it is also very suitable for portrait photography.

SUPER SIX *f* 1.9. Similar to "Primoplan".

EXAKTAR *f* 3.5 of 7.5 cm. (3 in.) focal length for the V.P. Exaktas, and of 5.4 cm. ($2\frac{1}{8}$ in.) focal length for the Kine-Exakta, is a three component lens (Cooke type), with a similar field of application to the Tessar *f* 3.5. In spite of the lower cost one will find that this lens is of quite good definition at full aperture and can be gradually improved by stopping down, though it is not up to the standard of the Tessars.

IHAGEE ANASTIGMAT *f* 3.5 of 7.5 cm. (3 in.) focal length for the V.P. Exakta and of 8.5 cm. ($3\frac{3}{8}$ in.) focal length for the $2\frac{1}{4} \times 2\frac{1}{4}$ in. Exakta has an identical field of application to the "Exaktar" described before; their performances also are identical.

IHAGEE ANASTIGMAT *f* 4.5 of 7.5 cm. (3 in.) is built into the Exakta Junior. It is equal in quality to the "Exaktar", but passes about 50 per cent. less of the light at full aperture than the latter. Consequently its field of application under poor light condition is more limited.

Wide-Angle Lenses

Wide-angle lenses have shorter focal length and show a wider angle of view than the standard lenses. The increase in the field covered as compared with the standard Exakta lenses is indicated in the tables on p. 62.

Wide-angle lenses will be found particularly useful for taking interiors where as wide a field as possible should be reproduced, also for taking large groups, for photographing in narrow streets—in fact, everywhere where the distance subject-camera is restricted. Perspective, as depicted by a wide-angle lens, appears the more exaggerated the shorter the focal length of the lens. The exaggeration of perspective of the wide-angle lenses can be put to good use in special cases—for example, to enhance the foreground of a composition or to introduce some other deliberate distortion. One has to put up with the fact that the illumination towards the edges of negatives taken with wide-angle lenses is bound to fall off to a slight degree. This can be offset (to some degree) by giving generous exposure times.

For V.P. Exakta: Wide-Angle Tessar *f* 8 5.5 cm. ($2\frac{3}{16}$ in.).
Meyer Wide-Angle Anastigmat *f* 6.8 5.6 cm. ($2\frac{1}{4}$ in.).
Dallmeyer Wide-Angle *f* 11 6 cm. ($2\frac{3}{8}$ in.).

For Kine Exaktas: Meyer Wide-Angle Anastigmat *f* 4.5 4 cm. ($1\frac{9}{16}$ in.),
Wide-Angle Tessar *f* 4.5 4 cm. ($1\frac{9}{16}$ in.).

Tele Lenses

Tele lenses for the Exakta are either just lenses of longer focal length than the standard lens, or special constructions giving a smaller angle of view than normal and reproducing this reduced field bigger on the negative. The decrease in field compared with the standard Exakta lens is shown in the tables on p. 62.

Given the same size negative and the same distance between camera and subject, the longer the focal length the larger is the reproduction of the subject. Tele lenses are thus particularly useful for far-distance work, such as photographing mountains or architectural details, where one cannot approach near to the object; this is also the case when taking animals, sports photographs and portraits, where the mellowed perspective which can be got with the longer focus lens from an increased working distance is pictorially advantageous. The disadvantage of long-focus lenses is that they yield less depth of focus than the standard lenses and thus should be focused more carefully. Also their size and weight have an adverse influence on our steady grip of the camera, making it advisable to operate longish exposure times with the camera fixed on a tripod.

For V.P. Exakta: Ihagee Anastigmat *f* 4.5 10.5 cm. ($4\frac{1}{4}$ in.).
Telephoto Lens Dallon *f* 5.6 15 cm. (6 in.).
Tele Tessar *f* 6.3 12 cm. ($4\frac{3}{4}$ in.).
Tele Megor *f* 5.5 15 cm. (6 in.).
Tele Megor *f* 5.5 18 cm. ($7\frac{1}{8}$ in.).
Tele Tessar *f* 6.3 18 cm. ($7\frac{1}{8}$ in.).
Tele Megor *f* 5.5 25 cm. (10 in.).
Tele Tessar *f* 6.3 25 cm. (10 in.).
Tele Xenar *f* 5.5 15 cm. (6 in.).
Tele Xenar *f* 5.5 18 cm. ($7\frac{1}{8}$ in.).
Tele Xenar *f* 4.5 24 cm. ($9\frac{1}{2}$ in.).
Tele Xenar *f* 5.5 30 cm. ($11\frac{3}{4}$ in.).
Tele Xenar *f* 5.5 36 cm. ($14\frac{1}{4}$ in.).

For Kine Exaktas: Telephoto Lens Dallon *f* 5.6 10 cm. (4 in.).
Telephoto Lens Dallon *f* 5.6 15 cm. (6 in.).
Primoplan *f* 1.9 7.5 cm. (3 in.).
Triotar *f* 4 8.5 cm. ($3\frac{3}{8}$ in.).
Trioplan *f* 2.8 10.5 cm. ($4\frac{1}{4}$ in.).
Trioplan *f* 4 12 cm. ($4\frac{3}{4}$ in.).
Triotar *f* 4 13.5 cm. ($5\frac{3}{8}$ in.).
Tele Megor *f* 5.5 15 cm. (6 in.).
Tele Megor *f* 5.5 18 cm. ($7\frac{1}{8}$ in.).
Tele Tessar *f* 6.3 18 cm. ($7\frac{1}{8}$ in.).
Tele Megor *f* 5.5 25 cm. (10 in.).
Tele Tessar *f* 6.3 25 cm. (10 in.).
Zeiss Long Distance Lens *f* 8 50 cm. (20 in.).

Owing to the fact that the $2\frac{1}{4} \times 2\frac{1}{4}$ in. Exakta appeared on the market just a few weeks prior to the outbreak of war, there have never been any auxiliary lenses or special attachments supplied for this model.

KINE-EXAKTA LENSES COMPARED

Name	Focal length cm.	Focal length in.	Full aperture	Lens speed value compared with f 3.5	Angle of field °	Magnification or reduction compared with 5 cm. lens
Meyer wide angle ...	4	1 7/16	4.5	0.6	57	0.8
Wide-angle Tessar ...	4	1 7/16	4.5	0.6	57	0.8
Tessar, Xenar ...	5	2	3.5	1	45	1
Tessar, Xenar ...	5	2	2.8	1.6	45	1
Xenon	5	2	2	3	45	1
Exaktar	5.4	2 1/8	3.5	1	42	1.1
Biotar... ...	5.8	2 1/4	2	3	40	1.2
Primoplan	5.8	2 1/4	1.9	3.4	40	1.2
Super Six	5.8	2 1/4	1.9	3.4	40	1.2
Primoplan	7.5	3	1.9	3.4	33	1.5
Trioctar	8.5	3 3/8	4	0.8	28	1.6
Tele Dallon	10	4	5.6	0.39	22.5	2
Trioplan	10.5	4 1/2	2.8	1.6	22	2.1
Trioplan	12	4 3/4	4	0.8	21	2.4
Tele Dallon	15	5 7/8	5.6	0.39	16.4	3
Triotar	13.5	5 3/8	4	0.8	18.4	2.6
Tele Megor	15	5 7/8	5.5	0.4	16.4	3
Tele Megor	18	7 1/8	5.5	0.4	13.6	3.5
Tele Tessar	18	7 1/8	6.3	0.3	13.6	3.5
Tele Megor	25	10	5.5	0.4	10	5
Tele Tessar	25	10	6.3	0.3	10	5
Zeiss long distance ...	50	20	8	0.2	5	10

V.P. EXAKTA LENSES COMPARED

Name	Focal length cm.	Focal length in.	Full aperture	Lens speed value compared with f 3.5	Angle of field ° (approx.)	Magnification or reduction compared with 7.5 cm. lens (approx.)
Wide-angle Tessar ...	5.5	2 3/16	8	0.2	78	0.7
Meyer wide angle ...	5.6	2 1/4	6.8	0.26	76	0.75
Dallmeyer wide angle	6	2 3/8	11	0.1	68	0.8
Exaktar	7.5	3	3.5	1	54	1
Tessar, Xenar ...	7.5	3	3.5	1	54	1
Tessar, Xenar ...	7.5	3	2.8	1.6	54	1
Xenon	8	3 1/8	2	3	50	1
Biotar...	8	3 1/8	2	3	50	1
Primoplan	8	3 1/8	1.9	3.4	50	1
Super Six	8.5	3 1/4	1.9	3.4	49	1.1
Ihagee Anastigmat ...	10.5	4 1/2	4.5	0.6	41	1.4
Tele Tessar	12	4 3/4	6.3	0.3	34	1.6
Telephoto Dallon ...	15	5 7/8	5.6	0.39	27	2
Tele Megor	15	6	5.5	0.4	27	2
Tele Xenar	15	6	5.5	0.4	27	2
Tele Megor	18	7 1/8	5.5	0.4	25	2.4
Tele Tessar	18	7 1/8	6.3	0.3	25	2.4
Tele Xenar	18	7 1/2	5.5	0.4	25	2.4
Tele Xenar	24	9 1/4	4.5	0.6	17	3.2
Tele Megor	25	10	5.5	0.4	16	3.3
Tele Tessar	25	10	6.3	0.3	16	3.3
Tele Xenar	30	11 3/4	5.5	0.4	13.5	4
Tele Xenar	36	14 1/2	5.5	0.4	12	4.8

THE TECHNIQUE OF FOCUS

Depth of Field

Strictly speaking, an ideal photographic lens can give a critically-sharp image of a single plane only—so far as the image formed in the plane of the film is concerned. This is the "plane of focus", and its distance from the plane of the film represents the distance on which the lens has been focused. Still, points in front of and behind the actual distance focused at *appear* to be sharp. How is this possible? Any point lying outside the plane of focus will not be represented in the plane of the film as a point, but as a small "circle of confusion"; the diameter of this circle of confusion increases in size with the focal length of the lens. Furthermore, the larger the aperture of the lens the further the point to be represented lies from the plane of focus, and the nearer this plane is to the lens. Indeed, we know, the longer the focal length and the larger the aperture, the narrower the belt in front of and behind the distance focused which appears to be sharp. Still, the human eye does not perceive an image to be unsharp as long as its departure from "pin-point" delineation does not exceed certain limits. That area in front and behind the plane actually focused which, although not "pin-point" sharp, can be accepted as sharp by the human eye, is described in photographic language as "depth of field".

As a matter of experience it is found that the circle of confusion still appears as a sharp point if it is seen from a distance at which the angle of view which it subtends amounts to two minutes of arc at most. In plain English: at a viewing distance of 10 in. (25 cm.), which may be regarded as normal for a print between 6 × 4 in. and 8 × 6 in. (13 × 18 and 18 × 24 cm.) in size, this means that the highest permissible diameter of the circle of confusion is 1/6 mm.

For the 24 × 36 mm. (1 × 1½ in.) negative of the Kine-Exakta this corresponds to 1/30 mm. maximum permissible diameter of the circle of confusion. Incidentally, the average grain of our film emulsion, limiting the fineness of details

which can still be recorded, can be resolved to about the same diameter. Thus all points which are represented on the Kine-Exakta negative by a circle of confusion of not more than 1/30 mm. diameter can be accepted as covered by "depth of field" and therefore as sufficiently "sharp".

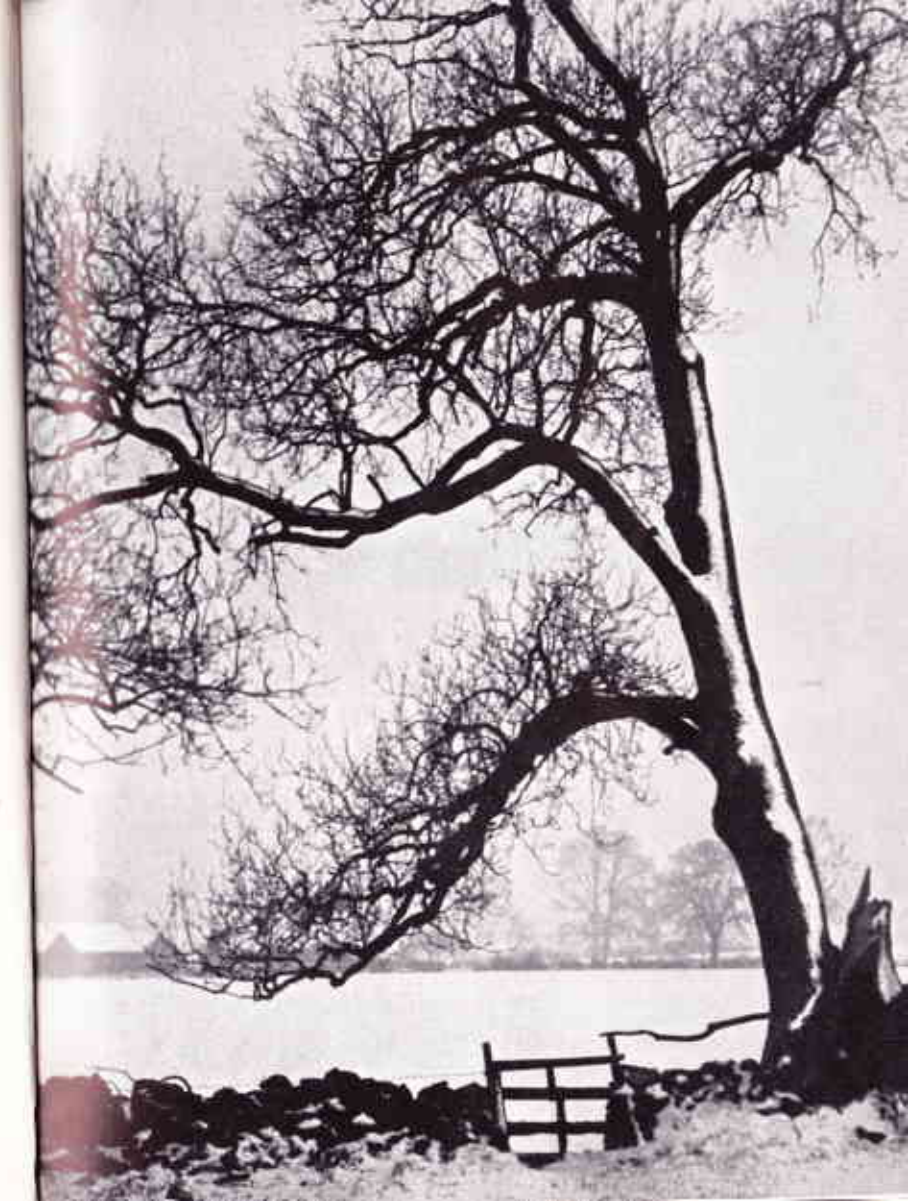
In the case of the larger size Exaktas (the V.P. and the $2\frac{1}{4} \times 2\frac{1}{4}$ in. models) the original negative is larger and the degree of enlargement need be less to arrive at the same size print as with the Kine-Exakta. Thus an increased circle of confusion (1/25 mm. and 1/20 mm.) can be allowed for these larger negative sizes. On the other hand, the longer focal length of the standard lenses of these Exaktas—7.5 cm. (3 in.) and 8 cm. ($3\frac{1}{8}$ in.) compared with the 5 cm. (2 in.) of the Kine-Exakta—result again in a decrease of depth of field. For all intents and purposes *the increased tolerance in circle of confusion and the decreased depth of field of the longer focal lengths offset one another*, so that the figures for depth of field (see p. 87, etc.) and hyperfocal distance (see p. 82) or Kine-Exakta and large-size Exaktas, with their *standard* lenses, coincide. It is for this reason that the same tables apply to the Kine, V.P. *and* $2\frac{1}{4} \times 2\frac{1}{4}$ in. Exakta cameras with their standard lenses of 5 cm. (2 in.), 7.5 cm. (3 in.) and 8 cm. ($3\frac{1}{8}$ in.) respectively.

Control of Depth of Field

The depth of field—being dependent on the focal length of the lens used, the distance actually focused at and the aperture employed—has to be ascertained for every stop separately.

The reflex image of the Exaktas permits control of the depth of focus. In stopping down, the increase in definition to the foreground and the background from the actual point one has focused at can be seen (up to the state where the reflex image grows too dark for observation). Use of the magnifier and focusing hood extension (see p. 101) facilitates the observation considerably.

Nevertheless, one should make some allowance for the fact that our focusing screen is only negative size, not the



WILTSHIRE VILLAGE (above). Functional use of the Exakta format. The motif is brilliantly employed to fit the shape of the Exakta negative. March, 3 p.m., bright sunlight.—V.P. Exakta B, Tessar f 3.5 7.5 cm., stop 8, 1/50 sec., yellow filter (factor 1½), Ilford Selo H.P.2 film.—LEONARD and MARJORIE GAYTON.

SNOW TREE (on p. 65). The type of landscape photography to which the reflex miniature is particularly suited: dominant foreground motif with little background detail which could go beyond the resolving power of the film. December, 11 a.m., no sun.—V.P. Exakta B, Cassar f 2.9 7.5 cm., stop 4, 1/25 sec., Gaevert Extra Fine Grain ortho film. (24 × 40 mm. negative on 35 mm. film, used in the V.P. Exakta.).—A. L. COLBECK.

LAKELAND (above). Although the reproduction cannot fully retain the qualities of the enlargement, it does give an intimation of the possibility of recording distant detail in spite of what is said in other parts of this book. The exemplary result is obviously due to extreme care in exposure and processing. September, 2 p.m., bright sunshine.—V.P. Exakta B, Dallmeyer Wide Angle 2⅜ inches, stop 11, 1/100 sec., yellow filter (factor 1½), Ilford Selo H.P.2 film.—LEONARD and MARJORIE GAYTON.

EVENING ON THE LAKE (on p. 68). Example of photographing "atmosphere", which so many people believed could only be done with large-size field cameras. Although the reproduction cannot do justice to the qualities of an exhibition print, it is perhaps sufficient to show what the reflex miniature can achieve.—Exakta 2¼" × 2¼".—W. G. HAWORTH, F.R.S.A.

TRIXIE (above). Use of the tele-photo lens for animal portraiture.—Kine Exakta, Tele-Megor 15 cm., stop 8, Kodak Plus X film.—E. E. HAWORTH.

EVENTIDE (on p. 69). Vertical section of a horizontal negative. August, early afternoon, against the sun.—V.P. Exakta, Tessar f 2.8, deliberately under-exposed.—E. J. EVERLEY.

COSY (above). Again good use of the long-focus lens in child portraiture.—Kine Exakta, Makro-Plasmat f 2.7 10.5 cm., stop 5.6, $\frac{1}{2}$ sec., Ilford Selo H.P.2 film.—FRANK H. SHARMAN, A.R.P.S.

THE AUTHOR OF "MY WAY WITH THE MINIATURE", LANCELOT VINING, F.R.P.S., F.I.B.P. (above). Candid portrait taken in the offices of the London "Daily Mirror", with lighting from a large window without lamps.—Kine Exakta, Tessar f 2.8, stop 4, Kodak Plus X film, 1/10 sec. (camera held on ledge).—IVOR H. RICHMAN.

FORM THREES (opposite). Good use of the "dead moment" in motion under limited conditions of lighting.—Kine Exakta, Tessar f 2.8, 1/25 sec. Kodak Plus X film.—FRANK H. SHARMAN, A.R.P.S.

BACKYARD BRADMAN (on p. 74). This and the following picture show the advantages of the viewpoint typical of reflex cameras.—V.P. Exakta, Tessar f 2.8, stop 8, 1/50 sec., Ilford Selo H.P.2 film.—HAROLD WHITE, F.I.B.P., F.R.P.S.

FLYING SEAGULLS (above). The Exakta may not be the best camera for high speed shooting, still it can take high speed pictures.—V.P. Exakta, Tessar f 3.5 7.5 cm., 1/800 sec., Kodak S.S. Pan film.—OLIVER G. PIKE, F.R.P.S., F.Z.S., M.O.U.

RESCUE PARTY (on p. 75). Exakta 2¼" × 2¼", Exaktar f 3.5, stop 5.6, 1/50 sec., Ilford Selo H.P.2 film.—HAROLD WHITE, F.I.B.P., F.R.P.S.

GREEN TREE FROG. Close-up nature photography—the very thing or the single lens reflex camera.—Exakta 2¼" × 2¼", Tessar f 2.8 8 cm., short extension tube, stop 8, 1/50 sec., Agfa Isopan F film.—W. S. PITT, F.R.P.S.

NATURE'S FILIGREE.—V.P. Exakta A, Tessar f 3.5 7.5 cm., extension tube.—DUDLEY STYLES.

FRITILLARY BUTTERFLY RESTING ON BRAMBLE LEAVES (above).—V.P. Exakta A., Exaktar f 3.5, 1½ cm. extension tube, stop 8, 1/50 sec., Ilford Selo H.P.2 film.—D. BOYES.

FLYING DRAGONFLY NYMPH (on p. 80).—Swift microscope, Exaktar f 5.6 54 mm. lens used on the microscope, 1/25 sec., Ilford Selo H.P.2 film, dark ground illumination.—D. A. KEMPSON, F.I.B.P.

size of the enlarged print, and that the eye cannot distinguish a very small circle from a mathematical point, so it can happen that towards the extremes of the range of depth of field seen on the ground-glass, the enlargement will show blur. Indeed, in every case when importance is attached to good definition in depth, one should rather rely on depth of field tables than on what appears on the focusing screen.

The lenses of the Kine-Exakta and $2\frac{1}{4}'' \times 2\frac{1}{4}''$ Exakta are in addition fitted with a depth of field calculator, allowing one to read off figures for depth of field for the different stops and distances at once. The lens mount has been provided with a special scale bearing the aperture figures, diverging from either side of the index mark.

To read, first set the distance index (obtained by reflex-focusing or by guessing) to, let us say, 10 ft. Assuming that we are working in the Kine-Exakta with a 5 cm. (2 in.) lens with aperture *f* 5.6, the two index lines marked 5.6 on the depth of field ring point on one side to 6 ft., and on the other side to 30 ft. The range of depth of field is therefore from 6 ft. to 30 ft., while actually set to 10 ft.

The reader will be surprised to find these figures very different from those given for the same conditions in our depth of field tables, the reason being that on perfectly unjustifiable grounds 1/10 mm. has been allowed by the manufacturers as permissible circle of confusion, compared with the accepted standard of 1/30 mm. for $1\frac{1}{2} \times 1$ in. negatives (p. 63). *The depth of field calculator is misleading.*

Limits of Depth of Field

The widely held idea that everything is equally sharp within the depth of field and completely unsharp outside these limits is mistaken. It must be emphasized that, as we have said before, critical "pin-point" definition can be expected only in the plane actually focused.

For this very reason care should be taken to *place the focus as exactly as possible at the spot on which the greatest sharpness is required.* It may be emphasized again that focusing should always be done with full aperture of the

lens to have the least "depth" on the screen and stopping down only be done afterwards.

In the case of distant landscapes use should *not* be made of hyperfocal distance (described below) if the greatest sharpness is required in the far distance. In this case, focusing on the object in the far distance will give better results. This applies also to the use of the safety-zone focusing detailed on p. 83.

When making use of the built-in magnifier, the Exakta forces us automatically to concentrate on the main subject, as the magnifier shows only a portion of the whole reflex image. This is all the better, as otherwise one is rather apt to judge the picture by its general appearance on the ground-glass, which as regards pin-sharp definition can be somewhat deceiving.

Further, the assumed circle of confusion which has been laid down for the depth of focus tables is derived on the supposition that the whole negative is viewed or enlarged. When small sections of the negative are greatly enlarged, the depth of field decreases accordingly, because the circle of confusion is enlarged at the same time. That is just one more reason why focusing should be carried out as exactly as possible.

On the other hand, in exactly the same way as sharpness is not absolutely uniform within the depth of field, the region of unsharpness outside the depth of field area increases only gradually.

The Hyperfocal Distance

The depth of field extends for a greater distance in the direction of infinity than towards the camera. When a lens is focused on such a distance that the depth of field just reaches the far distance (infinity), then the lens is focused on the "infinity-near point" or the "hyperfocal distance". This adjustment of focus is always advisable when it is desired to secure adequate sharpness from the farthest distance as far as possible into the foreground, rather than extreme sharpness in the far distance only. See p. 84.

Safety-zone Focusing

There are opportunities in a photographer's life which, like time and tide, wait for no man; when, to bring your whole technical armament to bear—reflex focusing, exposure meter and the rest—would be to let your prey escape you for ever. Such situations are best dealt with by applying a kind of pre-prepared depth focusing, the following "safety-zone" method, details of which should be jotted down on a piece of paper and kept handy in the Ever-ready case:—

FOR KINE-EXAKTAS WITH 5 cm., V.P. EXAKTA WITH 7.5 cm. and $2\frac{1}{4} \times 2\frac{1}{4}$ in. EXAKTA WITH 8 cm. lens:

Focus at 15 ft. (4 m.), stop 9.
Everything between $9\frac{1}{2}$ and 33 ft. will be sharp.

Focus at 30 ft. (9 m.), stop 9.
Everything between $14\frac{1}{2}$ ft. and infinity will be sharp.

With these settings, a 27° *Scheiner film* and fair weather, nothing can go wrong. The exposure times are:—

For bright sunny weather ..... **1/100 sec.**
For good diffused light ..... **1/50 sec.**
For dull day (not too dark) ..... **1/25 sec.**

Hyperfocal Distance and Depth of Field Tables.

These tables have been computed in conformity with the principles laid down on p. 63 for circle of confusion. The explanation of the fact that the values of corresponding focal-length lenses of the various Exaktas are identical is given on p. 81.

In the depth of field table the figures on the left of each group relate to the setting of the lens stop. The bold (middle) figures in each group indicate the distance in feet to which the lens has to be set on the focusing mount. The corresponding figures above them give the distance of the near limit (in feet and inches), and the figure below gives the distance of the distant limit (in feet and inches) of the region of depth of field.

Depth of field tables are provided in this book for the most important focal lengths. It was, however, impossible to devote separate tables to every single focal length of the well nigh bewildering choice of Exakta lenses (see p. 59). The tables can be used, however, for all the lenses with very little adaptation. For all practical purposes a deviation of 10 to 15 *per*

cent. in the circle of confusion is negligible, consequently the 11 cm. (=4½ in.) table for the V.P. Exakta may be employed for 10.5 cm. (=4⅛ in.) and 12 cm. (= 4¾ in.) focal lengths, etc.

(An ingenious combination of a depth of field indicator with tabulated figures is the *Focal Focusing Chart* supplying quick and elastic answers to any depth focusing question.)

HYPERFOCAL DISTANCE

Table of focusing distances giving the greatest possible depth of field from the foreground to infinity with the 5 cm. (2 in.) lenses of the Kine Exakta as well as the 7.5 cm. (3 in.) lenses of the V.P. Exakta and 8 cm. (3⅛ in.) lenses of the 2¼×2¼ in. Exakta (see p. 64).

(For conversion into metric units, see p. 109.)

Aperture f	*Setting of lens in feet*	*Extent of depth to infinity from:*
1.5	∞	161–6
1.9	152	72–6
2	133	66–8
2.2	107	53–6
2.8	100	46–5
3.2 (3.5)	77	38–6
4	70	34–0
4.5	60	30–0
5.6	50	23–3
6.3	42	21–0
8	30	15–1
9	28	14–6
11	26	13–0
12.5	22	11–0
16	15	7–7
18	14	7–0
22	12	5–9

NOTE.—The infinity near point (hyperfocal distance) should *not* be used when maximum sharpness is required in the far distance.

DEPTH OF FIELD TABLE FOR 4 cm. = 1⅝ in. LENS

(For conversion into metric units, see p. 109)

f2	3–9½	4–8¼	5–6½	6–5¼	7–3½	8–3	8–10¼	10–4¾	12–7	15–11	21–7¾	30–5¼	43–8¾	77–6	∞
	4	5	6	7	8	9	10	12	15	20	30	50	100	∞	
	4–2¾	5–4	6–5½	7–8¼	8–10½	10–1½	11–5½	14–2¼	18–6¾	26–10½	48–9¼	140–3	∞		
f2.8	3–8¾	4–7½	5–5½	6–2¾	7–1¼	7–9¼	8–5¾	9–10¼	11–9¾	14–8⅝	19–5½	26–3¾	35–8	55–4¼	∞
	4	5	6	7	8	9	10	12	15	20	30	50	100	∞	
	4–3⅝	5–5½	6–8¼	7–11½	9–3¾	10–8⅜	12–2¼	15–3¾	20–6½	31–2⅜	65–1¾	∞	∞		
f4	3–7¾	4–5¼	5–2½	5–11¼	6–7¾	7–4	8	9–2	10–10	13–3	16–11	21–10	27–11	38–9	∞
	4	5	6	7	8	9	10	12	15	20	30	50	100	∞	
	4–5¼	5–8½	7–1	8–6	10	11–8	13–5	17–4	24–4	41–1	130–11	∞	∞		
f5.6	3–6	4–3	4–11⅜	5–7½	6–2⅜	6–9½	7–4	8–5	9–9	11–8	14–5	17–10	21–8	27–8	∞
	4	5	6	7	8	9	10	12	15	20	30	50	100	∞	
	4–7½	6–3	7–7	9–4	11–2	13–3	15–6	21	32–5	70–11	∞	∞	∞		
f8	3–4	4	4–7½	5–2	5–8½	6–2	6–7½	7–5	8–6	9–10	11–10	14	16–3	19–5	∞
	4	5	6	7	8	9	10	12	15	20	30	50	100	∞	
	5	6–8½	8–7	10–10	13–6	16–7	20–5	31	64–6	∞	∞	∞	∞		
f11	3–1½	3–8½	4–2¾	4–8½	5–1½	5–6½	5–10½	6–6½	7–4	8–4	9–7	11	12–4	14–1	∞
	4	5	6	7	8	9	10	12	15	20	30	50	100	∞	
	5–6½	7–8	10–3	13–8	18–1	24–3	33–4	76–1	∞	∞	∞	∞	∞		
f16	2–10¾	3–3½	3–8¾	4–1½	4–5	4–8¾	4–11½	5–4½	5–11	6–6½	7–4½	8–1⅜	8–10½	9–8½	∞
	4	5	6	7	8	9	10	12	15	20	30	50	100	∞	
	6–7½	10–4	15–2½	24–4	42–7½	106–6	∞	∞	∞	∞	∞	∞	∞		

DEPTH OF FIELD TABLE FOR STANDARD EXAKTA LENSES

(5 cm.= 2 in. in Kine-Exakta, 7.5 cm.= 3 in. in V.P. Exakta and 8 cm.= 3⅛ in. in 2¼ × 2¼ in. Exakta)*

(For conversion into metric units, see p. 109)

f2 (f2.2)	3–11 4 4–1	4–10 5 5–2	5–9 6 6–3	6–8 7 7–5	7–7 8 8–6	8–5 9 9–8	9–4 10 10–10	11–0 12 13–2	13–6 15 16–—1	17–5 20 23–6	24–6 30 38–9	36–4 50 80–0	57–11 100 ∞	133 ∞ ∞
f 2.8	3–10 4 4–2½	4–8⅝ 5 5–3½	5–7½ 6 6–5½	6–5⅜ 7 7–7½	7–4 8 8–9½	8–2 9 10	8–11⅜ 10 11–3	10–7 12 13–11	12–10 15 18–1	16–3 20 25–11	22–4 30 45–10	31–9 50 118	46–5 100 ∞	86–6 ∞ ∞
f 3.5	3–9½ 4 4–2⅜	4–8 5 5–4½	5–6⅛ 6 6–6⅜	6–4½ 7 7–9¼	7–2¼ 8 9–¼	7–11⅜ 9 10–4	8–9 10 11–8	10–3 12 14–6	12–4 15 19–1	15–7 20 28	21 30 52–9	29–1 50 178–8	40–11 100 ∞	69–2 ∞ ∞
f 4	3–9¼ 4 4–3½	4–7½ 5 5–5¼	5–5⅜ 6 6–7⅜	6–3½ 7 7–10⅜	7–1 8 9–2½	7–10½ 9 10–6	8–7½ 10 11–11	10 12 14–11	12–1 15 19–10	15–1 20 29–9	20–1 30 59–2	27–5 50 283	37–9 100 ∞	60–7 ∞ ∞
f 5.6	3–8 4 4–4⅜	4–6 5 5–7⅓	5–3½ 6 6–11¼	6–½ 7 8–3⅜	6–9¼ 8 9–9½	7–5⅜ 9 11–4	8–1⅜ 10 12–11	9–5 12 16–6	11–2 15 22–10	13–9 20 36–11	17–9 30 96–9	23–3 50 ∞	30–3 100 ∞	43–3 ∞ ∞
f 8	3–6½ 4 4–7	4–3⅜ 5 5–11½	5–¼ 6 7–5¼	5–8½ 7 9–½	6–4¼ 8 10–9	6–11⅓ 9 12–9	7–6½ 10 14–10	8–7½ 12 19–8	10–1 15 29–5	12–1 20 58	15–1 30 ∞	18–11 50 ∞	23–3 100 ∞	30–3 ∞ ∞
f 11	3–5 4 4–10	4–1½ 5 6–5	4–9 6 8–2	5–4 7 10–2	5–10¾ 8 12–5	6–5 9 15	6–11 10 18–1	7–9¾ 12 25–11	8–11½ 15 46	10–6 20 202	12–9 30 ∞	15–4 50 ∞	18–1 100 ∞	22 ∞ ∞
f 16	3–2½ 4 5–4½	3–9½ 5 7–4½	4–4 6 9–9¼	4–9⅜ 7 12–9	5–3½ 8 16–7	5–8½ 9 21–7	6–⅜ 10 28–7	6–8⅝ 12 55	7–7 15 ∞	8–8 20 ∞	10–1 30 ∞	11–8 50 ∞	13–2 100 ∞	15–2 ∞ ∞
f 22	2–11½ 4 6–1⅜	3–5⅜ 5 8–11	3–11 6 12–9	4–3¾ 7 18–6	4–8 8 27–9	5 9 45–7	5–3⅜ 10 93–10	5–9½ 12 ∞	6–4⅝ 15 ∞	7–1⅜ 20 ∞	8–1 30 ∞	9–⅞ 50 ∞	9–11¼ 100 ∞	11 ∞ ∞

*The reason for the fact that the values for all Exaktas with standard focal length lenses are identical is given on p. 64.

DEPTH OF FIELD TABLE FOR 7.5 cm. = 3 in. LENS IN KINE-EXAKTA

(For conversion into metric units, see p. 109)

f1.9	3–5½ 3.5 3–6½	3–11½ 4 4–0⅝	4–11 5 5–1½	5–10⅝ 6 6–1⅝	6–10 7 7–2½	7–9½ 8 8–3	8–8⅝ 9 9–3⅝	9–8 10 10–4½	11–6 12 12–6½	14–3 15 15–10	18–8 20 21–6	27–1 30 33–7	35 40 46–7	42–5 50 60–9	59–3 75 102	73–9 100 155	98 150 321	281 ∞ ∞
f2.2	3–5½ 3.5 3–6½	3–11½ 4 4–1	4–10⅝ 5 5–1½	5–10½ 6 6–2	6–9⅝ 7 7–2½	7–9 8 8–3½	8–8 9 9–4½	9–7½ 10 10–5½	11–3 12 12–7½	14–1 15 16	18–5 20 21–10	26–8 30 34–4	34–3 40 48–1	41–4 50 63–3	57–1 75 109–5	70–6 100 172	92–1 150 404	239 ∞ ∞
f3.2	3–5½ 3.5 3–7	3–11 4 4–1½	4–10½ 5 5–2	5–9½ 6 6–2⅝	6–8⅝ 7 7–3⅝	7–7⅝ 8 8–5	8–6½ 9 9–6½	9–5½ 10 10–7⅝	11–2 12 12–11	13–9 15 16–6	17–10 20 22–9	25–5 30 36–7	32–3 40 52–7	38–6 50 71–4	51–9 75 136	62–7 100 249	79 150 ∞	167 ∞ ∞
f4.5	3–4½ 3.5 3–7½	3–10½ 4 4–1⅝	4–9½ 5 5–2⅝	5–8½ 6 6–4	6–7½ 7 7–5½	7–6 8 8–7	8–4½ 9 9–9	9–3 10 10–11	10–11 12 13–4	13–4 15 17–2	17–2 20 24–1	23–11 30 40–1	29–11 40 60–4	35–2 50 86–4	46 75 203	54–4 100 631	66–4 150 ∞	119 ∞ ∞
f6.3	3–4½ 3.5 3–8	3–10 4 4–2½	4–8⅝ 5 5–3⅝	5–7½ 6 6–5½	6–5⅜ 7 7–7½	7–3½ 8 8–10	8–2 9 10–1	8–11 10 11–4	10–6 12 14	12–9 15 18–3	16–2 20 26–2	22–2 30 46–5	27–2 40 75–8	31–2 50 122	39–10 75 645	45–11 100 ∞	54–2 150 ∞	84–10 ∞ ∞
f9	3–3⅜ 3.5 3–8½	3–9 4 4–3½	4–7½ 5 5–5½	5–5½ 6 6–8	6–3 7 7–11	7–1 8 9–3	7–10 9 10–7	8–7 10 12	10 12 15	12 15 20–1	15 20 30–2	19–11 30 60–7	23–11 40 122	27–2 50 315	33–2 75 ∞	37–3 100 ∞	42–5 150 ∞	59–5 ∞ ∞
f12.5	3–3 3.5 3–10½	3–8 4 4–5	4–6 5 5–8	5–3 6 7	6 7 8–4½	6–9 8 9–10	7–5 9 11–5	8–1 10 13–1	9–4 12 16–8	11–1 15 23–1	13–8 20 37–7	17–8 30 100–6	20–8 40 616	23–1 50 ∞	27–3 75 ∞	30 100 ∞	33–3 150 ∞	42–9 ∞ ∞
f18	3–1½ 3.5 4	3–6½ 4 4–7½	4–3 5 6	5 6 7–6	5–8 7 9–2	6–4 8 10–11	6–11 9 12–11	7–6 10 15–1	8–7 12 20–2	10 15 30–2	11–11 20 61–3	14–11 30 ∞	17–1 40 ∞	18–8 50 ∞	21–3 75 ∞	21–11 100 ∞	24–10 150 ∞	29–8 ∞ ∞
f25	3 3.5 4–2½	3–4½ 4 4–11	4 5 6–6	4–8 6 8–4	5–3 7 10–5	5–10 8 12–9	6–4 9 15–6	6–10 10 18–9	7–8 12 27–4	8–10 15 50–3	10–4 20 308	12–6 30 ∞	13–11 40 ∞	15 50 ∞	16–8 75 ∞	17–8 100 ∞	18–9 150 ∞	21–5 ∞ ∞

DEPTH OF FIELD TABLE FOR 10.5–12 cm. (4¼–4¾ in.) LENS IN V.P. EXAKTA

(For conversion into metric units, see p. 109)

f4.5	3–5⅛	3–11	4–10½	5–10	6–9	7–8	8–7	9–6	11–4	13–11	18–2	26–1	33–4	40	54–6	66–7	85–7	120	199
	3.5	4	5	6	7	8	9	10	12	15	20	30	40	50	75	100	150	300	∞
	3–6⅝	4–1	5–1½	6–2	7–3	8–4	9–5	10–6	12–9	16–3	22–3	35–4	50	66–9	121	200	600	∞	∞
f6.3	3–5	3–10½	4–9⅝	5–9	6–7⅝	7–6	8–5	9–3	11	13–5	17–3	24–3	30–5	35–10	47–1	55–10	68–8	89	127
	3.5	4	5	6	7	8	9	10	12	15	20	30	40	50	75	100	150	300	∞
	3–7¼	4–1⅝	5–2½	6–3½	7–5	8–7	9–8	10–10	13–3	17	23–9	39–4	58–7	82–8	184	∞	∞	∞	∞
f9	3–4½	3–10	4–8⅝	5–7½	6–6	7–4	8–2	9	10–7	12–10	16–4	22–5	27–7	32	40–7	47	55–8	68–5	89
	3.5	4	5	6	7	8	9	10	12	15	20	30	40	50	75	100	150	300	∞
	3–7⅝	4–2¼	5–3⅛	6–5	7–7	8–10	10	11–3	13–11	18–1	25–10	45–4	73	115	∞	∞	∞	∞	∞
f12.5	3–4	3–9½	4–7⅜	5–6	6–4	7–1	7–11	8–8	10–1	12–2	15–3	20–5	24–7	28	34–6	38–11	44–9	52–7	64
	3.5	4	5	6	7	8	9	10	12	15	20	30	40	50	75	100	150	300	∞
	3–8½	4–3	5–5	6–7½	7–10	9–2	10–6	11–10	14–9	19–7	29–2	56–8	107	231	∞	∞	∞	∞	∞
f18	3–3	3–8	4–6	5–3½	6–1	6–9	7–6	8–2	9–5	11–2	13–9	17–11	21	23–6	27–10	30–8	34–2	38–7	44
	3.5	4	5	6	7	8	9	10	12	15	20	30	40	50	75	100	150	300	∞
	3–9⅜	4–5	5–7⅜	6–11	8–4	9–9	11–4	12–11	16–6	22–8	36–6	93	∞	∞	∞	∞	∞	∞	∞
f25	3–2	3–6½	4–4	5–1	5–9	6–5	7	7–7	8–9	10–2	12–3	15–5	17–9	19–6	22–5	24–2	26–4	28–10	31–11
	3.5	4	5	6	7	8	9	10	12	15	20	30	40	50	75	100	150	300	∞
	3–11	4–7	5–11	7–5	9	10–8	12–6	15–6	19–3	28–4	54	∞	∞	∞	∞	∞	∞	∞	∞
f36	3	3–5	4–1	4–9	5–4	5–11	6–5	6–11	7–9	8–11	10–6	12–9	14–3	15–4	17–1	18–2	19–4	20–8	22–2
	3.5	4	5	6	7	8	9	10	12	15	20	30	40	50	75	100	150	300	∞
	4–2	4–11	6–6	8–3	10–3	12–6	15–2	18–3	26–2	46–6	206	∞	∞	∞	∞	∞	∞	∞	∞

DEPTH OF FIELD TABLE FOR 25 cm. (10 in.) LENS IN V.P. EXAKTA

(For conversion into metric units, see p. 109)

f4	8–10¾	9–10½	11–10	14–8¾	19–6¼	28–11	47–½	88–9	217	785
	9	10	12	15	20	30	50	100	300	∞
	9–1¼	10–1½	12–2	15–3¼	20–6	31–2	53–4	114–6	485	∞
f5.6	8–10½	9–10	11–9	14–7½	19–4	28–6	45–11⅓	84–11	195–6	560
	9	10	12	15	20	30	50	100	300	∞
	9–1⅝	10–2	12–3	15–4⅝	20–8½	31–8	54–10	121–7	644	∞
f6.3	8–10¼	9–9⅝	11–8⅝	14–7	19–3	28–4	45–5¾	83–4	137	500
	9	10	12	15	20	30	50	100	300	∞
	9–1⅞	10–2⅛	12–3⅓	15–5⅛	20–9⅝	31–10½	55–6	124–11	1000	∞
f8	8–9¾	9–9½	11–8	14–5⅞	19–⅝	27–11	44–5	79–9	170–2	392
	9	10	12	15	20	30	50	100	300	∞
	9–2¼	10–3	12–4⅓	15–6⅝	21–½	32–5¼	57–2	133–11	1267	∞
f11	8–9	9–8½	11–6⅜	14–3½	18–8⅝	27–2¼	42–7⅛	74–2	146–5	285
	9	10	12	15	20	30	50	100	300	∞
	9–3¼	10–4	12–6	15–9½	21–5½	33–5¼	60–6	153–6	∞	∞
f16	8–7⅛	9–6½	11–4	13–11⅝	18–2½	26–1	39–11½	66–4	118–9	196–2
	9	10	12	15	20	30	50	100	300	∞
	9–4⅜	10–6	12–9	16–2½	22–2½	35–3½	66–10	203	∞	∞
f22	8–6	9–4½	11–1½	13–7⅓	17–7¼	24–10½	37–1¾	58–11	96–10	142–8
	9	10	12	15	20	30	50	100	300	∞
	9–6⅜	10–8⅛	13–¼	16–8½	23–1⅝	37–9⅓	76–6	330	∞	∞
f32	8–3½	9–1½	10–9	13–1	16–8¼	23–1	33–3	49–8	75	98–1
	9	10	12	15	20	30	50	100	300	∞
	9–10	11–⅜	13–7	17–7	24–11½	42–10⅛	101–1	∞	∞	∞
f45	8–¼	8–9¾	10–3⅝	12–5½	15–7⅝	21–1¼	29–3½	41–2⅝	60	69–9
	9	10	12	15	20	30	50	100	300	∞
	10–2⅝	11–6¾	14–4½	18–10⅜	27–8½	51–10	171–5	∞	∞	∞

THE TECHNIQUE OF EXPOSURE

The correct exposure time depends on two sets of circumstances:—

(1) The amount and colour of light reflected from the object to be photographed. This, in its turn, depends on the season of the year, time of day, situation, weather, etc.

(2) The speed of film, the kind of filter used, the aperture employed and probably an allowance for an increase in exposure in the case of special fine grain development.

The correct exposure time can be ascertained by:—

EXPOSURE TABLES. These are based on mathematical calculations and practical experience. They tabulate all or most of the factors given above, and, if used with discretion, will give an exposure-figure which lies within the latitude of the film. The *Focal Exposure Chart* is the most up-to-date version of an exposure table. A simplified table is given on p. 91.

OPTICAL EXPOSURE METERS, also called "visual" or "extinction type" meters. They measure, with the aid of the eye, the amount of light reflected. Their main advantage lies in the fact that they can be used under particularly poor light conditions—indoors, for example. Their accuracy suffers from the fact that the sensitivity of the eye to light varies considerably according to individuals. If used consistently and with care, however, they will give exposure figures well within the latitude of the film.

PHOTO-ELECTRIC EXPOSURE METERS. They are the most accurate and dependable means available for arriving at the right exposure time. They consist of a photo-electric cell which converts light-energy into electricity, which in turn moves an indicator over a table of light values.

The field covered by an electric exposure meter is wider than that covered by a standard lens in the Exakta (Weston meter = 60°; Sixtus over 102° vertically and 122° horizontally and 94° vertically; Helios 92°). By comparison with the tables on p. 62, where the angle of the various lenses is indicated, it will be found that the standard lenses

EXPOSURE TABLE FOR DAYLIGHT

Add the respective figures in the Tables 1, 2 and 3; the correct exposure time can be taken from Table 4.

1. *Subject and light value*

	Clear sun	*Cloudy light*	*Cloudy med.*	*Cloudy dull*
Distant land or seascape without foreground	0	1	2	3
—with light foreground ...	1	2	3	4
Open streets, squares, light buildings	2	3	4	5
Figures, groups in open, near objects without heavy shade...	3	4	5	6
—in shade	4	5	6	
Average interiors, diffused light	10	11	12	13

2. *Month and time*

	May June July	*Aug. April*	*Sept. March*	*Oct. Feb.*	*Nov. Dec. Jan.*
11 a.m. to 2 p.m.	0	0	0	1	1
9 a.m. to 11 a.m. 2 p.m. to 4 p.m.	0	0	1	1	2
4 p.m. to 6 p.m.	1	1	2	2	3

3. *Film speed and aperture*

Film speed Scheiner	*Stop f2*	*Stop f2.8*	*Stop f4*	*Stop f5.6*	*Stop f8*	*Stop f11*	*Stop f16*
32°	0	1	2	3	4	5	6
29°	1	2	3	4	5	6	7
26°	2	3	4	5	6	7	8

4. *Result (sum of Tables 1 + 2 + 3 = "Value")*

Value	5	6	7	8	9	10	11	12	13	14
Seconds	**1/1000**	**1/500**	**1/250**	**1/100**	**1/50**	**1/25**	**1/10**	**1/5**	**1/2**	**1**

Value	15	16	17	18	19	20	Value	21	22	23	24
Seconds	**2**	**4**	**8**	**16**	**30**	**60**	**Minutes**	**2**	**4**	**8**	**16**

have a considerably smaller angle than the meter. Therefore, the measurement should be taken from a point nearer to the camera than the one at which the subject is actually situated. As any meter measures the light value of dark *and* light objects within its field, it will be necessary to point the instrument towards the darkest object within the area to be photographed, provided that no deliberate under-exposure of the shadows is intended, as may be the case with particularly contrasty subjects like stage shots, etc.

To the experienced Exakta photographer *the brightness of the image on the reflex focusing screen soon becomes a useful guide to the correct exposure.* It acts to some extent as an optical exposure meter. By using a standard exposure time, e.g. 1/50 sec. for average subjects, it can become a matter of habit to vary the aperture so that the screen has a standard intensity of illumination or to see how far into the corners of the screen details may be observed (but the latter only if the subject is of even illumination).

The Right Negative

Exakta negatives should be very sharp, have fine grain and show a well-balanced gradation.

The beginner will be particularly well advised to use the *exact time of exposure* suggested by his meter and to employ straightforward methods of development. In this way he will achieve negatives with the best definition for a reasonable degree of enlargement. The grain—provided he was using films of medium speed—will not show unpleasantly.

The advanced worker aiming at particularly fine-grained results and intending to use special fine grain developers, must be aware of the loss of speed caused by them and allow for the increase in exposure time. He will have the satisfaction of mastering by this method even subjects of very high contrast at the cost of some loss of definition which inevitably goes with generous exposure.

Again, intentional over-exposure or, as a matter of fact, any variation of exposure in aiming at definite pictorial effects is only possible after the *correct* exposure time has been ascertained. Thus, a reliable meter is indispensable.

THE TECHNIQUE OF TONE

The Use of Filters

The photographic film, even when orthochromatic or panchromatic, fails to render colours in their true black and white tone values, so that the photograph often gives quite a false impression of the real scene. The explanation of this discrepancy is the following.

Scientifically speaking, to the human eye yellow appears to be over ten times as bright as blue, three times as bright as red, and one and a half times as bright as green. The average panchromatic film (p. 48), however, registers blue with a brilliance of about four-fifths that of yellow, green with one-third, and red with two-thirds of the brightness of yellow.

It is therefore evident that in order to obtain a colour rendering which will correspond with some degree of accuracy to the impression of colours received by our eye, the comparative sensitivity of the various colours to each other in our film will have to be corrected. This can be achieved by the use of filters.

Filters are intended to correct on our negative material the various degrees of brightness of the actual picture. Principally, *they lighten objects of their own colour and darken those of their complementary colour* (e.g. a yellow filter will darken the blue of the sky). They may be used to obtain a colour rendering in our picture which corresponds more closely to the impression made upon our eye by the object: here we speak of "correction filters". Filters may also be employed to produce certain effects; for instance, our picture can be made to show heavy clouds against a particularly dark sky, whereas the actual landscape revealed only light clouds in a blue sky. Filters employed to such ends are termed "effect filters".

All filters cut out certain parts of the light and an increase in exposure time is always necessary when using them. Exact figures can only be given for each particular case, according to the film used, for the exposure ratio depends

not only on the nature of the filter, but on the colour sensitivity of the film and on the colour of the light in which the photograph has to be taken. There are tables available which speak of 1.4 or 1.7 times the exposure, but we can cheerfully ignore these fractions and content ourselves with round figures, such as 1.5, 2, 3 times, etc.

FILTER FACTORS

In Daylight	*Orthochromatic Film*	*Panchromatic Film*	*Infra-Red Film*
Yellow—Light (1) ...	2	1.5	—
Medium (2) ...	2.5	2	—
Dark (3) ...	5	3	—
Green—Light	—	3	—
Medium ...	—	4	—
Orange—Light	—	4	—
Dark ...	—	5	—
Red—Light	—	7	10
Dark	—	—	15
In Artifical Light			
Yellow—Light (1) ...	1.5	1.5	—
Medium (2) ...	2	1.5	—
Dark (3) ...	3	2	—
Green—Light	—	3	—
Dark	—	5	—
Blue	—	1.5	—

The following list gives a summary of the filters recommended and a short explanation of their use. The best practical guide to choosing and handling filters is the *Focal Filter Chart.*

YELLOW FILTERS, suitable for orthochromatic and panchromatic film. They mainly reduce the actinic effect of blue, rendering it darker, and are therefore particularly suitable for landscape photography in order to obtain clearly defined cloud effects on a normal blue sky. In the case of a very light blue sky, a darker filter should be used and vice versa.

GREEN FILTERS suitable for panchromatic films. Their effect is similar to that of yellow filters, but they also hold back red (render it darker), to which some panchromatic films are comparatively over-sensitive (photographing it too light).

SKY FILTERS are designed for photographing scenes with a bright background and a dark foreground, such as often occur in landscape photography. They serve mainly to avoid partial over-exposure, and are obtainable as graduated green filters for panchromatic film only,

and graduated yellow filters for both orthochromatic and panchromatic material. If the top part of the object (as in landscapes) is bright, the coloured part of the filter should cover the top part of the lens. No exposure increase is necessary if the exposure time has been determined for the darker part of the picture. Sky filters placed directly in front of the lens act in the same way as a fully-coloured filter (of rather lighter shade than the coloured part of the sky filter). To get the sky filter effect it is essential to have this filter at least a distance from the front of the lens which equals one quarter of its focal length. Sky filters should therefore be used in a mount allowing this distance, or otherwise be placed on the front of a lens hood.

ORANGE FILTERS are for panchromatic film only. They give over-correction, and serve, therefore, as an "effect" filter for drawing *heavy* clouds against a dark sky, and very clear distances in landscapes, eliminating light haze, etc.

RED FILTERS are for panchromatic film only. Of still stronger effect than the orange filter, for extreme contrast, creating black sky with brilliant clouds, faking sunshine into moonlight effects, etc.

DARK RED FILTERS to be used only with infra-red film. Chiefly used for scientific purposes, it penetrates mist.

BLUE FILTERS are for panchromatic film in artificial light. They absorb part of the red sensitivity. This results in better skin-tones and darker reds (lips).

Polarizing Filter

Highly-polished subjects can be very difficult to illuminate successfully so as to obtain a true photographic rendering, since they will reflect too much light and so spoil the reproduction with a glare which obscures the detail. To overcome this difficulty the polarizing filter has been introduced. It suppresses light vibrating in one particular plane, while light vibrating in a plane at right angles to this will freely pass. Light reflections from glass, china, enamel, polished wooden surfaces, water, vibrate to a large extent in one plane (= it is polarized) and can therefore be almost extinguished by placing the polarizing filter in proper position over the lens.

The filter has to be rotated to find out its best position on the lens. The Exaktas are ideal for this observation. The filter is simply held in front of the lens, and then by slowly rotating the filter one can find the best or desired result on the reflex-focusing screen, and push the filter on to the lens in the position selected. As the polarizing filter is slightly tinted, the exposure time should be increased, the factor being about three times.

CLOSE-UP WORK WITH THE EXAKTAS

The single-lens reflex cameras are suited, as is no other type of camera, for close-up photography. When working with supplementary lenses or extension tubes or a combination of both, the actual image covered, as well as the exact definition, can be controlled by the reflex-focusing screen. Parallax, which makes close-up work with almost any other type of camera at least very difficult or necessitates expensive auxiliary attachments, simply does not exist in the Exaktas (p. 7).

Supplementary Lenses

The Exakta cameras can be focused down to about three feet. This figure varies somewhat in accordance with the lens employed.

The field covered at 3 ft. in the V.P. Exakta is about 15 × 10 in., in the Kine-Exakta 14 × 9¼ in., and in the 2¼ × 2¼ in. Exakta 14 × 14 in.

To photograph at closer range for table top, copying and similar work, supplementary lenses can be used. The makers of the Exaktas provide one type of close-up lens, which is equivalent to the +2 diopter lens described below. But *there is no reason whatsoever to confine oneself to this one lens.* The author has used quite successfully a range of three lenses, giving a scope which can reasonably be described as covering all practical needs. These lenses are a +1 diopter, a +2 diopter, and a +3 diopter meniscus lens. These may be had from photographic dealers or opticians. One will find it convenient to get these lenses of suitable diameter to fit into an interchangeable filter mount, so that one mount only is required and a lens can be inserted in accordance with the distance at which one has to work.

The distances covered by these supplementary lenses, are (with any Exakta):—

Supplementary Lens	*Distance Covered*
+1 diopter	from 38 to 19 in. (100 to 50 cm.)
+2 diopter	from 19 to 13 in. (50 to 33 cm.)
+3 diopter	from 13 to 9½ in. (33 to 25 cm.)

The determination of the field covered, the distance at which the lens has to be set, as well as definition can be observed on the reflex ground-glass. The following table giving these figures is intended for general information and purposes of comparison:—

CLOSE-UP FOCUSING TABLE FOR SUPPLEMENTARY LENSES
(for Kine-Exakta, V.P. Exakta and 2¼ × 2¼ in. Exakta)
(For conversion into metric units, see p. 109.)

Setting of focusing mount in feet	Distance* with +1 diopter lens	Distance* with +2 diopter lens	Distance* with +3 diopter lens	Approximate field covered at A=∞ B=3½ feet
∞	38⅝ in.	19⅛ in.	13 in.	KINE-EXAKTA +1 *lens*
100	38⅛ in.	19⅜ in.	13 in.	A=28 × 18⅝ in.; B=14 × 9¼ in.
				+2 *lens*
50	37 in.	19⅛ in.	12⅞ in.	A=14 × 9⅜ in.; B=9¼ × 6⅛ in.
				+3 *lens*
25	34⅜ in.	18⅛ in.	12⅛ in.	A=9⅜ × 6¼ in.; B=6⅞ × 4⅛ in.
15	32⅜ in.	17⅜ in.	12¼ in.	V.P. EXAKTA +1 *lens*
				A=30 × 21⅝ in.; B=14⅜ × 10⅜ in.
10	29⅝ in.	16⅞ in.	11⅞ in.	+2 *lens*
8	27⅞ in.	16⅜ in.	11½ in.	A=14⅜ × 10⅜ in.; B=8⅞ × 6⅜ in.
				+3 *lens*
6	25¼ in.	15¼ in.	11⅛ in.	A=9⅜ × 7⅛ in.; B=7 × 5 in.
5	23⅜ in.	14⅝ in.	10⅝ in.	2¼ × 2¼ EXAKTA +1 *lens*
				A=30 × 30 in.; B=14⅜ × 14⅜ in.
4	21⅝ in.	14 in.	10⅜ in.	+2 *lens*
				A=14⅜ × 14⅜ in.; B=8⅞ × 8⅞ in.
3½	20⅜ in.	13⅜ in.	10 in.	+3 *lens*
3	18⅜ in.	12⅜ in.	9 in.	A=9⅜ × 9⅞ in.; B=7 × 7 in.

* Measured from front of supplementary lens.

It should be noted that *no change in exposure time is required when working with these close-up lenses.* To obtain perfect definition it is advisable to *stop down one stop.*

The depth of field, when working at such close range, is obviously a very small one. One can count on an approximate *total* depth of:—

6 in. with +1 diopter lens, at *f* 6.3 and infinity setting;
2 in. with +1 diopter lens, at *f* 6.3 and 3½ ft. setting;
2 in. with +2 diopter lens, at *f* 6.3 and infinity setting;
1 in. with +2 diopter lens, at *f* 6.3 and 3½ ft. setting;
1¼ in. with +3 diopter lens, at *f* 6.3 and infinity setting;
⅜ in. with +3 diopter lens, at *f* 6.3 and 3½ ft. setting.

Extension Tubes

They can be had in different lengths to increase the extension of the Exakta at will. Their purpose is somewhat similar to that of the supplementary lenses, but the working distances are rather less than with the latter. They allow photographs up to natural size and even larger than life-size to be taken straight on to the negative (see table, p. 100).

FOR THE V.P. EXAKTAS two tubes are available:

A = 1½ cm. covering approximately the same distance range as the +2 diopter supplementary lens.

B = 3 cm. covering part of the distance range of the +3 diopter lens.

Tubes A and B may be used together, allowing one to focus at around 10 in., or two tubes B joined together will produce pictures in natural size.

The effect of the extension tubes can also be supplemented by the close-up lenses to allow of photographs at still closer range.

To use the extension tubes, the taking lens is unscrewed, the extension tube is screwed into its place, and the lens now screwed into the front of the extension tube.

Tube A alone cannot be used with the Primoplan and Biotar lenses, as the lens panel is too long and strikes the edges inside the tube. The combination of tubes A and B may be employed with these lenses, tube B receiving the lens and tube A being screwed on the focusing mount of the camera.

The exposure time has to be Increased when using extension tubes. The approximate factors are:

For two tubes B : 4X. For tube B : 2½X.
For tubes A + B : 3X. For tube A : 2X.

FOR KINE-EXAKTAS. In principle, the same rules apply as detailed for V.P. Exakta. As the Kine-Exakta models have a bayonet fitting, a pair of adapting rings has to be used, adapting the extension tubes to the bayonet joints of camera and lens. These rings themselves act as a short extension tube .

Tube B = 3 cm. It is for close-ups between 7¾ and 7⅞ in.

Tube C = 0.5 cm. It gives the same performance regarding distance as a supplementary lens of +3 diopters.

And a special short extension tube D. It allows of focusing between 25 and 16 in.

A range of other combinations (see table p. 99) is possible equivalent to those of the V.P. Exakta, also similar exposure increase has to be taken into account.

To use the extension tubes, the lens has to be removed from the camera-body, the adapting ring (back-part) inserted; the extension tube or tubes may now be screwed into the adaptor; the front part of the adaptor is screwed in front of the tube to take the bayonet fitting Kine-Exakta lens.

CLOSE-UP TABLE FOR KINE-EXAKTA

With Attachment Rings, Tubes and Supplementary Lens

(As the figures for the various Kine-Exakta lenses differ to some degree we give here the values for the Exaktar *f* 3.5 5 cm. lens; for conversion into metric units see p. 109)

Arrangement	*Focusing distance*	*Field covered at* ∞	*Field covered at* 3 ft.	*Scale of reproduction* ∞	*Scale of reproduction* 3 ft.
Attachment rings only ...	... 17¾ – 13¼ in.	8¼ × 5½ in.	5½ × 3¾ in.	1 : 5.8	1 : 3.9
Supplementary lens only	... 20¾ – 13¾ in.	11 × 7½ in.	6⅜ × 4⅜ in.	1 : 7.8	1 : 4.5
Attachment rings + supplementary lens	11⅜ – 10 in.	4¾ × 3⅛ in.	3¼ × 2¼ in.	1 : 3.4	1 : 2.5
Attachment rings + tube C	... 13⅜ – 11⅜ in.	5½ × 3¾ in.	4⅛ × 2¾ in.	1 : 3.9	1 : 2.9
Attachment rings + tube B	... 9⅛ – 8¼ in.	2 × 1⅜ in.	1¾ × 1⅛ in.	1 : 1.4	1 : 1.3
Attachment rings + 2 tubes B	... 8¾ in.	1⅛ × ¾ in.	1 × ⅝ in.	1.29 : 1	1.38 : 1

CLOSE-UP TABLE FOR V.P. EXAKTA

Lens group:	A	B	C	D	E	F
With Supplementary lens	20–15 in.	21–16 in.	23–16 in.	24–18 in.	24–17 in.	21–12 in.
With Tube A	23–17 in.	26–20 in.	24–17 in.	27–20 in.	—	23–14 in.
With Tube B	14–13 in.	15–14 in.	14–13 in.	18–16 in.	16–14 in.	14–12 in.
With Tubes A and B ...	12½ in.	13½ in.	12½ in.	14½ in.	13½ in.	12–11 in.
With lens and Tube A ...	13–12 in.	14–13 in.	14–12½ in.	15½–14 in.	—	13½–11 in.
With lens and Tubes A & B	10⅛ in.	11 in.	10⅛ in.	12½ in.	11⅛ in.	10 in.

Lens group "A" comprises: Exaktar f 3.5, Primotar f 3.5, Ihagee-Anastigmat f 3.5
Lens group "B" comprises: Xenar f 3.5, Xenar f 2.8, Makro-Plasmat f 2.7, Tessar f 3.5
Lens group "C" comprises: Tessar f 2.8
Lens group "D" comprises: Xenon f 2
Lens group "E" comprises: Biotar f 2
Lens group "F" comprises: Ihagee-Anastigmat f 4.5

The above table gives the working distances, measured from back of camera with the various attachments. The higher figure indicates setting to infinity, the lower to closest lens setting.

Extension Tube for Tele Effect

For the Exakta, a negative (Tele) supplementary lens together with an extension tube has been supplied, increasing the focal length of the lens to 6.2 cm. ($2\frac{7}{16}$ in.) in Kine-Exakta and 10.5 c.m. ($4\frac{1}{8}$ in.) in V.P. Exakta. The fact that with this tele lens and tube the exposure time will have to be doubled and, in addition, stopping down to *f* 11 is necessary to get satisfactory definition (one consequently has an effective working aperture *f* 16), makes this additional possibility of the Exakta never very popular. Only in exceptionally favourable circumstances can an instantaneous exposure be arrived at.

EXAKTA ACCESSORIES

FINDER HOOD EXTENSION. This is a collapsible leather box with a magnifier in its top, and can be pushed over the reflex hood of Kine-Exakta and V.P. Exakta. It cuts out stray light, increases the brilliancy of the reflex image and makes focusing easier. A version of this hood without magnifying glass may be had for the V.P. Exakta (p. 27).

EXAKTA LENS HOOD. To protect one's lens against stray light from objects outside the picture area, particularly when photographing against the light, a lens hood has to be used. This is a metal tube placed over the front of the lens. *There is no picture which could not be improved in clarity and brilliancy by the use of a lens hood.* Various lens hoods are available for the different Exakta lenses. The Exakta lens hoods are slightly conical shaped tubes which are pushed on to the lens mount of our Exakta lenses (p. 103).

EXAKTA FOCUSING PIN. The helical focusing mount of the V.P. Exakta is provided with a small threaded hole for the reception of a pin with a milled handle which facilitates quick focusing (p. 103).

EXAKTA BUTTON RELEASE. A convex metal button can be screwed into the release knob, increasing its surface. It facilitates releasing the shutter while wearing gloves (p. 103).

CABLE RELEASE. A special cable release is supplied for the Exakta which screws into the screw thread in the centre of the release button. (Its push pin is rather stronger than that of the normal cable releases.)

TO WORK WITH FLASH indoors and without any special gadgets mount the Exakta on a tripod, set distance, shutter to "B" and the stop according to the distance between flash and subject. The instructions with the flash-bulbs sometimes include a table showing the correct aperture for various distances (see table on p. 104). Ordinary room light can be left switched on as long as it does not shine on to the lens. Press shutter release and keep it pressed down, while releasing the flash-bulb by means of a 4.5 volt pocket torch, then let go shutter release.

A better method consists in using a flash-bulb release "synchronizer", which automatically opens the shutter, releases the flash-bulb and closes the shutter again. Since these releases work with intervals of about 1/5 sec. between the actions it is possible to dispense with a tripod and to make action shots indoors.

More exactly adapted to the camera are synchronizers such as the "Exakta flashlight synchronizer", which allows the Exakta shutter to be set to the slower instantaneous speeds up to 1/50 sec. The synchronization between attachment and shutter is such that immediately the shutter opens combustion occurs. The left-hand front wall of the Exakta is fitted with two metal sockets which are electrically connected with the Exakta shutter. The battery and lampholder, fitted

with a flash-bulb of the Exakta flash outfit, is plugged with its two projecting pins into the sockets on the camera-body *after* the shutter has been wound and set. A reflector, silvered on the inside, is clipped round the bulb. When releasing the shutter, combustion is effected simultaneously. Make sure that fresh batteries are used.

Kine-Exaktas II, V and VX have two sets of flash synchronising contacts, one marked "V" for flash bulbs, and one "E" for electronic flash. When using electronic flash or small flashbulbs (SM, etc.) set the shutter to 1/25 sec., with larger bulbs any speed may be used (see also p. 104).

The makers of the Exakta also supply a variation of this flash outfit which allows of an increased flexibility in action. This "large outfit" consists of battery holder, reflector, a flexible cable and a camera connecting piece by means of which the battery holder with lamp can be placed some distance from the camera. Further, there is a flexible extension allowing for some distance between battery holder and lamp and a junction piece permitting the firing of several flashes at the same time. Finally, a simple clamping holder allows one to fix the battery holder to a table or other support. (This clamping holder may also be used with the camera for upright pictures, giving a firm support.)

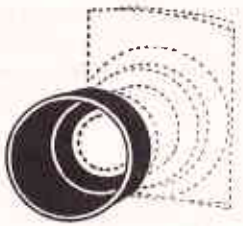
The post-war Exakta flashgun is fixed below the camera body and is of a somewhat different design (p. 103).

PHOTO-MICRO ATTACHMENT. The micro attachment (p. 103) of the Exakta consists simply of a metal tube which can be fitted to the microscope around the draw-tube holding the eye-piece; hinged to this is a second tube which fastens to the Exakta body. After connecting the Exakta by means of the hinged tubes to the microscope, the camera is swung to one side. The microscope can now be used in the usual way, set and focused. Now the Exakta is swung back into taking position. The ground-glass screen image of the Exakta shows the correct image and definition that will appear on the negative. Adjustments which may be found necessary, both as regards picture frame and focusing, can be corrected by observation through the reflex image. Particularly when taking living objects, following up the object on the reflex image by moving the mechanical stage of the microscope or the slide may prove invaluable. The degree of enlargement is determined by objective and eye-piece.

PRISM ATTACHMENT FOR KINE EXAKTA. This is pushed over the opened finder hood, and allows the camera to be used at eye-level. The full reflex image is visible, right way up and right way round. The image in the finder therefore moves in the same direction as the object. This is particularly valuable in following moving subjects in the viewfinder. The prism attachment carries an additional magnifier for critical focusing. While it is securely fixed to the camera so that it cannot fall off, it can at any time be removed to use the camera in the ordinary way.

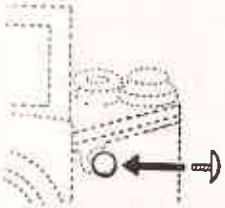
REWIND CRANK FOR KINE EXAKTA. This is a special crank which can be pushed onto the rewind knob. It considerably simplifies and speeds up rewinding of the film into the cartridge.

Extension rings (pp. 98, 100).



Lens hood (p. 101)

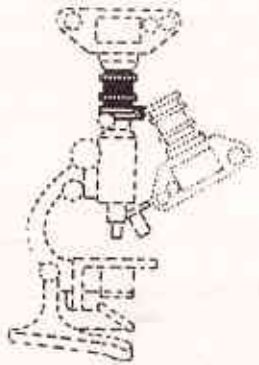
Focusing pin (p. 101).



Button release (p. 101)

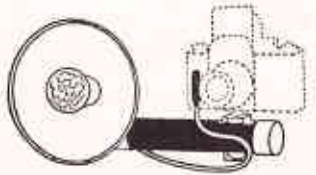
Filter and supplementary lens (p. 93)

Prism attachment (p. 102)



Micro attachment (p. 102).

Rewind Crank (p. 102)



Flashlight outfit (p .101).

Shutter set to "B", or 1/25 sec. with synchronising contact used, procedure as explained on p. 102.

Distance	Mazda or G.E.C.: SM	Philips: PF14	Mazda or G.E.C.: No. 5	Philips: PF25	Mazda or G.E.C.: No. 22 Philips: PF60
6 ft. (2 m.)	f 16	f 16	—	—	—
8 ft. (2.5 m.)	f 12.5	f 16	—	—	—
10 ft. (3 m.)	f 10	f 12.5	f 16	—	—
15 ft. (4.5 m.)	f 6.3	f 9	f 11	f 12.5	f 16
20 ft. (6 m.)	f 4.5	f 6.3	f 8	f 10	f 12.5
30 ft. (9 m.)	f 3.5	f 4.5	f 5.6	f 6.3	f 9

Exposures with Mazda or G.E.C. No. 22, or Philips PF60 bulbs, and "V" contacts used for synchronisation.

Shutter	Distance: Up to 10 ft. (3 m.)	10–15 ft. (3–4.5 m.)	15–20 ft. (4.5–6 m.)	20–30 ft. (6–9 m.)	30–50 ft. (9–15 m.)
1/100 ...	f 16	f 11	f 8	f 5.6	f 4
1/250 ...	f 11	f 8	f 5.6	f 4	f 2.8
1/500 ...	f 8	f 5.6	f 4	f 2.8	f 1.9
1/1000 ...	f 5.6	f 4	f 2.8	f 1.9	—

All these exposures apply to rooms of average brightness, and 32° Sch. (100–125 ASA) film. In bright rooms, or with faster films, use next smaller aperture. In dark-walled rooms, or with 27° Sch. (64–80 ASA) films use next larger aperture. Outdoors at night increase aperture by two stops.

SUBJECTS IN FRONT OF THE EXAKTA

Most of what can be said about photographing one subject or the other holds good for any type of camera. Here, we propose only to list points which appear more or less particular to the Exaktas or to cameras based on the same principle. We shall confine ourselves to statements in telegram style. The reader interested in the whys, ifs and buts will find good literature recommended under each subject.

Landscapes

AIM: The mood, pattern or detail of a scene; not picture post-cards.

ADVANTAGES: Finding and composing the picture with the help of the ground-glass screen.

HANDICAPS: Trees, woods, cliffs and other subjects of predominantly vertical shape do not fit easily into the oblong frame.

VIEWPOINT: Any that includes foreground interests and avoids foreground waste.

LENS: Standard and long-focus lenses.

FOCUSING: At foreground including the main subject; background blur can usually be tolerated.

STOP: Moderate; small stops to provide all-over sharpness useful only in exceptional cases.

SHUTTER SPEED: Should be measured as carefully as possible to get negatives showing full range of tones.

ACCESSORIES: Lens-hood in every case where, when using a lens-hood, the ground-glass image appears more brilliant; filters for cloud effects or to create tone contrast.

PITFALLS: (*a*) Being misled by colours instead of relying on forms. (*b*) Over-filtering and thus killing atmospheric depth. (*c*) Trying to include distant detail that is beyond the resolving power of the small-size negative.

LITERATURE: The *focal* Photo Guides, "All About Landscapes", *Hugo von Wadenoyen*, and "All About Composition," by *A. Krasznа-Krausz*.

Architecture

AIM: The beauty of architectural detail, the play of light and shade, old-world atmosphere; not the documentary record.

ADVANTAGES: Use of the ground-glass screen to control the straightness of perpendiculars.

HANDICAPS: Difficulties of tackling subjects which, more often than not, are tall and do not give the photographer space to retreat far enough away from them; the camera does not offer special facilities, similar to those of field cameras, for preventing distortion.

VIEWPOINT: Any from which one can work without tilting the camera.

LENS: Wide-angle lenses when working in limited space, long-focus lenses for architectural detail.

FOCUSING: On the ground-glass screen, using the magnifier to make sure of sharp definition.

STOP: Smaller stops to ensure greatest possible depth of focus.

SHUTTER SPEEDS: Mostly slow.

ACCESSORIES: Tripod for long exposures; flash-gun for adverse lighting conditions.

PITFALLS: Half-hearted tilting that just slants the verticals; better to tilt radically and thus resort openly to unusual views.

LITERATURE: The *focal* Photo Guides, "All About Architecture," by *R. M. Fanstone* and "All About Pictures in Town" by *Hugo van Wadenoyen*.

Portraits

AIM: Characteristic facial expressions, lively views of people alive; not poses.

ADVANTAGES: Unobtrusive observation of the subject on the ground-glass screen while avoiding the menacing "shooting" approach of range-finder cameras.

HANDICAPS: The difficulty of photographing full figures of tall subjects with cameras producing oblong negatives.

VIEWPOINT: As near level as possible with the model's face.

LENS: Large aperture, long-focus lenses.

FOCUSING: At the eyes of the subject; control of critical definition with the magnifier.

STOP: Just enough to include the subject in the zone of sharpness while throwing his background out of focus.

SHUTTER SPEED: Moderate instantaneous exposure (around 1/50 sec.).

ACCESSORIES: Reflectors to obviate shadows.

PITFALLS: (*a*) Use of short-focus lenses that easily lead to perspective distortion (big noses). (*b*) Crowded backgrounds which can mar any picture if not subdued.

LITERATURE: The *focal* Photo Guide, "All About Portraits," by *Hugo van Wadenoyen*, and the comprehensive work of the same author, "Photographing People."

Children and Animals

AIM: Life and movement; not staged idylls.

ADVANTAGES: Unobtrusive observation on the ground-glass screen, the convenience of finding low viewpoints.

HANDICAPS: The noise of the shutter when dealing with very shy subjects.

VIEWPOINT: The subject's own level, that is, usually low; not too near to avoid the subject's immediate circle of attention; "round-the-corner" approach with shy subjects.

LENS: Wide-angle indoors, long-focus lenses in the open.

FOCUSING: Safety zone focusing to provide sufficient margin of definition for sudden movements of the subject.

STOP: Medium aperture.

SHUTTER SPEEDS: Instantaneous from 1/50 sec. upwards.

ACCESSORIES: Flash, if artificial light necessary.

PITFALLS: Trying to trick the subjects or to enforce in any way the photographer's idea of how the picture ought to look.

LITERATURE: "Nature and Camera," by *O. G. Pike*, and The *focal* Photo Guides "All About Cats and Kittens" and "All About Dogs and Puppies" by *Philip Johnson*, and "All About Children Indoors" and "All About Children Outdoors" by *Hugo van Wadenoyen*.

Action

AIM: Dramatic high points, not the "even" phases of the movement.

ADVANTAGES: None.

HANDICAPS: The natural limitations of reflex cameras when it comes to "shooting" photography.

VIEWPOINT: At some distance and at an acute angle with the direction of the movement to keep its apparent speed within the scope of the shutter, using eye level frame-finder.

LENS: Standard lenses of large aperture to compensate for short shutter speeds.

FOCUSING: Pre-focusing on the point where action is expected.

STOP: Only if unavoidable to ensure a zone of sharpness.

SHUTTER SPEED: Minimum speed to arrest the movement in question (see table, p. 108).

ACCESSORIES: Flash if lighting conditions adverse.

PITFALLS: (*a*) Following the wrong direction by dividing attention between subject and image movement on the ground-glass screen—which should not be used at all for this type of work. (*b*) Excessive blur of the moving subject due to being too close to it, and/or at right angles with its direction of movement. (*c*) Elongation of image when shutter speed lags behind the speed of the subject while moving in the same direction; it is better to photograph from an angle that allows the shutter to move into a direction opposite to the subject.

LITERATURE: The *focal* Photo Guides, "All About the Right Moment," by *Alex Strasser*, and "All About Sport and Games," by *Lancelot Vining*, also *Lancelot Vining's* book, "My Way with the Miniature."

SHUTTER SPEEDS TO ARREST MOVEMENT

Subject	Speed in m.p.h.
Swimmer ...	2½
Walker ...	3
Runner ...	12½
Cyclist ...	15
Skater ...	28
Horse walking	4
,, trotting	9
,, galloping	19
Racehorse ...	31
Waves ...	15
Heavy waves	44
Boats making 10 knots ...	10
Boats making 20 knots ...	20
Tramcar ...	9
Motor car on road ...	35
Slow train ...	25
Express train	60
Aeroplane ...	95

The values given are for PERPENDICULAR displacement to the optical axis.
MOTION 45° to optical axis increase time by 50 per cent.
MOTION parallel to optical axis increase time 300 per cent.

With Normal Focal Length Lens	Distance Between Camera and Object					
	3 m. / 10 ft.	5 m. / 17 ft.	7.5 m. / 25 ft.	12.5 m. / 42 ft.	25 m. / 83 ft.	50 m. / 165 ft.
Speed m.p.h.	Shutter Speeds in Fractions of Seconds					
0—1	1/50	1/20	1/16	1/12	2/5	1/2
2	1/60	1/30	1/25	1/15	1/8	1/3
3	1/100	1/60	1/40	1/25	1/12	1/6
4	1/125	1/75	1/50	1/30	1/15	1/8
6	1/200	1/100	1/75	1/50	1/25	1/10
8	1/250	1/150	1/100	1/60	1/30	1/15
10	1/300	1/200	1/125	1/75	1/60	1/30
20	1/600	1/400	1/250	1/150	1/75	1/40
30	1/1000	1/600	1/400	1/250	1/125	1/60
40	1/1250	1/750	1/500	1/300	1/150	1/75
60	1/2000	1/1000	1/750	1/500	1/250	1/100
80	1/2400	1/1500	1/1000	1/600	1/300	1/150
100	1/3000	1/2000	1/1250	1/750	1/400	1/200

With a wide-angle lens of two-thirds of the normal focal length the exposure time can be one-third longer than indicated above, while with a lens twice the normal focal length only half the exposure time is permissible and with three times the normal focal length only one-third of the time listed above for normal focal length lenses should be used.

CONVERSION OF FEET AND INCHES INTO METRIC UNITS

Many cameras are marked only in either the metric or British system, while most of the tables in this book are also given in only one system. The following table shows at a glance equivalent lengths.

British to metric.		Metric to British.	
⅛ in.	0.32 cm.	0.5 cm.	3/16 in.
¼ in.	0.64 cm.	1 cm.	⅜ in.
½ in.	1.27 cm.	2 cm.	13/16 in.
1 in.	2.54 cm.	3 cm.	1 3/16 in.
2 in.	5.08 cm.	4 cm.	1 9/16 in.
3 in.	7.62 cm.	5 cm.	1 15/16 in.
4 in.	10.2 cm.	6 cm.	2⅜ in.
5 in.	12.7 cm.	7 cm.	2¾ in.
6 in.	15.2 cm.	8 cm.	3⅛ in.
7 in.	17.8 cm.	9 cm.	3½ in.
8 in.	20.3 cm.	10 cm.	3 13/16 in.
9 in.	22.9 cm.	12 cm.	4¾ in.
10 in.	25.4 cm.	15 cm.	5⅞ in.
11 in.	27.9 cm.	20 cm.	7⅞ in.
1 ft.	30.5 cm.	25 cm.	9 13/16 in.
2 ft.	61.0 cm.	30 cm.	11¾ in.
3 ft.	91.4 cm.	40 cm.	15¾ in.
4 ft.	1.22 m.	50 cm.	19¾ in.
5 ft.	1.52 m.	60 cm.	23⅝ in.
6 ft.	1.83 m.	80 cm.	31½ in.
7 ft.	2.13 m.	100 cm.	39½ in.
8 ft.	2.44 m.	1.5 m.	4 ft. 11 in.
9 ft.	2.74 m.	2 m.	6 ft. 7 in.
10 ft.	3.05 m.	2.5 m.	8 ft. 3 in.
15 ft.	4.57 m.	3 m.	9 ft. 10 in.
20 ft.	6.10 m.	4 m.	13 ft. 2 in.
30 ft.	9.14 m.	5 m.	16 ft. 5 in.
40 ft.	12.20 m.	10 m.	33 ft. 0 in.
50 ft.	15.24 m.	15 m.	49 ft. 2 in.
100 ft.	30.48 m.	20 m.	66 ft. 0 in.

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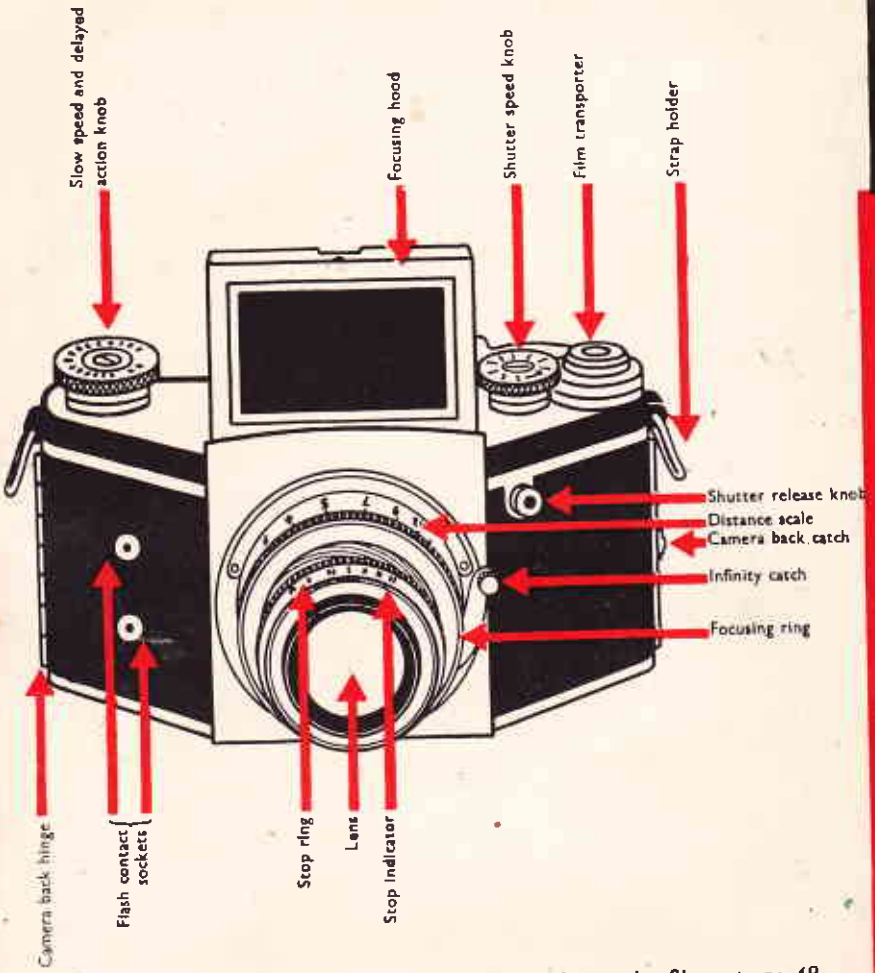

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