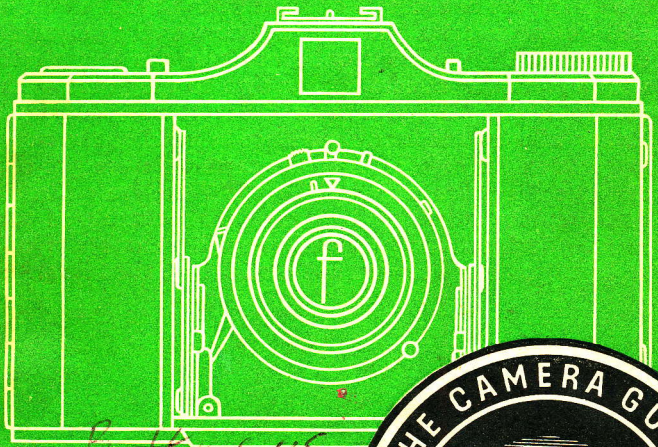
NETTAR GUIDE

IKONTA I & II



THE CAMERA GUIDE

FOCAL PRESS

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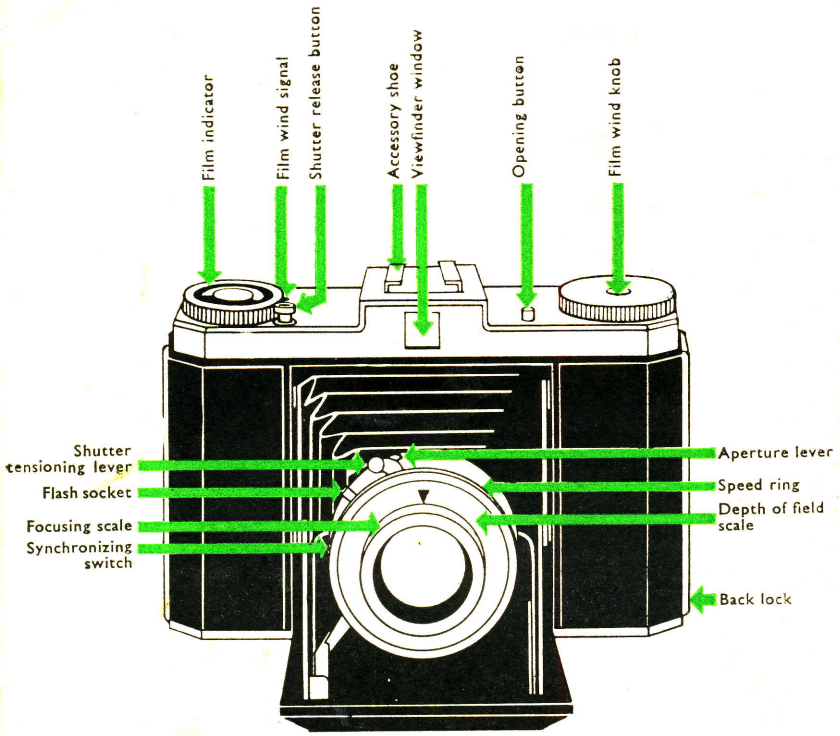

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THE NETTAR AND THE IKONTA CAMERAS

The Nettar and the Ikonta are roll film cameras of the folding type, fitted with a variety of lenses and shutters and taking different picture sizes. They are designed to suit the diverse requirements in dimensions, performance and price of the amateur photographer.

It should be stated at this stage that Ikonta models are numerous and widely varied. They include, in addition to the simple roll film cameras dealt with in this guide, more advanced models with built-in rangefinder, and miniature cameras for 35 mm. film. These are the subject of separate Camera Guides.

Both the Nettar and the Ikonta have been produced over a period of almost twenty years. They have in the course of time undergone changes in construction and been fitted with improvements. Any significant change in the development of these camera models is covered in this guide, though minor alterations which are of no material consequence, may not always be listed.

The two cameras were constructed with particular regard to simple and quick handling and ability to stand up to hard wear. Yet they are of the smallest possible dimensions consistent with full efficiency.

The Nettars

Basically, the Nettar is a standard roll film model equipped with a range of lenses from the inexpensive to the medium priced, and fitted with appropriate shutters.

1. THE $2\frac{1}{4} \times 3\frac{1}{4}$ in. NETTAR will take 8 exposures on standard 120 size film. It has an all-metal body with hinged back and is connected with leather bellows to the self-erecting front. Focusing is done by means of the front cell. The camera is also fitted with a brilliant reflecting finder and direct vision frame finder, and is covered in black leatherette. The early model (*Code 510/2*), was fitted with an *f* 7.7 Nettar lens in a 2-speed shutter, with or without built-in delayed action release.

Its successor (*Code 515/2*), was similar in design. The earlier models of this were without body release. Later ones had this addition, but all were fitted with faster lenses and speedier shutter, namely the Nettar *f* 6.3, *f* 4.5, or *f* 3.5, or Tessar *f* 4.5 in Derval, Klio, Telma, or Compur shutters.

The early post-war cameras were equipped with Vario, Pronto, or Prontor S shutters.

In 1952 this type was redesigned and marketed as the Nettar II. It was more streamlined, had an optical direct vision finder built into the camera body (*Code 517/2*), and a Novar *f* 6.3, or *f* 4.5 in Vario, Pronto, or Prontor SV shutter was fitted as well as a depth of field indicator.

2. THE $1\frac{5}{8} \times 2\frac{1}{4}$ in. NETTAR takes 16 exposures on standard 120 size film and has similar specifications to the $2\frac{1}{4} \times 3\frac{1}{4}$ in. model, but is without brilliant-reflecting finder. The early model (*Code 510*) was fitted with a Nettar *f* 6.3 in a Derval shutter. Its successor (*Code 515*) was of nearly identical design but fitted with the *f* 4.5 Nettar in a Klio shutter, first without, later with, built-in body release. This model has not been re-introduced since the end of the war.

3. THE $2\frac{1}{4} \times 2\frac{1}{4}$ in. NETTAR was first introduced towards the end of 1938 (*Code 515/16*), and was designed for 12 exposures on standard 120 film. It is of the same design as the $1\frac{5}{8} \times 2\frac{1}{4}$ in. Nettar (*Code 515*) and fitted with a Nettar *f* 6.3 or *f* 4.5 in a Telma or Klio shutter. Early post-war models were equipped with Vario, Pronto, or Prontor S shutters.

In 1952 the redesigned $2\frac{1}{4} \times 2\frac{1}{4}$ in. Nettar was introduced on the market as the Nettar II (*Code 517/16*). This was more streamlined, with an optical direct vision finder built in, and fitted with a Novar *f* 6.3 or *f* 4.5 in Vario, Pronto, or Prontor SV shutter. It also has a depth of field indicator.

The Ikontas

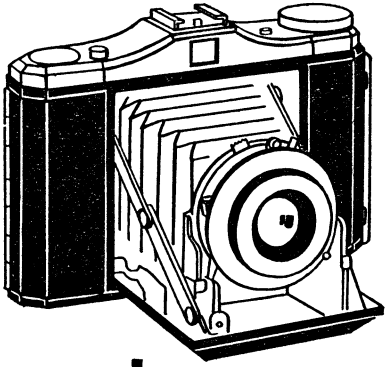
The Ikonta is the somewhat more de luxe counterpart of the Nettar, with superior body finish and lenses of high performance.

1. THE BABY IKONTA is intended for 16 pictures $1\frac{1}{4} \times 1\frac{5}{8}$ in. (3 × 4 cm.) on standard vest-pocket film (127 size), and is of the smallest possible dimensions, $1 \times 2\frac{1}{2} \times 3\frac{7}{8}$ in., weighing 12 oz. The body is all metal, with hinged back and is finished in black enamel, with nickel-plated fittings; the fully self-erecting front gives perfect rigidity. Focusing operates by means of the front cell from 3 ft. to infinity. The finder is of the folding direct vision frame type. Leather bellows connect the camera front to the back.

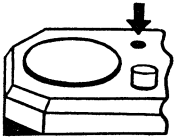
A variety of lenses from the *f* 6.3 Novar to the fast *f* 3.5 Tessar have been fitted in shutters ranging from the simple two-speed to the elaborate Compur Rapid. A tripod bush is let into the camera body. This model was discontinued in 1938.

The Code No. of the Baby Ikonta is 520/18.

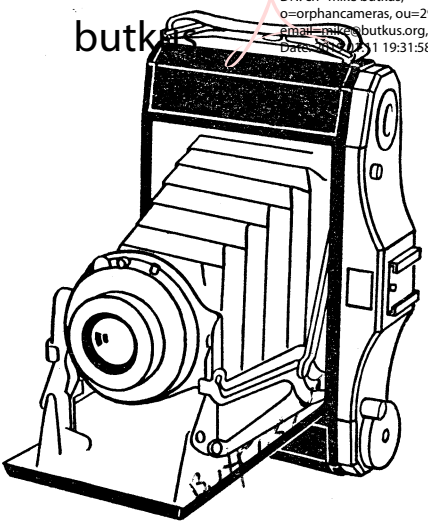
CURRENT NETTAR MODELS (page 4)



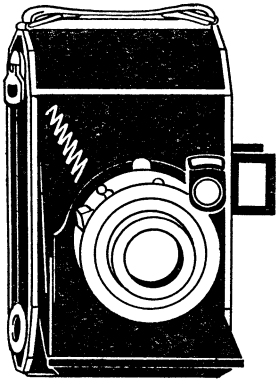
The $2\frac{1}{4}$ in. square Nettar II is the latest of the $2\frac{1}{4}$ in. square Nettars. Like the preceding models it takes 12 exposures. A built-in optical viewfinder takes the place of the direct vision finder and carries a shoe for accessories. The shutter fitted is synchronized and the lens is coated. Also fitted is a depth of field indicator. Code No. 517/16.



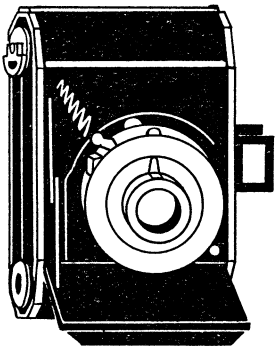
Since Autumn 1953 this model is also supplied with double exposure lock.



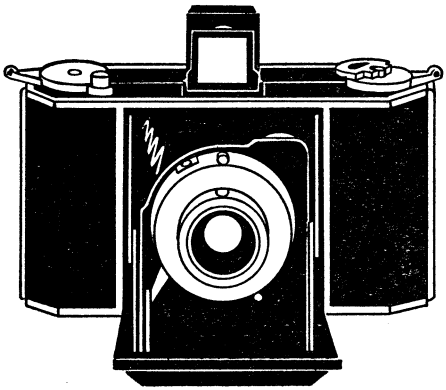
The $2\frac{1}{4} \times 3\frac{1}{4}$ in. Nettar II is the latest of the $2\frac{1}{4} \times 3\frac{1}{4}$ in. Nettars. Like the preceding models it takes 8 exposures. The shutter fitted is synchronized and the lens coated. An optical viewfinder is built-in and carries a shoe for accessories. Also fitted are a body release and double exposure lock as well as a depth of field indicator. Code No. 517/2.



The $2\frac{1}{4} \times 3\frac{1}{4}$ *in. Nettar* takes 8 exposures on standard 120 film. A brilliant reflecting viewfinder is fitted as well as the direct vision finder. The *f* 7.7 lens is mounted in a two-speed shutter. Later models carry faster lenses and multiple speed shutters and are also fitted with a body release. Code No. 510/2.



The $1\frac{5}{8} \times 2\frac{1}{4}$ *in. Nettar* takes 16 exposures on standard 120 film. It is similar to the $2\frac{1}{4} \times 3\frac{1}{4}$ in. Nettar but is not fitted with a brilliant reflecting viewfinder. An *f* 6.3 lens is mounted in a 3-speed shutter. Later models carry an *f* 4.5 lens in an 8-speed shutter. Code No. 510.



The $2\frac{1}{4}$ *in. square Nettar*, takes 12 exposures on standard 120 film. It is similar to the $1\frac{5}{8} \times 2\frac{1}{4}$ in. Nettar and *f* 6.3 or *f* 4.5 lenses are mounted in 3 or 8-speed shutters. Code No. 515/16.

2. THE $1\frac{5}{8} \times 2\frac{1}{4}$ in. IKONTA takes 16 pictures, $1\frac{5}{8} \times 2\frac{1}{4}$ in. (4.5 × 6 cm.) on standard $2\frac{1}{4} \times 3\frac{1}{4}$ in. film (120 size). The dimensions of this model are $1\frac{3}{16} \times 3 \times 4\frac{1}{2}$ in., weight 14 oz. The body is of hard aluminium alloy with hinged back; the front is fully self-erecting, giving perfect rigidity; metal parts are stove enamelled, and fittings nickel-plated. Focusing is effected by rotating the front cell. The front is connected with leather bellows to the camera back. A variety of lenses from the Novar *f* 6.3 to the fast Tessar *f* 3.5 have been fitted in shutters varying from the three-speed Derval to the Compur Rapid. The finder is of the direct vision folding type. *The Code No. of this Ikonta is 520.*

The models made in 1936 are suitable for use with both 120 and the metal, narrow core 620 spools.

In 1937 an improved model of this camera came on the market (*with Code No. 521*) having a body release and metal fittings in chrome finish.

In 1939 the $1\frac{5}{8} \times 2\frac{1}{4}$ in. Ikonta was also equipped with a double-exposure lock. (*Code No. remained 521.*)

Post-war models are unchanged. Those produced since 1950 have coated lenses and flash-synchronized shutters (*Code No. unchanged, 521*).

3. THE $2\frac{1}{4}$ in. SQUARE IKONTA is for 12 exposures, $2\frac{1}{4} \times 2\frac{1}{4}$ in. (6 × 6 cm.) on standard $2\frac{1}{4} \times 3\frac{1}{4}$ in. film (120 size). The dimensions of this model are $1\frac{1}{4} \times 3 \times 5\frac{1}{4}$ in., weight 19 oz. The general description is the same as for the $1\frac{5}{8} \times 2\frac{1}{4}$ in. Ikonta (see above).

While the first models (1937) were fitted with body release, the later ones (from 1938 on) had also a double-exposure lock. *The Code No. of the $2\frac{1}{4}$ square Ikonta is 521/16.*

Post-war models are similar, and are now called Ikonta I (*Code No. still 521/16*). Those produced since 1950 have coated lenses and flash-synchronized shutters.

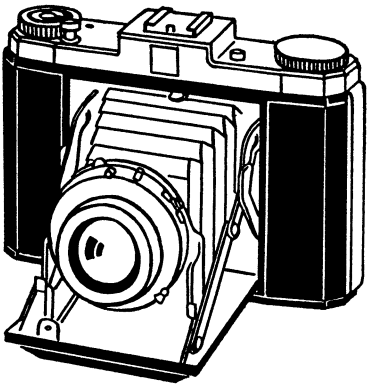
In 1951 this model was replaced by the Ikonta II (*Code No. 523/16*), which has a built-in optical finder instead of the folding one, a depth of field indicator, and carries an accessory shoe.

4. THE $2\frac{1}{4} \times 3\frac{1}{4}$ in. IKONTA takes 8 exposures, $2\frac{1}{4} \times 3\frac{1}{4}$ in. (6 × 9 cm.) on standard $2\frac{1}{4} \times 3\frac{1}{4}$ in. film (120 size). The models made during 1936 are suitable also for use with the narrow metal core 620 spools. The dimensions of this model are $1\frac{5}{8} \times 3\frac{1}{8} \times 6\frac{3}{8}$ in., weight 24 oz.

From 1936 on the $2\frac{1}{4} \times 3\frac{1}{4}$ in. Ikonta was fitted with a second film window and mask for taking 16 exposures, $1\frac{5}{8} \times 2\frac{1}{4}$ in. (4.5 × 6 cm.) on the same film. Its general description is the same as that of the $1\frac{5}{8} \times 2\frac{1}{4}$ in. Ikonta (see above), except that it is fitted with two finders, the direct vision eye level and a reversing reflecting (brilliant) finder. *The Code No. of the $2\frac{1}{4} \times 3\frac{1}{4}$ Ikonta is 520/2.*

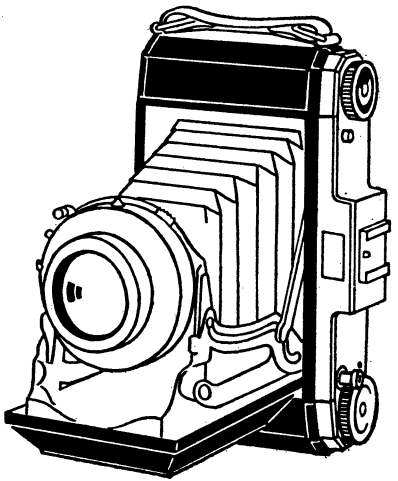
In 1937 the direct vision optical finder was replaced by the Albada finder and a body release was incorporated. (*Code No. unchanged 520/2.*)

In 1938 the double-exposure lock was added and all metal fittings chrome finished. However, the reflecting finder was omitted and the direct vision optical finder re-installed.



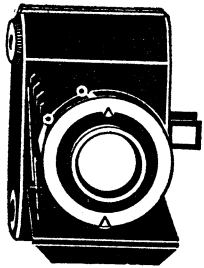
The $2\frac{1}{4}$ in. square Ikonta II is the latest of the $2\frac{1}{4}$ in. square Ikontas. Like the preceding models it takes 12 exposures. The camera is fitted with a double exposure lock and a body release. A built-in optical viewfinder takes the place of the direct vision finder, and carries a shoe for accessories. The shutter fitted is synchronized and the lens is coated. Code No. 523/16.

The $2\frac{1}{4} \times 3\frac{1}{4}$ in. Ikonta is the latest of the $2\frac{1}{4} \times 3\frac{1}{4}$ in. Ikontas. It takes 8 exposures. This model is fitted with a synchronized shutter, has a coated lens and a depth of field indicator. An optical viewfinder is built-in and carries an accessory shoe. Also fitted are a body release and a double exposure lock. Code No. 523/2.

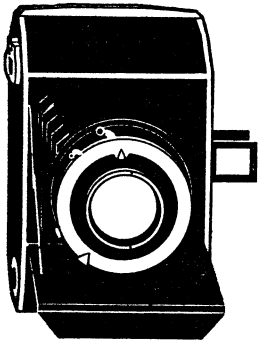


The $1\frac{5}{8} \times 2\frac{1}{4}$ in. Ikonta is basically the same as the earlier models and still carries the same code number.

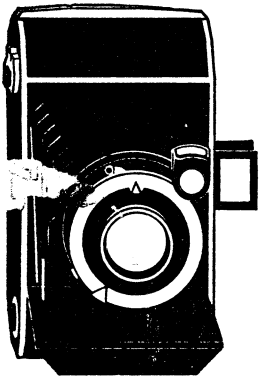
ORIGINAL IKONTAS (page 5)



The Baby Ikonta takes 16 exposures on standard 127 film. It is fitted with a direct vision finder. A variety of lenses from *f* 6.3 to *f* 3.5 are fitted in shutters ranging from 2-speed to 8-speed models. Code No. 520/18.

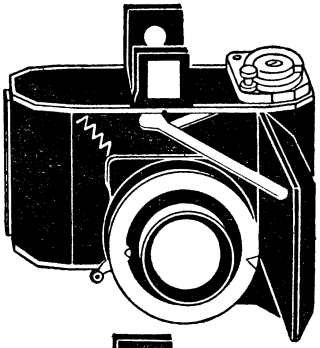


The $1\frac{5}{8} \times 2\frac{1}{4}$ *in. Ikonta* takes 16 exposures on standard 120 film. It is similar to the Baby Ikonta. The post-war models are unchanged. Code No. 520.

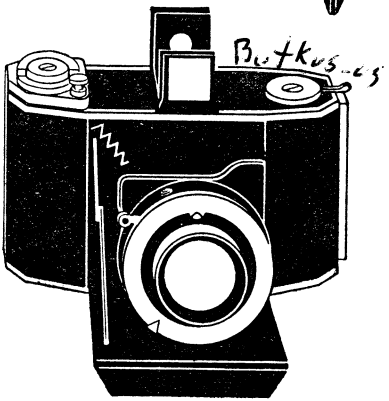


The $2\frac{1}{4} \times 3\frac{1}{4}$ *in. Ikonta* takes 8 exposures on standard 120 film. This model is fitted with a brilliant reflecting viewfinder in addition to the direct vision finder. In other respects it is very similar to the $1\frac{5}{8} \times 2\frac{1}{4}$ in. Ikonta. Code No. 520/2.

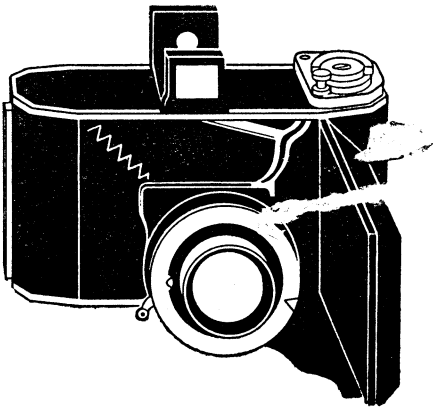
LATER IKONTAS (page 5)



The $1\frac{3}{4} \times 2\frac{1}{4}$ in. Ikonta is similar to the Baby Ikonta, but this later model has a body release for greater convenience. It also has a double exposure lock to avoid two or more exposures on one frame of film. A signal window shows red when the film has been wound on.



The $2\frac{1}{4}$ in. square Ikonta takes 12 exposures on standard 120 film. It is fitted with a direct vision viewfinder. Its construction is similar to the $1\frac{5}{8} \times 2\frac{1}{4}$ Ikonta. Code No. 521/16.



The $2\frac{1}{4} \times 3\frac{1}{4}$ in. Ikonta takes 8 exposures on standard 120 film and is very similar in construction to the original $2\frac{1}{4} \times 3\frac{1}{4}$ in. Ikonta. The brilliant reflecting viewfinder has been discontinued but a body release is fitted. Also a double exposure lock is built-in to avoid two or more exposures on one frame of film. Code No. 521/2.

In 1939 the masking device was dropped. (*Code No. of these last versions 521/2.*)

Post-war models are similar. Those produced since 1950 have coated lenses and flash-synchronized shutters (*Code No. still 521/2*).

In 1951 this model was replaced by the Ikonta II (*Code No. 523/2*), which has an optical finder instead of the folding one, a depth of field indicator, and an accessory shoe.

5. THE $2\frac{1}{2} \times 4\frac{1}{4}$ in. IKONTA will take 8 exposures, $2\frac{1}{2} \times 4\frac{1}{4}$ in. (6.5 × 11 cm.) on $2\frac{1}{2} \times 4\frac{1}{4}$ in. film on metal spool (616 size). The dimensions of this model are $1\frac{5}{8} \times 3\frac{1}{2} \times 7\frac{3}{8}$ in., weight 30 oz.

From 1936 on it has been fitted with a second film window and mask allowing 16 exposures, $2\frac{1}{8} \times 2\frac{1}{2}$ in. (5.5 × 6.5 cm.) to be made. Its general description is the same as that for the 4.5 × 6 cm. Ikonta (see above) except that it is fitted with two finders: the direct vision eye level optical and a reversing reflecting (brilliant) finder. This model was discontinued in 1939. *The Code No. of this model is 520/15.*

The Lenses

The lenses of the Nettar and Ikonta are not interchangeable and consequently neither telephoto nor wide angle lenses can be used. The only optical supplementary equipment employable consists of converging meniscus lenses which allow the camera to be set at nearer distances than would be possible with the unaided lens (see p. 49).

THE NOVAR is a three-lens, air spaced, anastigmat made in three apertures: *f* 6.3, *f* 4.5, *f* 3.5. It has a good standard of definition over the entire negative field even at full aperture and is gradually improved when stopped down to *f* 8. It is suitable for all general photographic work.

The *f* 4.5 lens, being twice as fast as *f* 6.3, allows work under unfavourable light conditions. The *f* 3.5 lens is again almost twice as fast as the *f* 4.5 lens and almost four times as fast as the *f* 6.3 Novar, and can usefully be employed for taking photographs in particularly poor light, of fast moving subjects, in sports photography, etc.

THE NETTAR, fitted to early Nettar cameras, is of similar construction to the Novar and was also made in *f* 7.7.

THE TESSAR is a four-lens anastigmat, front component air spaced, back component cemented. It is accepted throughout the world as a high-class optical design. The definition is considered very good even at full aperture, covering the negative fully and evenly illuminating it to the very corners, and it has great brilliancy. The best performance of the Tessar is given around *f* 5.6; the corrections remains undiminished at smaller apertures. Tessars of varying apertures are built into the Ikonta.

The Tessar *f* 4.5 may be called a universal type suitable for all average exposures including landscapes, portraits, street scenes, etc., except in conditions of poor light.

The Tessars *f* 3.8 and *f* 3.5 are almost twice as fast as the *f* 4.5 Tessar. They have the same field of application but are also suitable for more unfavourable light conditions, fast moving subjects, sports photography, etc.

The latest development in improving the performance of a photographic lens is a process generally called coating or blooming. It consists of the application of a microscopically fine film of some inorganic substance on the glass surfaces, which considerably reduces the light reflection between glass and air surfaces in the lens. The gain will be fully appreciated if it is understood that, for example, in a Tessar *f* 4.5 the loss of light due to surface reflection is in the region of about 35 per cent., a figure which can be reduced by coating to about 5 per cent. Apart from a gain in the speed of the lens which may be in actual practice 50 per cent. (half a stop), its main importance lies in the elimination of the scatter of light which impairs the contrast of the image. This results in a more brilliant negative, especially in the shadow regions where the tones are most subdued and so brilliance and contrast are most needed. The post-war Ikonta and Nettar models have factory-coated lenses. With older cameras the coating, however, can be undertaken by reliable optical manufacturers through photographic dealers. The fact that a lens has been coated can be recognized by observing in the lens reflections of, let us say, a lamp, which appear distinctly coloured, as a rule a rather deep blue with a tinge of red. In the case of factory-coated lenses, a code mark, the letter "T" in red, is stamped next to the lens number.

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. Since complete protection is impossible, the lens surface should be cleaned occasionally with a clean, soft chamois leather. When removing finger marks from

coated lenses, a bit of cotton wool, moistened with alcohol, should be used; but with utmost care. To remove dust or surface dirt a fine camel-hair brush gently used is most suitable.

THE LENS HOOD is a tube, as a rule made from metal, placed over the front of the lens to protect it from light coming from outside the actual picture area. There is no picture which could not be improved in clarity and brilliance by the use of a lens hood. The wider the aperture of the lens the more important is the use of the lens hood. The light coming from objects outside the actual picture area will touch the lens and reduce the brilliancy of the picture considerably. This applies not only to photographs taken against the light—when the lens hood becomes indispensable—but also to sunshine in general.

The Shutters

A range of different shutters was built into the various models to cater for individual requirements of the camera user.

THE VARIO shutter has three instantaneous speeds, 1/25, 1/75, 1/200 sec., and a B setting for time exposures.

To set the shutter turn the outside milled ring until the V mark points to the speed required. The figures engraved 25, 75, 200 are fractions of a second and stand therefore for 1/25, 1/75, and 1/200 sec. respectively.

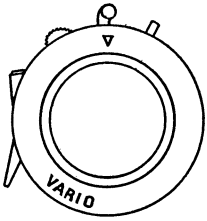
The shutter must be tensioned by pulling the tensioning lever on top of the shutter in an anti-clockwise direction as far as it will go.

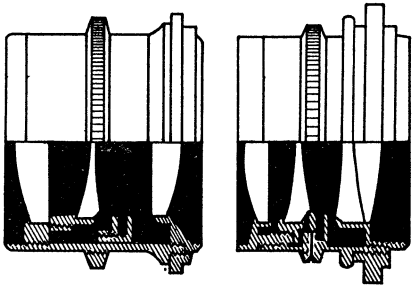
THE PRONTO shutter has four instantaneous speeds of 1/25, 1/50, 1/100, and 1/200 sec., B for time exposures, and a built-in delayed action release.

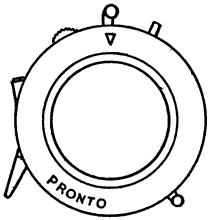
To set the shutter turn the outside milled ring until the arrow head points to the speed required. The engraved figures 25, 50, 100, 200 stand for 1/25, 1/50, 1/100, and 1/200 sec. To tension the shutter pull the tensioning lever on top of the shutter in an anti-clockwise direction as far as it will go.

A delayed action release (also called self-timer) is built into the Pronto shutter which permits the photographer to appear in the photograph himself. To use the delayed action release, set the camera in the usual way and mount it on a rigid support, best a tripod. Press down the delayed action setting lever as far as it will go. This is the lever with a red dot in its centre on the lower part of the shutter rim. On pressing

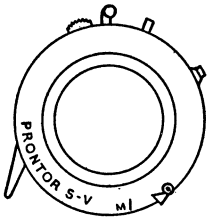
NETTAR AND IKONTA LENSES AND SHUTTERS (pages 12, 14)

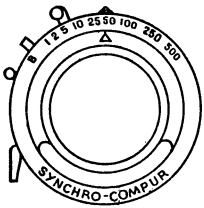




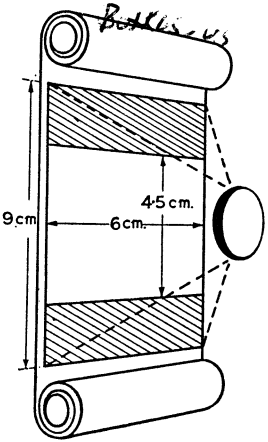


The Novar (*above left*) is a simple three-component anastigmat lens of good definition and medium speed. The slightly more elaborate *Tessar* (*above right*) is one of the best general purpose lenses of medium to fast speed, and pin-sharp definition. When used on a camera masked for smaller picture size, the lenses cover a smaller angle of view (*below*), eliminating unwanted foreground.





The Nettar II is fitted either with a Vario shutter (3 speeds), the Pronto shutter (4 speeds) or the Prontor S-V (8 speeds). The Ikonta II carries a Synchro-Compur shutter. Both the Prontor S-V and the Synchro - Compur are speed-synchronized (page 54).



the shutter release, the shutter works after a delay of approximately 8 secs., giving the operator time to take his place in the picture.

THE PRONTOR SV and PRONTOR S shutters have eight speeds: 1, 1/2, 1/5, 1/10, 1/25, 1/50, 1/100, and 1/300 sec. (in $2\frac{1}{4} \times 3\frac{1}{4}$ in. models 1/250 sec.) and a B setting for time exposures, as well as a built-in delayed action release. They differ only in their synchronization (see p. 53).

To set the shutter turn the outside milled ring until the top of the diamond mark ◆ points to the speed required. The engraved figures 1, 2, 5, 10, 25, 50, 100, and 300 stand for 1, 1/2, 1/5, 1/10, 1/25, 1/50, 1/100, and 1/300 sec. respectively. To tension the shutter pull the tensioning lever on top of the shutter anti-clockwise as far as it will go.

The delayed action release of the Prontor S shutter is used in the same way as with the Pronto. On the Pronto SV the synchronizing lever (see p 54) must be set to X when the self-timer is used.

THE SYNCHRO-COMPUR and COMPUR-RAPID shutters have nine speeds: 1, 1/2, 1/5, 1/10, 1/25, 1/50, 1/100, 1/300, and 1/500 sec., as well as a B setting for time exposures.

The Synchro-Compur and recent Compur-Rapid shutters differ only in their flash synchronization (see p. 54).

To set the shutter, turn the outside milled ring until the arrow head points to the speed required. The engraved figures 1, 2, 5, 10, 25, 50, 100, 250 and 500 stand for 1, 1/2, 1/5, 1/10, 1/25, 1/50, 1/100, 1/250, and 1/500 sec. respectively. To tension the shutter, pull the tensioning lever on top of the shutter in a clockwise direction as far as it will go.

The speeds from 1 to 1/10 and 1/25 to 1/250 sec. range continuously and may be set to any in-between value, i.e. setting between 50 and 100 gives an exposure of 1/75 sec. On the other hand no intermediate speeds between 1 sec. and B nor between 1/10 and 1/25 nor between 1/250 and 1/500 sec. can be set. When turning the outside milled ring of the shutter from 1/250 to 1/500 sec. a resistance is felt which is due to an additional spring fitted to the shutters and needed to achieve this fastest speed.

For time exposures with any of the shutters described, set the shutter speed ring to B (brief time). The shutter requires tensioning in the usual way. On releasing, the shutter will remain open as long as the release button is pressed down and closes as soon as the pressure on the release is removed. For such time exposures the camera must be mounted on a firm support such as a tripod. It is usually best to release the shutter with the help of a cable release to avoid shaking the camera. This release is screwed into the cable release socket of the shutter in models without double exposure lock, or, on the Ikonta, with body release, into the centre of the same.

For long time exposures—where the shutter is to remain open for longer than you can conveniently keep the release depressed—a cable release with locking screw should be employed. To make the exposure set the shutter to B, depress the cable release plunger, and tighten its fixing screw. The shutter will now remain open until the fixing screw is unlocked.

Also fitted were a number of shutters which are now discontinued. They include:

THE DERVAL shutter. It is used in the Nettar and Baby Ikonta, $1\frac{5}{8} \times 2\frac{1}{4}$ in., $2\frac{1}{4} \times 3\frac{1}{4}$ in., and $2\frac{1}{2} \times 4\frac{1}{4}$ in. It has speeds 1/25, 1/50, 1/100 sec. (1/75 in the case of the Baby Ikonta) and T and B settings.

To use the shutter, set the pointer on top of the shutter to one of the numbers engraved there—25, 50, 100—which stand for fractions of seconds and should therefore be read as 1/25, 1/50, 1/100 sec. On pressing the release lever—or the cable release which may be screwed on to the cable release nipple below the release lever—the shutter opens for the time set.

Short time exposures are obtained by setting the pointer to B. Pressure on the release lever or cable release opens the shutter which closes again as soon as the pressure is removed.

Long time exposures are made by setting the pointer to T. By pressing the release lever or cable release the shutter opens and remains open until a second pressure closes it.

THE TELMA shutter. This is used in the Baby Ikonta, $1\frac{5}{8} \times 2\frac{1}{4}$ in., the $2\frac{1}{4} \times 2\frac{1}{4}$ in., $2\frac{1}{4} \times 3\frac{1}{4}$ in., $2\frac{1}{2} \times 4\frac{1}{4}$ in. Ikontas and the Nettars. It has speeds of 1/25, 1/50, 1/100 sec., T and B settings, and is fitted with a built-in delayed action release. The latest type of Telma shutter has also 1/125 sec.

The shutter is operated in the same manner as the Derval shutter above. When using the delayed action release (which only works with the instantaneous speeds 1/25 to 1/100 sec.), set the shutter speed in the ordinary way, then press down the delayed action lever on the right of the shutter (the lever with a red dot). Pressing the shutter release sets the escapement in motion, and after 12 sec. automatically releases the shutter. The delay allows the photographer to take his place in the picture.

THE KLIO shutter is fitted to $2\frac{1}{4} \times 2\frac{1}{4}$ in., $2\frac{1}{4} \times 3\frac{1}{4}$ in. and $2\frac{1}{2} \times 4\frac{1}{4}$ in. Ikontas and Nettars and has the speeds 1, 1/2, 1/5, 1/10, 1/25, 1/50, 1/100, 1/175 (1/150) sec., T and B settings, and also a built-in delayed action.

It is operated as the Derval (see above) but requires cocking by turning the cocking lever on top of the shutter anti-clockwise until it engages. The delayed action release can be used for all instantaneous speeds from 1 to 1/175 sec. and is manipulated as described for the Telma shutter (above).

THE COMPUR shutter is used in some Nettar and Ikonta models.

The small size Compur 00, as used in $1\frac{5}{8} \times 2\frac{1}{4}$ in. and $2\frac{1}{4} \times 2\frac{1}{4}$ in. models has the speeds 1, 1/2, 1/5, 1/10, 1/25, 1/50, 1/100, and 1/300 sec., B and T settings, while the Compur Rapid OOR has 1, 1/2, 1/5, 1/10, 1/25, 1/50, 1/100, 1/250, 1/500 sec., B and T settings. No built-in delayed action is available in this size Compur shutter.

The large size Compur O, as used in $2\frac{1}{4} \times 3\frac{1}{4}$ in. models and larger, has the speeds 1, 1/2, 1/5, 1/10, 1/25, 1/50, 1/100, 1/250 sec., B and T

settings. The older models are without built-in delayed action release, but later ones (OS) are fitted with it.

The Compur Rapid OSR has 1, 1/2, 1/5, 1/10, 1/25, 1/50, 1/100, 1/200, and 1/400 sec. with B and T settings and built-in delayed action release.

The handling of this shutter is the same as described for the Synchro-Compur model (p. 16).

Viewfinders

The present models of the Ikonta and the Nettar are fitted with built-in, direct vision optical viewfinders. Earlier models have a folding-type finder which springs automatically into position on opening the camera.

Alternatively, the front frame should be pulled towards the front of the camera, when the back sight will spring into position.

In cameras with mask for two picture sizes, the finder also carries a mask which has to be lifted up to reduce the field of the finder for pictures of half size.

Brilliant Finder: Some early models of the Nettar and the Ikonta have also been fitted with a brilliant finder, a reflecting finder fixed to the shutter holder, which is used at waist level. Looking down into this finder one sees a brilliant image, upright, but laterally reversed. The finder can be turned through 90° and can therefore be used also for the horizontal camera position. The top of the finder shows a square with a small blocked-out square in each corner. For horizontal photographs only the horizontal rectangle excluding the blocked-out corners is used, while for vertical photographs only the corresponding upright image counts.

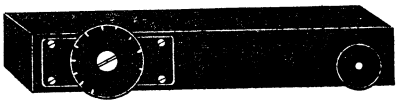
Later models of the Nettar and Ikonta are not fitted with a brilliant finder but carry a finder support on the top right-hand side of the lens holder, into which a detachable reflecting finder may be inserted.

The latest versions of these cameras, with the built-in optical finder, have no provision for a brilliant finder, with the exception of the $1\frac{5}{8} \times 2\frac{1}{4}$ in. Ikonta.

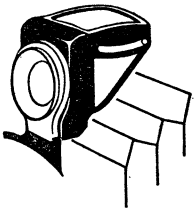
Albada Finder: This is an optical viewfinder built into some earlier Ikonta models, in which the actual field covered by the camera is indicated by a white boundary line which seems to be just as far away as the subject. As some part of the surroundings of the field to be included on the negative—outside the boundary line—remains visible through the finder, it is possible to keep an eye on these surroundings at the same time. This is of particular value when photographing moving subjects.

The actual handling of the finder is the same as described previously for the direct vision finder.

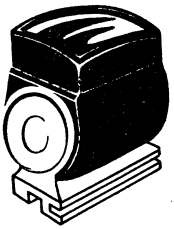
In cameras with mask for two picture sizes, the finder also carries a mask which has to be lifted up to reduce the field of the finder for pictures of half-size.



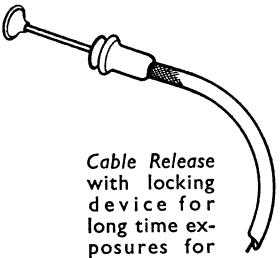
Rangefinder measures distance by making two images coincide (page 20).



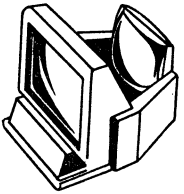
Reflecting Finder to view image from low viewpoint. Useful for photographing children.



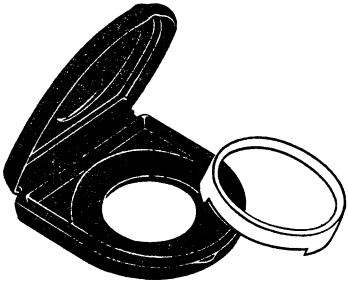
Reflecting Finder fits on accessory shoe on top of the camera.



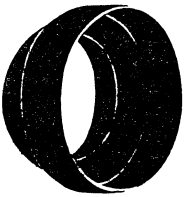
Cable Release with locking device for long time exposures for models fitted with "B" setting only.



Albada eye - level finder.



Filters (page 43) improve colour rendering of the picture. *Supplementary Lenses* (page 49) allow going close to the subject.



Lenshood (see page 14).

Rangefinder for Nettar and Ikonta

As guess work in estimating distances is unsatisfactory, particularly with wide apertures, and the use of a tape measure is generally quite impracticable, a separate rangefinder has been made available. This is constructed on the "coincidence" principle. On one side of the square tube is the viewing aperture fitted with an eye-cup. Behind this (within the tube) is a semi transparent silvered mirror at an angle of 45°, and at the other end of the tube a reflecting prism which can be tilted relatively to the fixed mirror by means of a cam mechanism attached to the calibrating focusing disc. Setting the index to *infinity* (∞) and looking through the viewing aperture one perceives in the middle of the circular field of view a smaller and lighter circle, and in this a double image of a near object whose distance from the camera is to be ascertained. By simply turning the graduated disc the two images may be made to superimpose so that coincidence is so perfect that only one image, instead of the previous double image, is visible. By means of a tinted glass one of the images is coloured; this is a great help in separating two images and so simplifies the adjustment for coincidence.

HANDLING

Loading

Loading of film into the camera is best done in subdued daylight, i.e. in one's own shadow.

1. **Open camera back.**
2. **Insert empty spool in chamber on winding key side.**
3. **Insert rollfilm in other empty chamber.**
4. **Fix paper end on to empty spool.**
5. **Wind film transport key two turns.**
6. **Close camera back.**
7. **Turn film winding key until No. 1 appears in film window.**

1. Slide the locking latch on top of the camera in the direction of the arrow, and the camera back will open on its hinge.
2. The empty film spool has to be in the take-up chamber—that is the one below the film window key—before a film can be inserted. The empty spool has a slot at one end, while the other end has a round hole. Engage the projecting bar of the film winding key in the end with the slot, while the other end is received by the peg on the opposite side of the chamber. The peg is on a spring plate which has to be pulled slightly outwards to allow the spool to drop into position.

   The procedure with the V.P. film of the *Baby Ikonta* is the same except that the round end of the spool is first pushed over the spring stud opposite the winding key. Then push the spool down so that the bar of the key engages as far as possible into the slot, and turn the key until it catches the spool with a click and turns it.
3. Place the full roll of film into the chamber opposite the one with the film key by pulling out the side pin on its spring to allow the spool core to enter and then replace the pin in the central bore of the core itself. The pointed end of the backing paper on the spool must point towards the empty take-up spool.

   The procedure with the Baby Ikonta is the same, except that the spool is pressed over the spring stud and pushed down to engage the opposite end on the second stud of the chamber.
4. Now break the gummed paper slip holding down the backing paper of the full spool and remove as far as possible. Draw the pointed end of the backing paper across the film aperture and fit into the longer slit in the core of the empty spool. The black inner side of the backing paper must face the camera lens.

5. By turning the film winding key twice in a clockwise direction the backing paper is pulled taut. The paper has to lie flat between the flanges of the empty spool and must on no account chafe or rub them. If the paper does not lie flat and straight, it must be adjusted.
6. Close the back of the camera and check by trying to pull it open without touching the catch.
7. Turn the film winding key until No. 1 appears in the red window on the camera back. Where the window has a cover this must, of course, be opened to allow observation. On models with two windows, it is always the one farthest away from the film wind key which is used for setting film to No. 1 (see p. 8).

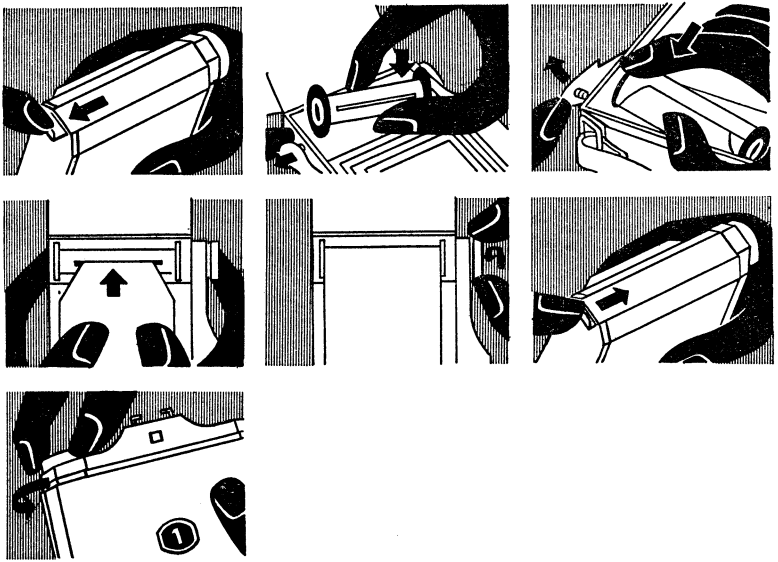
Shooting

1. Open camera front.
2. Check that film has been transported.
3. Set distance.
4. Set aperture.
5. Set exposure time.
6. View the image.
7. Release.
8. Wind on film for next exposure.
9. Close camera.

1. Press the front-opening button to release the camera front, which will spring into proper taking position (hence the name "self-erecting" camera). The camera should be tilted slightly forward as it is opened. There is no need to retard the quick-opening movement by applying the hand as a brake (as some users do) to prevent the film from being sucked forward out of its focal plane. The camera is fitted with bellows ventilation which prevents the film from being pulled out of true when the camera is opened.
2. In the modern models with double exposure lock no special check is required as the shutter cannot be released unless the film has been wound on. When using an older model without this device it is advisable to adhere strictly to the sequence of operations given (see No. 7, above). Then the film is always wound on after exposure, thus confusion and uncertainty will be avoided.
3. The distance is set by rotating the front cell of the lens, the scale of focusing distances being engraved on the outside of the lens front. Turn the lens front until the distance figure—representing the distance from the back of the camera to the subject to be photographed—comes to lie opposite the index mark fixed to the shutter casing.

The distance between camera and subject can be determined

LOADING THE NETTAR AND THE IKONTA (page 21)



Top left: Open the camera back.

Top centre: Place the empty spool in the chamber below the film transport knob. Pull out the spring for this.

Top right: Insert the full spool in the film chamber.

Centre left: Thread the paper leader on to the empty spool.

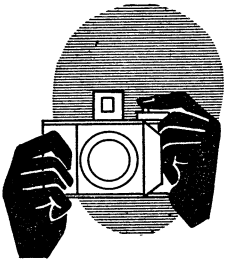
Centre: Tighten the paper leader.

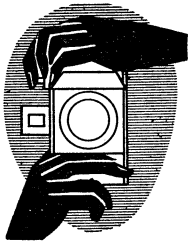
Centre right: Close the camera.

Bottom left: Wind the film until No. 1 appears in the film window.

HOLDING THE NETTAR AND THE IKONTA (page 26)

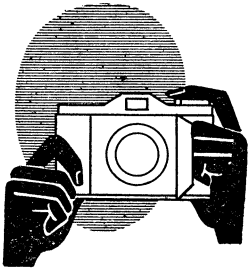
$1\frac{5}{8} \times 2\frac{1}{4}$ *in. models:* For horizontal pictures hold the camera with the right hand from above, while the thumb of the left hand rests on the body release. Support the lower part between thumb and index finger.

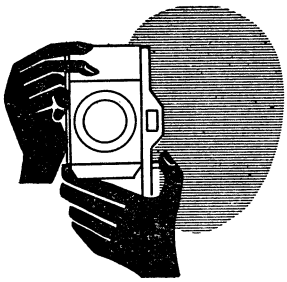




$1\frac{5}{8} \times 2\frac{1}{4}$ *in. models:* For vertical pictures hold the camera with both hands on either side of the camera body and press its back against the nose. The index finger of the left hand lies on top of the body release.

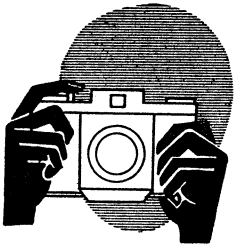
$2\frac{1}{4} \times 3\frac{1}{4}$ *in. models:* For vertical pictures press the camera with both hands against the nose. The index finger of the left hand lies on top of the body release.



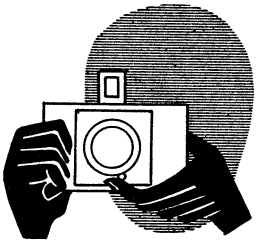


$2\frac{1}{4} \times 3\frac{1}{4}$ *in. models:* For upright pictures hold the camera with the right hand from above. The thumb of the left hand lies against the body release whilst the camera is supported from underneath by the palm of the left hand.

HOLDING THE NETTAR AND THE IKONTA (page 26)

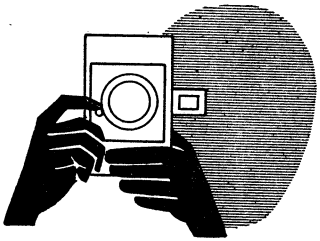


Early models without body release: For upright pictures hold the camera firmly against the forehead with the left hand and rest the index finger of the right hand against the shutter release.



To avoid camera shake, always hold your camera steady. When standing, spread your feet and lean against a wall or tree or at least support your elbows. Use a unipod or camera chain. For long exposures use a tripod.

$2\frac{1}{4}$ in. square models: Hold the camera firmly against the nose, the left hand gripping the body. The right hand also holds the body with the index finger pressing on the body release.



Early models without body release: Hold the camera against the nose with the right hand. Place the index finger of the left hand on the shutter release, and support the camera front with the palm of the left hand.

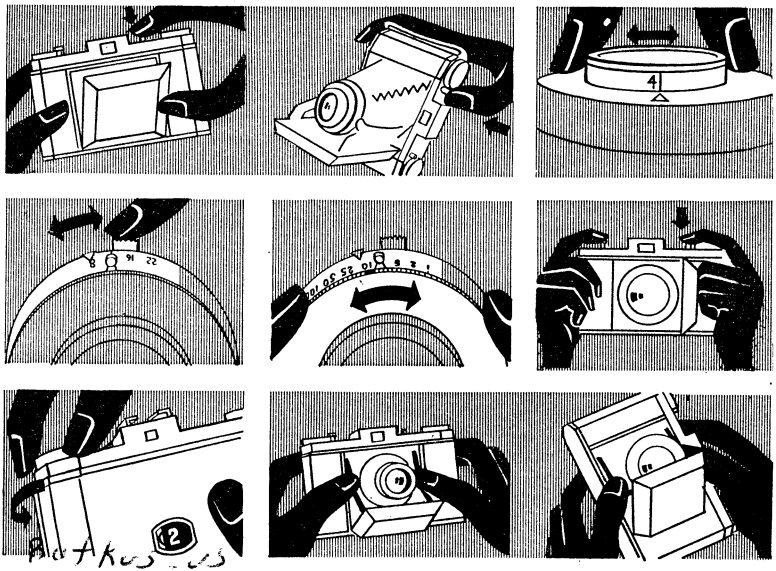
either by guess work or measurement. It is preferable to use a rangefinder (see p. 19), but as a rough measure one may pace out the distance between camera and subject, counting each average step as three feet. For close-up work (i.e. portraits) a piece of string with knots every 6 in. may be used to get accurate distance setting.

4. Set the aperture (stop) by turning the diaphragm lever below the lens until the indicator points to the stop required (scale on lower part of the shutter). The purpose of the diaphragm is to adjust the effective opening of the lens. The smaller this opening (i.e. the more the lens is "stopped-down") the greater the depth of field (see p. 30). However, as less light can pass through the "stopped-down" lens in any given time, the exposure must be lengthened accordingly (see p. 30).
5. Set the exposure time on the shutter of the camera in accordance with the instructions given on pp. 14–15.
6. To view the back sight hold close to the eye or look straight down on to the waist-level finder (p. 18). Do not attempt to turn the camera to the right or left, away from the eye, nor must the eye be moved from the centre of the eyepiece to find the limitation of the field of view. This "spying round the corner" is deceptive, as only that section seen in the centre of the eyepiece while looking straight ahead, will appear on the negative. The field of view is exact for photographs taken at 9 to 12 ft. distance. At infinity a trifle more appears on the negative than is seen through the finder, and at 3½ to 6 ft. a shade less.
7. Expose by pressing the body release, or in earlier models the release lever of the shutter, very gently. Exposures of 1/25, 1/50 and less, are "instantaneous" and can be taken from the hand. It is, however, advisable to use 1/25 as sparingly as possible from the hand, as there is some danger of jerking the camera, and even a slight jerk, enlarged six or eight times on the print, results in unsatisfactory definition. On the other hand, if one has a steady hand and a chance of leaning against a wall or—even better—of supporting the camera on something firm, not only the 1/25 but also 1/10 and even 1/5 sec. exposure can, with care, often be given without shaking. Time exposures should be made with the cable release, which screws into the body release socket, or in the case of a model without body release, into the cable release nipple. Cameras with double exposure lock can only be released after the film has actually been wound on.

   Ikonta models with body release have a small circular aperture beside the release button, in which a red or white disc appears. The white disc indicates that the film has not yet been wound on, and that the shutter cannot be released. The red disc, on the other hand, shows that the film has been transported and that pressure on the shutter release will expose it.

8. Turn the film winding key until first a hand and then a few dots have

SHOOTING WITH THE NETTAR AND THE IKONTA (page 22)



Top left: Open the baseboard.

Top right: Turn the lens mount to the set distance.

Centre left: Set the aperture by the aperture lever.

Centre: Set the shutter by turning the speed ring, and tension the shutter.

Centre right: Sight the subject through the finder and press the shutter release to take the picture.

Bottom left: Wind on the film for the next exposure.

Bottom right: Close the camera.

passed the film window and finally the figure 1 appears (as explained under Loading, p. 26, No. 7). To get the film into position for the second exposure, turn the key until No. 2 appears in the window and so on until all exposures have been taken.

Winding film in models with two windows: When the $2\frac{1}{4} \times 3\frac{1}{4}$ in. or $2\frac{1}{2} \times 4\frac{1}{4}$ in. model is used for full size pictures, use only the far window and ignore the near window (the one nearest to the film winding key).

If the two-size cameras are used with the removable mask in the film gate for 16 exposures of half size, use both windows. This applies also to the $1\frac{5}{8} \times 2\frac{1}{4}$ in. models with two windows.

Turn the film winding key until first a hand and a few dots pass. Finally the figure 1 appears in the window which is farthest away from the winding key (as instructed under Loading). To get the film in position for the second exposure turn the film winding key until the same No. 1 appears in the second window, or "near window", i.e. the one nearest the key. For the third exposure the film is wound until No. 2 is visible in the far window, for the fourth exposure one has to wind until No. 2 appears in the near window and so on.

Consequently each No. on the film corresponds to two exposures (one in the far and the second one in the near window). As the film has eight numbers there will be sixteen exposures in all.

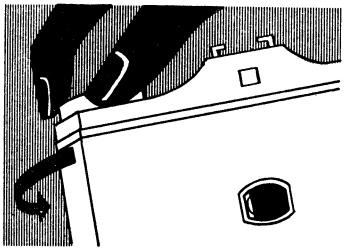
9. Close the camera by pressing down the upper links of the struts on either side and then raising the baseboard of the camera until it engages on the main body.

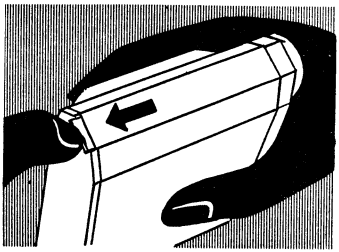
Unloading

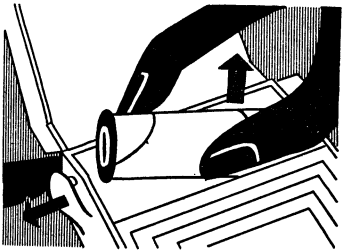
1. Wind off paper end.
2. Open camera back.
3. Remove exposed film.
4. Close camera back or reload with new film.

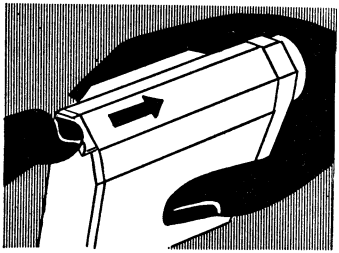
1. After all exposures have been taken, wind on the film key until the paper end disappears in the film window on the back of the camera, and finally give a further three turns to the key to wind the paper fully on to the take-up spool.
2. The camera back is opened as described on p. 21, No. 1.
3. Remove the film by pulling back the spring stud on the bottom of the camera and lift the film out of its chamber. Keep it firmly fastened by the gummed label adhering to it and keep it wrapped up until it is developed.
4. Close the camera back as described on p. 22, No. 6, or reload as instructed on p. 21.

UNLOADING THE NETTAR AND THE IKONTA (page 28)









Top left: Turn the transport knob to wind off the end of the backing paper.

Top right: Open the camera back.

Bottom left: Pull out the spring and remove the roll of film. Seal the film immediately.

Bottom right: Close the camera or reload with new film (page 21).

FOCUSING

Depth of Field

The lens is focused at some definite distance. This means that its position relative to the film is adjusted in such a way that whatever is exactly at the focused distance will be represented by a "sharp" image on the film. Everything else—everything nearer to the camera or farther from it—will be, strictly speaking, "unsharp".

In practice the decline of definition is, of course, gradual. Thus there is a zone—stretching from somewhere in front of the focused distance to somewhere behind it—which will appear sufficiently sharp to the human eye. This is called depth of field.

Now, what should or should not be accepted as sufficiently sharp is debatable. Certain standards, however, have been agreed upon. It is agreed that any pin-point represented on a $1\frac{5}{8} \times 2\frac{1}{4}$ in. and $2\frac{1}{4} \times 2\frac{1}{4}$ in. negative by a "dot", the diameter of which does not exceed 1/25 mm., should be regarded as sharp. The technical term for that dot is circle of confusion. (The accepted circle of confusion for $2\frac{1}{4} \times 3\frac{1}{4}$ in. negatives is 1/20 mm.)

The limits defined by the circle of confusion are reached more quickly with certain lenses than with some others. The results also vary with the conditions under which one definite type of lens is used.

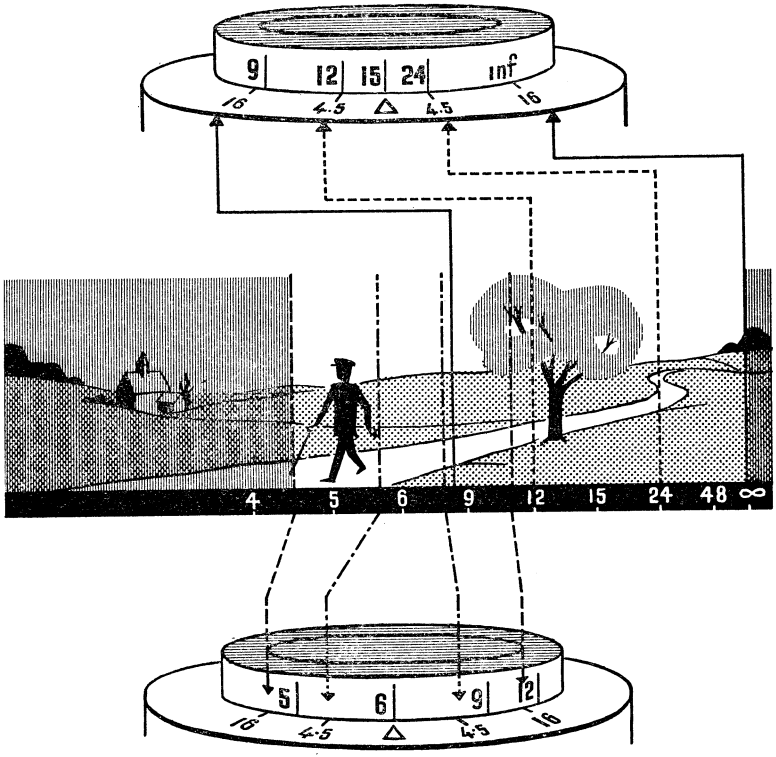
Short focus lenses yield more depth of field than long focus lenses.

Small apertures yield more depth of field than large apertures.

Far focusing distances yield more depth of field than near-focusing.

Control of Depth of Field

The depth of field—dependent on the distance actually focused at, the aperture employed and the focal length of the lens—has to be ascertained in each individual case. To start with, let us assume that we work with the standard



The depth of field indicator shows clearly how much of the subject will be sharp at any given aperture and distance setting. The depth of field itself varies according to the distance and the aperture. To facilitate accurate indication pairs of aperture numbers are engraved facing the distance scale. The figures on the distance scale opposite any two similar aperture figures indicate the near and distant limits of the depth of field at that aperture. In the example shown, setting the lens to 15 ft. using *f* 4.5 gives a depth from 12 ft. to 25 ft., at *f* 16 from 9 ft. to infinity. When the lens is set to 6 ft. the depth of field ranges from $5\frac{1}{2}$ ft. to 8 ft. at *f* 4.5 and from $4\frac{1}{2}$ ft. to 11 ft. at *f* 16. (See also page 30.)

lens of 7.5 or 8 cm. focal length of a $1\frac{5}{8} \times 2\frac{1}{4}$ in. or $2\frac{1}{4}$ in. sq. Ikonta or Nettar only. There remains the interplay of "aperture" and "focusing distance". Their effect can be read off on the depth of field table on p. 35-36.

Let us assume we are working with *f* 5.6 and the lens is set to 8 ft. We find in the horizontal column *f* 5.6, above the bold distance figure 8, 6–$9\frac{1}{4}$ and below 9–$9\frac{1}{4}$, and so the range of focus stretches from 6 ft. $9\frac{1}{4}$ in. to 9 ft. $9\frac{1}{4}$ in. When working with the lens set at the same distance of 8 ft., but with aperture *f* 3.5, the range of sharpness will extend only from 7 ft. $2\frac{1}{4}$ in. to 9 ft. $0\frac{1}{4}$ in., while aperture *f* 8 will produce a sharp area from 6 ft. $4\frac{1}{4}$ in. to 10 ft. 9 in. Note how we can vary the area of sharpness by playing with the stop, without changing the setting of the distance: the smaller the stop the larger the depth of field. So the stop (aperture) is one of the variables by which a convenient zone of sharpness can be obtained.

The other one is, of course, the distance setting. Let us compare the depth values for, let us say, aperture *f* 5.6 at a distance first of 10 ft., then of 20 ft. and lastly 50 ft. We learn that in the first case the depth of field stretches from 8 ft. $1\frac{3}{4}$ in. to 12 ft. 11 in. in the second case from 13 ft. 9 in. to 36 ft. 11 in.; and in the last case from 23 ft. 3 in. to ∞ (*infinity*). So we see confirmed that the depth of field grows as we set the lens at distances farther and farther away from the camera.

Incidentally, we also conclude that the depth of field in front of the focused distance is always more limited than the depth gained behind it. With the lens set at 10 ft. we get $1\frac{3}{4}$ ft. depth in front of the focused distance and almost 3 ft. behind it. At 20 ft. we get over 6 ft. in front of the focused distance and 17 ft. behind it. At 50 ft. we get 27 ft. in front and to ∞ in the rear.

With the longer focal length lens 10.5 cm. ($4\frac{1}{8}$ in.) to 12 cm. ($4\frac{3}{4}$ in.) of the $2\frac{1}{4} \times 3\frac{1}{4}$ in. and $2\frac{1}{2} \times 4\frac{1}{4}$ in. models the depth of field is somewhat reduced (see table on p. 36).

The comparative shallowness of the depth of field in front of the focused distance will sometimes make it neces-

sary—e.g. in landscape photography, where the subject may have to include much foreground—to set the lens nearer than the main point of interest lies, in order to gain additional sharpness towards the foreground while covering the main point of interest by the depth of field behind the focused distance. This trick, however, must be used with moderation. It should be recalled, that the widely held idea that everything is equally sharp within the depth of focus area and completely unsharp outside these limits is quite wrong. There is a gradual decline of sharpness even within the depth of field areas. Critical "pin-point" definition can be expected only in the plane actually focused. So care should be taken to place the focus as near as possible to the spot on which the greatest sharpness is required. Thus in the case of distant landscapes use should not be made of the *hyperfocal distance* (described below) if the sharpness is required in the far distance; focusing at the far distance will give better results.

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 hyperfocal distance. This setting of focus is advisable when it is desired to secure adequate sharpness from the farthest distance to as far as possible in the foreground, rather than extreme sharpness in the far distance only (see table on p. 34).

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—rangefinder 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 which is indicated on the camera by red dots on both the distance scale and the aperture scale.

On the Nettar and the Ikonta $2\frac{1}{4} \times 2\frac{1}{4}$ *in. and some* $1\frac{5}{8} \times 2\frac{1}{4}$ *in.* models there is a red dot between *f* 8 and *f* 11 on the aperture scale and near

30 ft. on the distance scale. If both distance and aperture are set to these red dots everything from 13 ft. to infinity will be sharp.

On the $2\frac{1}{4} \times 3\frac{1}{4}$ *in. and* $2\frac{1}{2} \times 4\frac{1}{4}$ *in.* models a red dot will be found on the aperture scale between *f* 11 and *f* 16 and on the distance scale at about 33 ft. If both distance indicator and stop indicator are set to the red dots—*everything from about 16 ft. to infinity will be sharp.*

Hyperfocal Distance and Depth of Field Tables

In the depth of field tables (see pp. 35 to 36), 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) of the region of depth of field.

The figures below give the corresponding distance of the far limit.

HYPERFOCAL DISTANCES

(For conversion into metric units see page 66)

This is the approximate focusing distance giving the greatest possible depth of field from the foreground to infinity.

Aperture f (*a*)	(*b*)	*Setting of Lens in ft.*	*Extent of Depth to Infinity from*
2.8	3.5	90	45–0
3.5	4.5	70	35–0
4	5.6	60	30–0
4.5	6.3	50	25–0
5.6	8	44	22–0
6.3	9	35	17–6
8	11	30	15–0
9	12.5	27	13–6
11	16	22	11–0
12.5	18	20	10–0
16	22	15	7–6
18	25	14	7–0
22	32	11	5–6

The figures in column (*a*) apply to the $1\frac{5}{8} \times 2\frac{1}{4}$ in. and $2\frac{1}{4} \times 2\frac{1}{4}$ in. Nettar and Ikonta, the figures in column (*b*) apply to the $2\frac{1}{4}$ in. $\times$ $3\frac{1}{4}$ in. and $2\frac{1}{2}$ in. $\times$ $4\frac{1}{4}$ in. models.

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

DEPTH OF FIELD

For 7.5–8 cm. (3 in. to 3 3/16 in.) Lenses in 1 5/8 × 2 1/4 in. and 2 1/4 in. square Nettar and Ikonta

(For conversion into metric units see page 66.)

f2.8	3–10	4–8 3/8	5–7 1/2	6–5 3/8	7–4	8–2	8–11 3/8	10–7	12–10	16–3	22–4	31–9	46–5	86–6
	4	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**15**	**20**	**30**	**50**	**100**	∞
	4–2 1/4	5–3 1/2	6–5 1/4	7–7 1/4	8–9 1/2	10	11–3	13–11	18–1	25–11	45–10	118	∞	∞
f3.5	3–9 1/2	4–8	5–6 1/2	6–4 1/2	7–2 1/4	7–11 3/4	8–9	10–3	12–4	15–7	21	29–1	40–11	69–2
	4	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**15**	**20**	**30**	**50**	**100**	∞
	4–2 3/4	5–4 1/2	6–6 3/4	7–9 1/4	9–1/4	10–4	11–8	14–6	19–1	28	52–9	178–8	∞	∞
f4	3–9 1/4	4–7 1/2	5–5 3/4	6–3 1/8	7–1	7–10 1/4	8–7 1/4	10	12–1	15–1	20–1	27–5	37–9	60–7
	4	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**15**	**20**	**30**	**50**	**100**	∞
	4–3 1/4	5–5 1/4	6–7 3/4	7–10 3/4	9–2 1/4	10–6	11–11	14–11	19–10	29–9	59–2	283	∞	∞
f5.6	3–8	4–6	5–3 1/2	6–1/8	6–9 1/4	7–5 3/4	8–1 3/8	9–5	11–2	13–9	17–9	23–3	30–3	43–3
	4	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**15**	**20**	**30**	**50**	**100**	∞
	4–4 3/8	5–7 1/2	6–11 1/4	8–3 3/8	9–9 1/4	11–4	12–11	16–6	22–10	36–11	96–9	∞	∞	∞
f8	3–6 1/2	4–3 3/4	5–1/4	5–8 1/2	6–4 1/2	6–11 1/2	7–6 1/2	8–7 1/2	10–1	12–1	15–1	18–11	23–3	30–3
	4	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**15**	**20**	**30**	**50**	**100**	∞
	4–7	5–11 1/2	7–5 1/4	9–1/2	10–9	12–9	14–10	19–8	29–5	58	∞	∞	∞	∞
f11	3–5	4–1 1/4	4–9	5–4	5–10 3/4	6–5	6–11	7–9 3/8	8–11 1/8	10–6	12–9	15–4	18–1	22
	4	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**15**	**20**	**30**	**50**	**100**	∞
	4–10	6–5	8–2	10–2	12–5	15	18–1	25–11	46	∞	∞	∞	∞	∞
f16	3–2 1/4	3–9 1/2	4–4	4–9 3/4	5–3 1/4	5–8 1/4	6–3/4	6–8 3/8	7–7	8–8	10–1	11–8	13–2	15–2
	4	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**15**	**20**	**30**	**50**	**100**	∞
	5–4 1/4	7–4 1/4	9–9 1/2	12–9	16–7	21–7	28–7	55	∞	∞	∞	∞	∞	∞
f22	2–11 1/2	3–5 3/8	3–11	4–3 3/8	4–8	5	5–3 1/2	5–9 1/2	6–4 3/4	7–1 3/8	8–1	9–1/8	9–11 1/8	11
	4	**5**	**6**	**7**	**8**	**9**	**10**	**12**	**15**	**20**	**30**	**50**	**100**	∞
	6–1 3/4	8–11	12–9	18–6	27–9	45–7	93–10	∞	∞	∞	∞	∞	∞	∞

DEPTH OF FIELD

For 10.5–12 cm. (4¼ in.–4¾ in.) Lenses in 2¼ × 3¼ in. and 2½ × 4¼ in. Nettar and Ikonta
(For conversion into metric units see page 66.)

f3.5	3–10 4 4–2¼	4–8¾ 5 5–3½	5–7½ 6 6–5¼	6–5¾ 7 7–7¼	7–4 8 8–9¾	8–2 9 10	8–11¾ 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 ∞ ∞
f4.5	3–9¼ 4 4–2¾	4–8 5 5–4¼	5–6¼ 6 6–6¾	6–4¼ 7 7–9¼	7–2¼ 8 9–¼	7–11¾ 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 ∞ ∞
f5.6	3–9¼ 4 4–3¼	4–7½ 5 5–5¼	5–5¾ 6 6–7¾	6–3½ 7 7–10¾	7–1 8 9–2¼	7–10¼ 9 10–6	8–7¼ 10 11–11	10 12 14–11	12–1 15 19–10	15–1 20 29–9	20–1 30 59–2	27–5 40 283	37–9 100 ∞	60–7 ∞ ∞
f8	3–8 4 4–4¾	4–6 5 5–7½	5–3½ 6 6–11¼	6–½ 7 8–3¾	6–9¼ 8 9–9½	7–5¾ 9 11–4	8–1¾ 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 ∞ ∞
f11	3–6½ 4 4–7	4–3¾ 5 5–11½	5–¼ 6 7–5¼	5–8¼ 7 9–½	6–4¼ 8 10–9	6–11½ 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 ∞ ∞
f16	3–5 4 4–10	4–1¼ 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 ∞ ∞
f22	3–2¼ 4 5–4¼	3–9½ 5 7–4¼	4–4 6 9–9¼	4–9¾ 7 12–9	5–3¼ 8 16–7	5–8¼ 9 21–7	6–¾ 10 28–7	6–8¾ 12 55	7–7 15 ∞	8–8 20 ∞	10–1 30 ∞	11–8 50 ∞	13–2 100 ∞	15–2 ∞ ∞
f32	2–11½ 4 6–1¾	3–5¾ 5 8–11	3–11 6 12–9	4–3¾ 7 18–6	4–8 8 27–9	5 9 45–7	5–3½ 10 93–10	5–9½ 12 ∞	6–4¾ 15 ∞	7–1¾ 20 ∞	8–1 30 ∞	9–¼ 50 ∞	9–11½ 100 ∞	11 ∞ ∞

FILMS AND FILTERS

There is no such thing as "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 grain.

Colour Sensitivity

The ordinary emulsion is only sensitive to violet and blue light, and therefore is bound to give an untrue black-and-white rendering 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 green and yellow, while the *panchromatic* film has been made sensitive not only to violet, blue, green and yellow, but also to red. Some particularly fast panchromatic films are over-sensitive to red and will render this colour too light.

The advantages of having a negative material sensitive to all colours—violet, blue, green, yellow and red—are so striking that it was evident that the genuine panchromatic film would displace the other types of film 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 useful.

Speed

The sensitivity of film materials to light in general is measured in *Scheiner, Hurter and Driffield, Weston or Din* and other degrees. Scientists and manufacturers all agree that none of the methods employed to determine the speed of films is entirely satisfactory, and continue to give 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 TABLE OF DIFFERENT SPEED DEGREES

European Scheiner	*BS & ASA Exposure Index Numbers (Arithm.)*	*(Log.)*	*Weston Speed*	*G.E. Speed*	*DIN*	*H. & D.*
14	1.5	13	1.2	2	4/10	60
17	3	16	2.5	4	7/10	120
20	6	19	5	8	10/10	250
23	12	22	10	16	13/10	500
26	25	25	20	32	16/10	1000
29	50	28	40	64	19/10	2000
32	100	31	80	125	22/10	4000

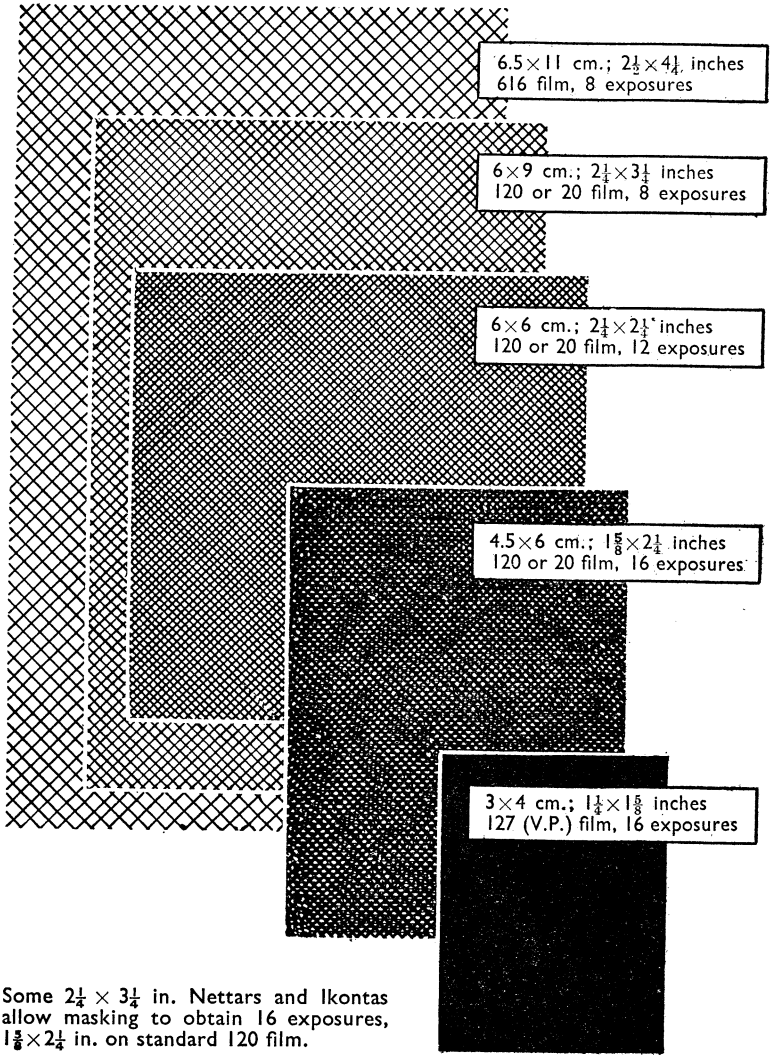
In this table each value represents twice as fast a film speed as the one immediately above it. In some systems this doubling of film speed means increasing the speed number by 3 each time (Scheiner, BS Log. Index, DIN), while in others the film speed itself is directly proportional to the speed number, and therefore inversely proportional to the exposure required (BS 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 their extremely fine grain, making special development unnecessary. Their disadvantage is their inability to cope with live subjects in other than exceptionally favourable lighting conditions, lack of latitude and, in most cases, 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 and sometimes steep gradation.

FAST PAN FILMS of 31° Sch. and over are for high-speed shots, interiors, stage pictures and night photography. Advantages: increased sensitivity to red (artificial light), use of smaller apertures (depth of focus). 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).

PICTURE SIZES FOR NETTARS AND IKONTAS



Some $2\frac{1}{4} \times 3\frac{1}{4}$ in. Nettars and Ikontas allow masking to obtain 16 exposures, $1\frac{5}{8} \times 2\frac{1}{4}$ in. on standard 120 film.

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 negative is coarse, it will soon become visible in an enlargement, and the finer the structure of grain, the greater degree of magnification will be visible without the appearance of 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. 38). The faster the film, the coarser the grain and vice versa. The grain can to a certain extent be influenced by development (fine-grain development), exposure, etc.

Gradation

Every 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.

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 a coloured backing 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	Grada-tion	Field of Applica-tion
Agfa:					
Isochrom F	O	29°	fg	n	A
Isopan F	P	27°	ef	n	A
Isopan ISS	R	32°	mg	n/s	B
Dufay:					
Ortho	O	28°	fg	n	A
Pan	P	28°	fg	n	A
Ensign:					
F. G. Pan	P	27°	ef	n	A
Ultrachrome	O	29°	fg	n	A
Ultrapan	R	31°	mg	n/s	B
Ferrania:					
Super Pancro	R	32°	mg	n/s	B
Ultracromatica	O	30°	fg	n	A
Gevaert:					
Gevapan 27	P	27°	ef	n	A
Gevapan 30	P	32°	mg	n/s	B
Gevapan 33	R	33°	mg	n	B
Gevachrome 30	O	30°	fg	n	A
Ilford:					
F.P.3	R	29°	ef	n	A
H.P.3	R	32°	mf	n/s	B
Selochrome	O	29°	fg	n	A
Kodak:					
Panatomic X	P	27°	ef	n	A
Plus X	P	30°	fg	n	A
Super XX	P	32°	mg	n/s	B
Verichrome	O	29°	fg	n	A

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.

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

FIELD OF APPLICATION: A = universal material for all average photography, B = material for photography under unfavourable light conditions, theatrical work and where shortest exposure times are more essential than finest grain.

Colour Film

There are two types of colour films suitable for the Ikonta and Super Ikonta.

One is represented by *Agfacolor*, *Pakolor*, and *Kodacolor*. These films produce negatives in colour where the light parts of the subject are dark and vice versa—as in ordinary negatives. In addition, the colours are reversed; blues are yellow, reds are blue-green, and greens are reddish. These colour negatives are then printed on a similar type of material to give colour prints or colour enlargements.

The second type of colour film (e.g. *Ansco Color*, *Ektachrome*) produces positive colour transparencies on the film which was exposed in the camera. These transparencies can either be viewed against a bright light (e.g. in a viewer) or projected on a screen by means of a transparency projector.

With both kinds of colour film there are different types, balanced for either daylight or artificial light photography.

PROCESSING. Most colour materials can be processed by the user. The procedure is somewhat more complicated than with black-and-white film. Special processing kits are usually available, containing all the chemicals and solutions required.

Alternatively, the film can be returned to the makers or to special colour laboratories for processing.

COLOUR FILMS ON THE MARKET

Film	*Type*	*Speed in Scheiner*	*Processing*	*Conversion Filter*	*Speed Sch. with Conversion Filter*
Agfacolor Neg.	Daylight	23°	Maker, user	—	—
Agfacolor Neg.	Tungsten	23°	Maker, user	—	—
Ansco Color	Daylight	23°	Trade, user	Ansco 10*	18°
Ansco Color	Tungsten	23°	Trade, user	Ansco 11**	23°
Ektachrome	Daylight	22°	Trade, user	—	—
Ferraniacolor Rev.	Daylight	25°	User	—	—
Gevacolor Neg.-Pos.	Daylight	23°	Maker	—	—
Kodacolor	Daylight	26°	Maker	—	—
Kodacolor	Photoflood	26°	Maker	—	—
Pakolor	Daylight	23°	Maker, user	—	—
Pakolor	Photofloods	23°	Maker, user	—	—

*Conversion filter to correct daylight film for use in artificial light, or **artificial light film for use in daylight.

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 (see p. 37), 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 shall correspond to the impression of colours as perceived by the eye (with some degree of accuracy), the relative sensitivity of our film to the various colours will have to be corrected. This can be achieved by the use of filters.

Filters are employed to correct on our negative material the various degrees of brightness of the actual picture. On the whole 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 also on the colour

sensitivity of the film and on the colour of the light in which the photograph has to be taken.

The following list gives a summary of the filters recommended and a short explanation of their use.

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 oversensitive (photographing it too light).

ULTRA-VIOLET FILTERS: for orthochromatic and panchromatic film. The very light ultra-violet filter is only to be used at heights of 6,500 ft. (2,000 m.) and over to avoid an unduly dark sky, such as would be obtained by using a yellow filter. At the same time it absorbs the ultra-violet rays of high altitudes for which the lens is not corrected and which would reduce the definition.

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 they show distant views clearly 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.

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

The filter factor is the number by which the exposure time indicated by an exposure chart or meter should be multiplied when a particular filter is used in conjunction with a particular type of film. The factors on p. 45 will be found sufficiently correct for all practical purposes. Other publications may insist on more exacting values—e.g. 1.4, 1.7. Such factors are of little use to the practical worker. Even if he is a good enough mathematician to play with odd fractions he will probably find that the shutter speeds so arrived at do not exist on most cameras. Besides, the effect of a difference of 0.1 or 0.2 in the factor is quite negligible—

considering that photographic exposure and development are hardly ever scientifically controlled processes, even in the hands of very careful workers.

FILTER FACTORS

Filter	*Correct Pan. Film*		*Pan. film with Increased sensitivity for Red*		*Orthochromatic Film*		*Zeiss Code No.*
	Day Light	*Art. Light*	*Day Light*	*Art. Light*	*Day Light*	*Art. Light*	
Light Yellow	1.5	1.5	1.5	1.5	2	1.5	G1
Medium Yellow	2	1.5	2	1.5	2.5	2	G2
Deep Yellow	3	2	2.5	2	5	3	G3
Orange	5	2	4	2	—	—	G4
Light Red	7	3	4	2	—	—	R10
Yellow-Green	2	1.5	2.5	1.5	3	2.5	GR55
Green	4	3	4	3	—	—	GR50
Dark Green	5	5	6	6	—	—	—
Light Blue	—	1.5	—	1.5	—	—	B40

Polarizing Filter

There are times when the judicious use of reflections will enhance the pictorial effect of the picture, but they are also frequently obtrusive and undesirable. Highly-polished subjects, for example, are difficult to illuminate successfully so as to obtain a true photographic rendering, since they will reflect too much light and spoil the reproduction with a glare which obscures the detail. To overcome this difficulty the polarizing filter has been introduced. It consists of a layer of herapathite, cemented between two optical flat glasses. It suppresses light vibrating in one particular plane, while light vibrating in a plane at right angles to this will pass through freely. Light reflections from glass, china, enamel, polished wooden surfaces, water, vibrate to a large extent in one plane (i.e. it is polarized) and can, therefore, be almost extinguished by placing the polarizing filter in the correct position over the lens. This filter will prove particularly useful when taking shop windows, furniture, photographing wet objects, etc.

The filter has to be rotated to find out its best position on the lens. It is simply held in front of the eye, and then slowly rotated. Then the filter must be slipped over the lens in the position selected. As the polarizing filter is tinted, the exposure time should be increased, the factor being about three times.

EXPOSURE

The correct exposure time depends on:

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, the time of day, weather, etc.

2. The speed of film, the kind of filter used, and the aperture employed.

The correct exposure time can be ascertained with:

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. Such an exposure table is given on p. 47. (The *Focal Exposure Chart* is quick working, up-to-date and the most comprehensive exposure table.)

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 people's eyes to light varies considerably.

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 meter is wider than that covered by the average camera lens which has an angle of around 50°. The measurement should be taken from a point nearer to the subject than the one at which the camera 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 detail 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.

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	7
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 f 2*	*Stop f 2.8*	*Stop f 4*	*Stop f 5.6*	*Stop f 8*	*Stop f 11*	*Stop f 16*
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	6	7	8	9	10	11	12	13	14
Seconds	**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**

The Right Negative

The photographer who shoots haphazardly, relying on the latitude of modern films, just like a snapshotter with a box camera, does not deserve and will not get better pictures than the man with that instrument.

The employment of some exposure help is strongly recommended to secure negatives suitable for considerable enlarging. The negatives must be sharp, have fine grain and show a well-balanced gradation.

The beginner will be particularly well advised to use the exact exposure time suggested by his table or meter and to employ straightforward methods of development; that is to say, a developer giving fine grain without loss of emulsion speed. In this way he will achieve negatives with the best definition for a reasonable degree of enlargement.

It should be borne in mind that the latitude allowed for under-exposure by any film is very small indeed, while on the other hand the old rule rather to over-expose does not hold good for small negatives, as an over-exposed negative will as a rule show more grain and poorer definition.

Further, the shutter speed must not be selected solely to give a well-exposed negative, but should be kept short.

Short shutter speeds are important in counteracting the danger of camera shake. Even the slightest shake will result in less crisp definition. Practical experience goes to show that 1/100 sec. is safe, while one has to hold the camera particularly steady when using 1/25 sec. or even 1/50 sec. (see also p. 26). Short shutter speeds are also desirable to arrest movement of the object.

Bearing in mind that the next bigger aperture (smaller number) allows one to halve the shutter speed should make it easy to arrive at a suitable compromise between a stop yielding sufficient depth of field (see p. 30) and still short enough a shutter speed to exclude camera shake and to arrest movement. If, for example, one has found that the right shutter speed is 1/25 sec. at *f* 8, the corresponding shutter speed at *f* 5.6 will be 1/50 sec. and at *f* 4.5 1/100 sec.

CLOSE-UP WORK

While $1\frac{5}{8} \times 2\frac{1}{4}$ in. and $2\frac{1}{4} \times 2\frac{1}{4}$ in. Nettar and Ikonta models generally focus down to 3.5 ft. and the larger models to 7 ft., one can work still closer with the Proxar lenses. Where the original lenses are not available any photographic dealer or optician will be in a position to supply a range of meniscus type lenses of suitable size for the right sort of filter mount, and which will serve the same purpose as the original lenses with the same efficiency.

These close-up lenses can be applied to all types of near distance photography such as plants, objets d'art, small creatures, table top work, copying of books, documents, etc.

Mount the camera on the tripod, and approach the subject until it appears the desired size in the viewfinder field. According to the distance, place the appropriate Proxar lens on the lens mount. Then measure accurately the distance between the front of the Proxar lens and the centre of your subject and look for this distance in the focusing table on page 50.

Besides the special Proxar lenses, a range of meniscus lenses in suitable mounts can equally well be used. The lenses suggested are +1 diopter, +2 diopters, +3 diopters. The distances obtained with these lenses are:

With +1 *diopter*, from $39\frac{1}{2}$ to $20\frac{1}{2}$ in. (100 to 51 cm.).

With +2 *diopter*, from 20 to 13 in. (50 to 33 cm.).

With +3 *diopter*, from 13 to 10 in. (33 to 25 cm.).

When working with these lenses the distance should be measured from the front of the supplementary lens to the subject. No increase in exposure is called for, but it is advisable to stop down to *f* 5.6 when using them.

The tables on p. 50 give the distance at which the lens has to be set, when used with the Proxar lens, to obtain sharp focus at a given distance of an object.

The depth of field, when working at very short distances, is rather limited. The table on p. 52 gives a clear indication of the depth of field to be expected at various working distances and apertures.

CLOSE-UPS WITH $2\frac{1}{4} \times 3\frac{1}{4}$ in. IKONTA and NETTAR

(For conversion into metric units see p. 66)

1. *Proxar 0.5 or + 0.5 diopter lens*

Lens Set to (ft.)	Distance (Front of Lens—Object) (in.)	Subject Field (in.)
∞	$78\frac{3}{4}$	$43 \times 65\frac{3}{4}$
50	$68\frac{3}{4}$	$37\frac{1}{2} \times 57\frac{1}{2}$
25	$61\frac{3}{4}$	$33\frac{1}{2} \times 51\frac{1}{4}$
15	$54\frac{1}{2}$	$29\frac{3}{4} \times 45\frac{1}{2}$
12	$50\frac{1}{4}$	$27\frac{1}{4} \times 41\frac{1}{2}$
9	$44\frac{1}{2}$	$24 \times 36\frac{3}{4}$
6	36	$19\frac{1}{4} \times 29\frac{1}{2}$
5	$32\frac{1}{4}$	$17\frac{1}{4} \times 26\frac{1}{4}$

2. *Proxar 1 or + 1 diopter lens*

Lens Set to (ft.)	Distance (Front of Lens—Object) (in.)	Subject Field (in.)
∞	$39\frac{1}{4}$	$21\frac{1}{4} \times 32\frac{1}{2}$
50	$36\frac{1}{2}$	$20 \times 30\frac{1}{2}$
25	$34\frac{1}{4}$	$18\frac{1}{2} \times 28\frac{1}{2}$
15	32	$17\frac{1}{4} \times 26\frac{1}{4}$
12	$30\frac{1}{2}$	$16\frac{1}{4} \times 25$
9	$28\frac{1}{4}$	$15\frac{1}{4} \times 23\frac{1}{4}$
6	$24\frac{3}{4}$	$13\frac{1}{4} \times 20$
5	23	$12\frac{1}{4} \times 18\frac{3}{4}$

3. *Proxar 2 or + 2 diopter lens*

Lens Set to (ft.)	Distance (Front of Lens—Object) (in.)	Subject Field (in.)
∞	$19\frac{3}{4}$	$10\frac{3}{4} \times 16\frac{3}{4}$
50	19	$10\frac{1}{2} \times 16$
25	$18\frac{1}{4}$	$10\frac{1}{4} \times 15\frac{1}{2}$
15	$17\frac{1}{2}$	$9\frac{3}{4} \times 15$
12	$17\frac{1}{4}$	$9\frac{1}{4} \times 14\frac{1}{4}$
9	$16\frac{1}{4}$	$8\frac{3}{4} \times 13\frac{1}{2}$
6	15	$8\frac{1}{4} \times 12\frac{1}{2}$
5	$14\frac{1}{4}$	$7\frac{3}{4} \times 11\frac{3}{4}$

CLOSE-UPS WITH 2¼ × 2¼ in. IKONTA and 1⅝ × 2¼ in. NETTAR

(For conversion into metric units see p. 66)

1. *Proxar 1 or + 1 diopter lens*

Lens Set to (ft.)	*Distance (Front of Lens—Object) (in.)*	*Subject Field* (in.)*
∞	39¼	30 × 30
50	36½	27¾ × 27¾
25	34½	26½ × 26½
15	32	24½ × 24½
12	30½	23¼ × 23¼
9	28¼	21½ × 21½
4	21¼	15½ × 15½

2. *Proxar 2 or + 2 diopter lens*

Lens Set to (ft.)	*Distance (Front of Lens—Object) (in.)*	*Subject Field* (in.)*
∞	19¾	15¼ × 15¼
50	19	14½ × 14½
25	18¼	14 × 14
15	17½	13¼ × 13¼
12	17	13 × 13
9	16½	12½ × 12½
4	13½	10¼ × 10¼

*The field size for 1⅝ in. × 2¼ in. negatives has the same length as given, but is only two-thirds as wide.

CLOSE-UP DEPTH OF FIELD TABLE

(For conversion into metric units see page 66)

f 3.5	37 3/4	33 3/4	29	25 5/16	20 1/2	19 1/16	15 3/4	11 7/8	10 1/16
	39 1/2	**35**	**30**	**26**	**21**	**19 1/2**	**16**	**12**	**11**
	41 3/8	36 1/2	31 1/4	26 1/16	21 9/16	20	16 1/4	12 1/4	11 3/16
f 5.6	36 9/16	32 5/8	28 5/8	24 5/8	20 1/8	18 3/4	15 5/8	11 3/4	10 1/16
	39 1/2	**35**	**30**	**26**	**21**	**19 1/2**	**16**	**12**	**11**
	42 1/8	37 9/16	31 5/8	27 5/16	22	20 3/8	16 1/2	12 7/16	11 5/16
f 8	35 7/16	31 11/16	27 5/8	24 1/16	19 3/4	18 7/16	15 5/16	11 9/16	10 9/16
	39 1/2	**35**	**30**	**26**	**21**	**19 1/2**	**16**	**12**	**11**
	44 5/8	38 7/8	32 9/16	28	22 1/2	20 13/16	16 3/4	12 5/8	11 7/16
f 16	32 1/8	29 1/16	25 3/8	22 1/2	18 5/8	17 7/16	14 1/2	11 1/8	10 3/16
	39 1/2	**35**	**30**	**26**	**21**	**19 1/2**	**16**	**12**	**11**
	51 1/4	43 3/4	35 15/16	30 7/16	24 3/16	22 3/16	17 11/16	13 3/16	12

The depth of field is obviously rather limited when working at close range with the supplementary lenses. The table gives the extent of depth of focus for close-up work. It gives clear indications of the depth of field to be expected when working at such short lens-subject distances. The figure on the left of the groups is the aperture, the bold middle figure gives the distance from front of lens to subject according to tables on pages 50-51 while the figure above gives the near limit, the figure below the far limit of the depth of field.

FLASH PHOTOGRAPHY

Flash is an efficient light source where no or insufficient daylight is available, such as at night, indoors, etc. In the flashlight you carry your own private "sun" with which you can illuminate your subject or scene at any time and place.

The flash bulb is similar to a small electric bulb. However, when current passes through it, it lights up in an intense flash lasting usually about 1/25 or 1/50 sec. Each bulb will flash only once and has to be discarded afterwards. Electronic flash units give several thousand flashes, each of 1/5000 sec.

The flash bulb is inserted in a battery case, and the current of the battery is used to set off the bulb. A reflector behind the bulb makes sure that all the light is directed towards the subject.

The most efficient types of flash guns incorporate a capacitor unit which increases the reliability of firing, even when the battery is nearly exhausted. The light of the flash bulb is strong enough to allow medium to small apertures to be used for the exposure. The shutter speed—provided it is slower than 1/25–1/50 sec.—has no effect on exposure since the flash is shorter than the exposure time.

How to Use Flash

The shutters of the Nettar and the Ikonta models made since 1950 are internally synchronized for flash. A flash contact socket protrudes on the flange of the shutter. An electrical cable from the battery case (with flash bulb and reflector) is connected to their flash socket by means of a special plug. On releasing the shutter an electric circuit is automatically closed through the flash contact when the shutter is almost fully open, setting off the flash bulb at this very moment.

With this internal synchronization shutter speeds up to 1/50 and 1/100 sec. can be used if flash bulbs are employed which need only a short time to come to the peak of their

light output, that is some 4–7 milliseconds. Such bulbs are, for example, the Speed Midget types. With other bulbs the delay is generally some 20 milliseconds (1/50 sec.); they should be used only at a shutter speed of 1/25 sec. to ensure that the maximum illumination coincides with the full opening of the shutter. Electronic flash has no firing delay and can be used with any speed.

The shutters of earlier cameras which are not originally internally synchronized can be converted. A mechanical synchronizer can be employed, which screws into the cable release socket of the body release. Pressing the plunger of this flash release will then simultaneously release the shutter and fire the flash bulb. However, no mechanical synchronization is entirely reliable.

Speed-Synchronized Shutters

The shutters of the models supplied since 1951 are speed-synchronized for using flash bulbs at even the fastest shutter speeds.

THE SPEED-SYNCHRONIZED PRONTOR SV shutter has an adjustable flash contact which can close the flash circuit, either when the shutter is fully open (X-setting, similar to the normal synchronization of shutters with flash contact) or approximately 20 milliseconds earlier to allow for the firing delay of most flash bulbs (M-setting).

For the X-setting move the synchronizing lever to the red dot (X). The shutter closes the flash circuit at the moment when the blades are fully open. This setting is suitable for electronic flash at any speed, and with flash bulbs of the Speed Midget type up to 1/100 sec.

For the M-setting move the synchronizing lever to the yellow dot, and set the delayed action lever to "M". The shutter closes the flash circuit 20 milliseconds before the shutter blades are fully open. This setting is suitable for the majority of flash bulbs, at all shutter speeds up to 1/300 sec. This setting will not synchronize electronic flash or Speed Midget type flash bulbs.

For use, connect the flash lead from the flash gun to the flash socket on the shutter. Set the synchronizing lever and the delayed action lever (except at the X-setting) to the delay time required. Set the aperture and shutter speed as usual. Put a bulb in the flash gun, focus, and release the shutter to fire the flash and take the picture.

With the M-setting the delayed action lever must be reset for every exposure. At X no resetting is needed.

With the X-setting you can use the delayed action release in the usual way if you want to appear in the picture yourself. At the M-setting the delayed action mechanism is part of the synchronizing system and thus cannot be used for its original purpose as "delayed action".

THE SPEED-SYNCHRONIZED SYNCHRO-COMPUR shutter has two synchronizing settings which are set by means of a synchronizing lever.

For the X-setting move the synchronizing lever to position X. The shutter closes the flash circuit at the moment when the shutter blades are fully open. This setting, which is similar to the normal synchronization of the Compur-Rapid shutter, is suitable for electronic flash at any speed, and for flash bulbs at speeds up to 1/25 sec.

For the M-setting move the synchronizing lever to position M. The shutter closes the flash circuit 16–18 milliseconds before the shutter blades open, to allow for the firing delay of most average flash bulbs. This setting is suitable for normal flash bulbs at all shutter speeds up to 1/500 sec. The M-setting will not synchronize electronic flash or Speed Midget type bulbs which have a firing delay of 5 milliseconds.

For use connect the flash lead from the flash gun to the flash socket on the shutter. Set the synchronizing lever to the appropriate position. Set the aperture and shutter speed as usual. Put a bulb in the flash gun, focus, and release the shutter to fire the flash and take the picture.

The table on p. 56 summarizes the shutter speeds at which most flash bulbs on the market can be synchronized with the various synchro-settings of the Prontor SV and the Synchro-Compur speed-synchronized shutters.

SUITABLE SHUTTER SPEEDS FOR FLASH

Class	*Flash*	*Synchronizing Settings*		
		Prontor SV : X	F*	M
		Synchro-Compur: X	—	M
F	G.E., G.E.C., Mazda, Westinghouse: Speed Midget (SM). Sylvania: SF. Philips: PFS.	1–1/100	1–1/300	—
—	Osram: FO.	1–1/50	1–1/100	—
	Osram: F1, F2.	1–1/25	1–1/50	—
M	Osram: S 2.	1–1/10	1–1/25	1–1/500
M	G.E., G.E.C., Mazda, Westinghouse: No. 5, No. 11, No. 22. Osram: S1. Philips: PF 3N, PF 14, PF 25, PF 38, PF 60. Stella: SF 14, SF 25, SF 60. Sylvania: Press 25, Press 40, No. 0.	1–1/25	1–1/25	1–1/500
M	Sylvania: No. 2.	1–1/25	1–1/25	1–1/100
S	G.E., Westinghouse: No. 50. Philips: PF 100. Stella: SF 100. Sylvania: No. 3.	1–1/10	1–1/25	1–1/100
X	Electronic flash (most types).	1–1/500	—	—
F	Relay fired electronic flash.	1–1/100	1–1/300	—

*This F setting is only found on some Prontor SV shutters now discontinued.

The speeds given for the X-setting also apply to shutters with built-in flash contact.

The Correct Aperture

Here are the apertures to use for some of the more common flash bulbs if used in an efficient reflector, in a room of average brightness and with shutter speeds up to 1/25 sec. They are correct for a film of 30°–32° Sch.

APERTURES WITH FLASH BULBS

Distance	*Mazda G.E., G.E.C.: SM Philips: PFS and PF 3N Sylvania: SF*	*Philips PF 14*	*Mazda, G.E., G.E.C.: No. 5. Philips: PF 25 Sylvania: Press 25*	*Philips: PF 38 Sylvania: Press 40 G.E.: No. 11*	*Philips: PF 60 Mazda, G.E., G.E.C.: No. 22 Sylvania: No. 2*
6 ft. (2 m.)	16	16	—	—	—
8 ft. (2.5 m.)	12.5	16	—	—	—
10 ft. (3 m.)	10	12.5	16	—	—
12 ft. (3.6 m.)	8	11	16	16	—
15 ft. (4.5 m.)	6.3	9	11	12.5	16
20 ft. (6 m.)	4.5	6.3	8	10	12.5
25 ft. (7.5 m.)	4	5.6	6.3	8	11
30 ft. (9 m.)	3.5	4.5	5.6	6.3	9

In bright rooms (kitchen, bathroom) or with films faster than 32° Sch., use next smaller aperture. In very large rooms, at night outdoors, or with slower 27°–29° Sch. film use next larger aperture.

The *Focal Flash Disc* (a celluloid disc to fit the pocket) is a simple and convenient ready means of reading off the correct aperture to use for any flash bulb at any distance, shutter setting and film speed.

The *Focal Flash Chart* gives exposures for all types of flash as well as for flash combined with daylight. It further contains a list of all flash bulbs with their use and performance, also information on "colour and flash" and much additional flash data.

SUBJECTS IN FRONT OF THE CAMERA

In dealing with the various types of photographic subjects we shall necessarily confine ourselves to those of greatest interest to the average Ikonta or Nettar user. We shall not discuss photography in general, but devote our attention to the peculiarities and the suitability of these cameras in approaching one or the other subject.

Landscapes

To the user of the Nettar or the Ikonta who carries his camera as a constant companion, landscapes will offer a rich variety of pictorial opportunities. There are, of course, pitfalls, too.

The typical picture postcard view with wide open foregrounds and distant background rich in diminutive detail, is a somewhat thankless subject. When it is reduced to a so much smaller size than it appears to our eyes, it may drop altogether beyond the resolving power of the film particularly when over-exposed. Much more easy to take are small sections of a landscape with a pronounced foreground. The inclusion of foreground will help to start off the picture with an interesting shape to hold the eye and so make the interpretation of distance more easy.

Little subject matter and much characteristic mood will yield the best landscapes. Sections of landscapes with a foreground, for example, of water, reflecting houses, hills or clouds, interesting patterns of foreground shadows, particularly in strong sidelight or against the light, will give successful pictures. On the other hand, landscapes mainly consisting of greens, e.g. meadows with woods in the background will, as a rule, turn out disappointing.

Winter landscapes will only be lively and show up snow and hoar frost if taken in sunshine and with strong side light or against the light. A lens hood is both parasol and umbrella to the lens, improving the brilliance of the negative in any weather.

Orthochromatic films are still good for green landscapes. Medium speed panchromatic film will, however, give better colour rendering.

A light yellow filter should always be used to get true colour rendering. If clouds and distance are to be shown prominently, use a medium yellow filter. An orange filter gives dramatic sky effect and considerably reduces distant haze.

When photographing in strong side light and against the light, expose for the shadows.

You will find that the best landscape pictures occur when the sky has that billowing white cloud which often precedes more ominous skies. The cloud breaks up the glare of the sun and casts interesting shadow patterns.

Don't break up the picture by having exactly equal areas of earth and sky. If the sky is devoid of interesting clouds it is not worth more than the top third of the picture. On the other hand, a very interesting cloud formation can make up—but only to a certain extent—for lack of landscape interest and you can let the sky take up two-thirds of the picture.

If the foreground to your picture is vacant it will be boring. Try to include a large object of some kind in the foreground—a clump of trees, a cottage, or a gnarled and twisted tree stump. This provides the bold relief to the otherwise detailed photograph and helps to suggest depth. But have it always at one side or the other, never in the middle.

Put the camera on a tripod if you want really sharp pictures. Then you can stop down for depth of field and use a longer exposure without fear of camera shake.

Portraits

Proper portraits should have roundness and have no disturbing background detail. This calls for critical focusing and wide apertures. Avoid going too close. The most suitable working distance is around 7–5 ft.

As both lighting and background should be carefully

controlled, it is often easiest to work indoors in artificial light. The Nettar or Ikonta user who has never tried his hand at artificial light photography may suspect that a fair amount of complications will be involved in this type of photography. But nothing is simpler and more satisfying than using these cameras indoors.

Two Photoflood lamps in reflectors are all you need. The background for portrait work is formed by a plain-coloured wall or a piece of dark or light cloth hung from the picture rail. The sitter should be kept away from the background as far as possible—as a rule about 3 ft.

The exposure time with two lamps will be reasonably short—e.g. with the lamps about 5 ft. from the subject and a medium pan film of 29° Scheiner, it will be 1/25 sec. at *f* 4.5. A good way to hold the camera is to straddle a chair, supporting the camera on the chair-back, and so do away with the need for a tripod. This position ensures at the same time that the camera is about at the eye-level of the model. If the camera looks down on the sitter, the picture would show a foreshortened skull and diminutive chin.

Full figure portraits can be shown with advantage from a low angle.

The use of high speed pan films of excessive red sensitivity is not very advisable, as faces are likely to turn out too pale. If you have to use this type of film, use also a pale blue filter.

Candid portraits outdoors can be obtained most easily by zone focusing. But wherever possible, focus accurately and use a wide aperture to keep the background unsharp. A blue sky, darkened by a yellow filter, will make a suitable background; or a plain-coloured house will serve the same purpose.

Avoid direct sunlight; the diffused light of an overcast sun is better for life-like portraits. The high midday sun is particularly bad as it will produce hard shadows cutting across the characteristic lines of the face.

Apart from holiday snapshots of a purely record type—Mum and Dad on the pier at Brighton—try to avoid including half the surrounding countryside in a portrait. A photo-

graph can be a portrait of a person or a picture of a landscape but not both at the same time. So get close enough to include only your model—your camera permits you to do that—and ignore everything else.

The background can so easily spoil a portrait. It may be too fussy, and detract the eye. Often it is not enough to keep the background out of focus. Pinpoints of light shining through foliage will be magnified when they are unsharp, and a harshly-lit brick or stone wall, even when out of focus, can still be very obtrusive. So try and find a fairly plain background.

If the sun is bright keep your model as far from the background as you can. If you don't there will be unwelcome shadows on it which can spoil the picture. Great masses of black are bad but they are avoidable.

Use a fast shutter speed, especially when taking head-and-shoulder portraits. You must avoid camera-shake at all costs, and you can afford to use a large aperture since the depth of field need be as little as twelve inches. Focus on the eyes, and don't over-expose.

Children

If you don't want posed and sentimentally arranged pictures of children (which after all do not require a technique different from that applied to normal portraits) you will have to work inconspicuously. Allow for the child's attention to be diverted by keeping the camera at some distance. Let the children play, while you play with the camera; set the lens to a suitable focusing zone and watch until you are sure that the camera does not attract attention, then shoot quickly. This not only produces life-like child studies but also includes some of the surroundings.

Do not worry about using comparatively slow snapshot speeds (e.g. because of a small aperture needed for depth of field), as slightly blurred outlines due to sudden movement will not show unpleasantly but actually add to the live appearance of the shot.

Avoid looking down at children with the camera; it dwarfs them in a ludicrously unflattering manner. Low angles are strongly recommended—get right down to the floor if possible.

After a while, children will become used to your presence and will take no further notice. Sometimes, though, it is useful to be able to shoot from the waist without looking through the viewfinder. To do this you need practice in aiming the camera and in knowing how close to get to objects of various sizes so that they fill the film.

You can't afford to be too fussy about things like background and composition. The chances of everything happening just the way you want it to are pretty slim. So when you see the action you want, press the release. You may wait all day and not have the chance again.

Taking photographs of children indoors need not present any problems. There is less room for the child to move about in, which simplifies the task. Adequate over-all lighting gives mobility.

Animals

The technique is the same as for children. Use zone focusing or pre-focus at some point at which the animal is likely to be, and shoot when its picture appears in the finder.

When taking animals behind bars or wire netting at the Zoo, bring the camera lens right up to the barrier, letting it look unobstructed through it.

Posing animals is not an easy job. A dog will not willingly permit himself to be dressed up in a collar and tie nor will he consent to smoke a pipe unless he is extremely well-trained. A cat has similar and even more pronounced views on the matter.

But by simple psychology you can arrange a fair degree of action.

If you want a picture of a dog chewing a bone, by way of simple example, get a dog, get a bone, put them together and there's your picture.

If you want a picture of a cat stalking, dangle a piece of string out of camera range, and the cat is almost bound to stalk.

Sports

It is not advisable to attempt photographing the whole field of, let us say, a football ground from a great distance. It is more practical to look out for the possibility of getting close-up sections—for example, concentrating on one of the goals.

As mostly the very short shutter speeds are required to arrest movement, it is hardly ever possible to stop down considerably for depth of field. Nor will you, as a rule, have sufficient time to change the setting of distance while the game is on. Consequently, the camera should be set at some distance where interesting action is likely to occur—in our example 2 or 3 yards from the goal mouth.

With other sports the distance setting is often simplified as action is confined to some definite point which can be pre-focused.

More often than not the success of a sport photograph depends solely on pressing the release at the right moment. Select the most interesting phase of the action, and look out for "dead points" of movement, which allow slower shutter speeds. Such "dead points" occur whenever a movement changes its direction because at such moments the action comes to a standstill for a fraction of a second.

The actual shutter speed required to arrest movement depends on the speed of the subject, its direction of movement, and its distance from the camera (see table on p. 64).

The best sports pictures are usually possible only when you are familiar with the game. Then you will be less likely to be taken unawares by unexpected excitement.

Sometimes there are two speeds of subject movement to be considered. A cyclist may be travelling at 30 m.p.h., but his feet are moving quicker than that. A shutter speed which will stop his forward motion will still show his feet blurred.

Use the fastest film in the camera and develop in an

SHUTTER SPEEDS TO ARREST MOVEMENT

Subject	Distance Between Camera and Object					
	10 ft. 3 m.	17 ft. 5 m.	25 ft. 7.5 m.	42 ft. 12.5 m.	83 ft. 25 m.	165 ft. 50 m.
Swimmer	1/60	1/30	1/25	1/15	1/10	1/5
Walker	1/100	1/60	1/40	1/25	1/10	1/5
Runner	1/300	1/200	1/125	1/75	1/60	1/30
Cyclist	—	1/300	1/200	1/100	1/75	1/40
Skater	—	—	1/500	1/250	1/125	1/60
Horse galloping ...	1/500	1/300	1/200	1/100	1/75	1/40
,, trotting ...	1/300	1/200	1/125	1/75	1/60	1/30
,, walking ...	1/125	1/75	1/50	1/30	1/15	1/10
Racehorse	—	—	1/500	1/250	1/125	1/60
Waves	1/500	1/300	1/200	1/100	1/75	1/40
Heavy waves	—	—	1/500	1/300	1/150	1/75
Boats making 10 knots	1/300	1/200	1/125	1/75	1/60	1/30
,, ,, 20 knots	1/500	1/300	1/200	1/100	1/75	1/40
Tramcar	1/300	1/200	1/125	1/75	1/60	1/30
Motor car on road ...	—	—	1/500	1/300	1/150	1/75
Slow train	—	1/300	1/200	1/100	1/75	1/40
Fast train	—	—	—	1/500	1/250	1/100
Aeroplane	—	—	—	1/500	1/300	1/200

The values given are for movement across the view of the camera.

For motion at 45 degrees to the view of the camera increase time 100 per cent. In other words, if the motion photographed obliquely approaches or moves away from the camera the exposure time can be twice as long, say 1/50 sec. instead of 1/100.

For subjects coming directly towards, or going away from, the camera, increase the time by 300 per cent. In other words, in such a case the exposure time can be four times as long—say 1/25 sec. instead of 1/100.

energetic developer which needs no extra exposure. For very bright subjects like winter sports or sailing, slower film may be used.

Filters are not usually necessary, but if the light is good a yellow filter will improve the tone rendering of outdoor shots.

CONVERSION OF FEET AND INCHES INTO METRIC UNITS

British to Metric.		Metric to British.			
$\frac{1}{8}$ in.	0.32 cm.	0.5 cm.			$\frac{3}{16}$ in.
$\frac{1}{4}$ in.	0.64 cm.	1 cm.			$\frac{3}{8}$ in.
$\frac{1}{2}$ in.	1.27 cm.	2 cm.			$\frac{13}{16}$ in.
1 in.	2.54 cm.	3 cm.			$1\frac{3}{16}$ in.
2 in.	5.08 cm.	4 cm.			$1\frac{9}{16}$ in.
3 in.	7.62 cm.	5 cm.			$1\frac{15}{16}$ in.
4 in.	10.2 cm.	6 cm.			$2\frac{3}{8}$ in.
5 in.	12.7 cm.	7 cm.			$2\frac{3}{4}$ in.
6 in.	15.2 cm.	8 cm.			$3\frac{1}{8}$ in.
7 in.	17.8 cm.	9 cm.			$3\frac{1}{2}$ in.
8 in.	20.3 cm.	10 cm.			$3\frac{15}{16}$ in.
9 in.	22.9 cm.	12 cm.			$4\frac{3}{4}$ in.
10 in.	25.4 cm.	15 cm.			$5\frac{7}{8}$ in.
11 in.	27.9 cm.	20 cm.			$7\frac{7}{8}$ in.
1 ft.	30.5 cm.	25 cm.			$9\frac{13}{16}$ in.
2 ft.	61.0 cm.	30 cm.			$11\frac{3}{4}$ in.
3 ft.	91.4 cm.	40 cm.			$15\frac{3}{4}$ in.
4 ft.	1.22 m.	50 cm.			$19\frac{3}{4}$ in.
5 ft.	1.52 m.	60 cm.			$23\frac{5}{8}$ in.
6 ft.	1.83 m.	80 cm.			$31\frac{1}{2}$ in.
7 ft.	2.13 m.	100 cm.			$39\frac{1}{2}$ 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.

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 above table shows at a glance equivalent lengths.

HOW TO . . .

WHAT IS WHERE?