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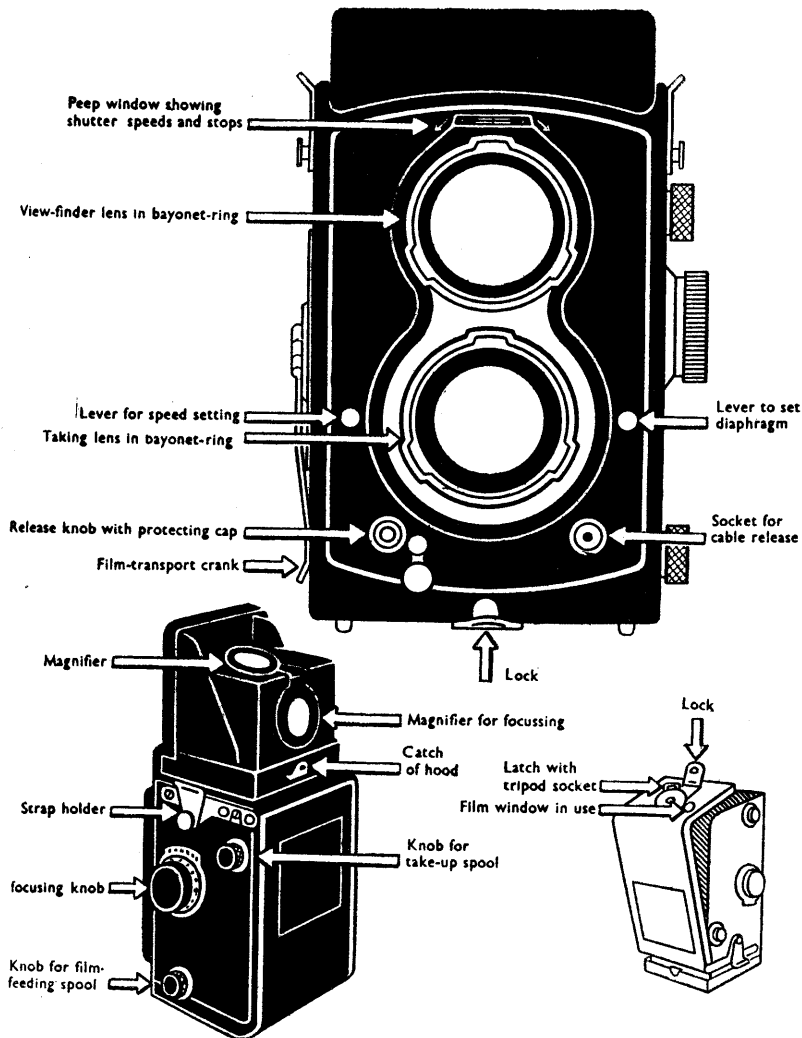
Only one "donation" needed per manual, not per multiple section of a manual !

The large manuals are split only for easy download size.

HANDLING THE ROLLEIFLEX STANDARD NEW

- I. OPENING THE CAMERA.** (1) Take camera in right hand, upside-down, lenses in the palm of the right hand (without touching the surface of the lenses). (2) With forefinger of left hand turn latch to side in direction of arrow. Lock is now loosened. (3) Press with forefinger of right hand against lock, grip with forefinger and thumb of left hand the two side-nipples and pull the back panel down.
- II. CLOSING THE CAMERA.** (1) Take camera in right hand. (2) Press back panel with the flat of the palm of the left hand firmly against camera body until (3) lock inserts with audible snap. (4) Turn latch with left forefinger inward.
- III. REMOVING THE BACK PANEL.** (1) Pull up the two levers to remove the back panel on the right- and left-hand strap-holders. (2) Open camera (see I.). (3) Lift up the back panel and remove it. The camera can now be used with the cine-film attachment or the plate-adaptor.
- IV. LOADING THE CAMERA.** *Do it in the shadow!* (1) Open the camera (see I.). (2) Pull out knob for the feeding-spool. (3) Secure knob by slight turn to the left. (4) Insert film-spool and turn knob again until it springs into position. (5) The coloured surface of the cover paper should show on the outside when winding on. (6) Remove seal. (7) Draw the pointed end of cover paper upwards, (8) and then over the picture frame downwards. (9) Push pointed end of cover paper as far as possible into the broad slit of the take-up spool. (10) Swing the crank in operating position and (11), if necessary, adjust the spool by turning the crank. (12) Turn the crank clockwise direction, and (13) wind cover paper once round the spool to hold the film fast during transport. (14) Do not damage the edges of cover paper during transport. (15) Close the camera (see II.) and secure lock *without* for the time being *turning the latch to the right*. (16) Continue cranking until No. 1 appears in the film-window on the right-hand side of the threaded bush for the tripod. (17) Now turn crank always backwards—anti-clockwise—as far as it will go, and (18) fold crank back into rest position. (19) Turn the latch to the right and thus secure lock and film-window. This window, merely serving to mark the beginning of film, has now fulfilled its purpose. The camera is loaded and the shutter is tensioned by the film transport crank.

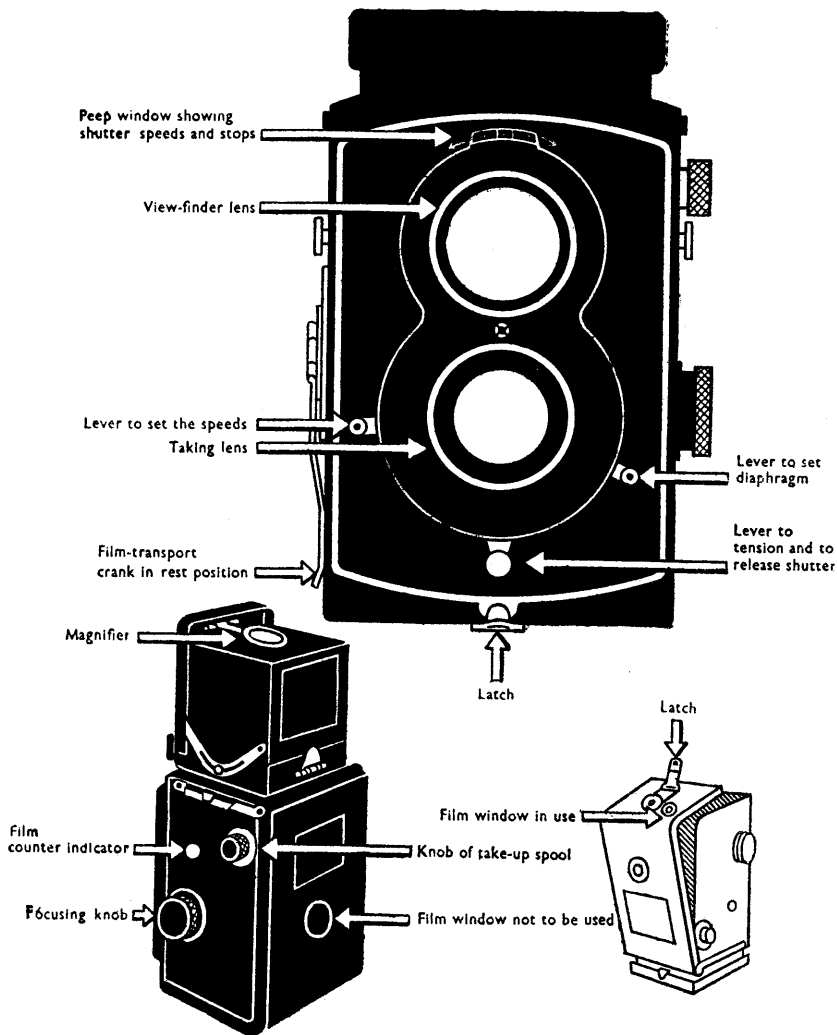
- V. THE FOCUSING-HOOD.** *To open:* (1) Release catch for focusing-hood. (2) The hood springs automatically up into position. *Using the magnifier:* (1) Press hinge of magnifier mount and (2) swing magnifier into position, (3) while pulling back at the same time. (4) Bring eye close to the magnifier and turn focusing-knob.—*Use at eye-level:* (1) Take care to leave magnifier in rest position. (2) Pull lever for mirror at eye-level up to the stop, (3) while exerting a slight pressure with thumb on the front of the focusing-hood. (4) Peep through the double magnifier provided in back panel of focusing-hood.—(5) to move back the mirror, press lightly on same lever, which springs back automatically into its initial position. *The focusing-hood cannot be closed until the mirror has been folded back!*—*To close:* (1) Fold over front edge of focusing-hood until it (2) springs home.
- VI. FOCUSING** is done by turning the focusing-knob. (1) Turn knob slowly with left hand and (2) observe image on the ground-glass screen. (3) Stretch forefinger of left hand until it reaches the lever for setting the stops. (4) Move lever up or down until the wanted stop appears in the peep-hole above finder-lens (black figures). The black dot between 11 and 22 marks $f 16$.
- VII. EXPOSURE.** (1) The right hand is below the camera, supporting it. (2) The right forefinger is on the lever for setting the shutter-speed, (3) moving it upwards or downwards until the wanted shutter-speed appears in the peep-hole on top of the finder-lens (red figures). (4) Move right-hand forefinger down on release knob. (5) If picture is well focused and composed press release knob (or by operating a cable release screwed in the threaded bush). The picture is now taken.
- VIII. TRANSPORT OF FILM.** (1) The right hand swings transport crank into operating position and (2) moves it from stop to stop; (3) then turn back crank, thus (4) tensioning the shutter after having transported the film the length of one picture. (5) Indicator shows next film. The film cannot be further advanced until the shutter has been released again.
- IX. CHANGING FILM.** *Do it in the shadow!* When the crank is no longer checked and can be turned round freely the 12th exposure has been made. (1) Wind off the film completely by cranking. (2) Open camera (see I.) and (3) pull out knob for take-up spool and fix it (see IV.). (4) Remove spool and (5) seal it at once. (6) Pull out knob for film-feeding spool. (7) Remove empty spool and (8) transfer it to the take-up position. *Note that the slotted end of the take-up spool has always to go to the right-hand side to fit the crank.* (9) Then see again IV.



The Rolleiflex Standard New (p. 37)

HANDLING THE ROLLEIFLEX STANDARD

- I. **OPENING THE CAMERA.** (1) Take camera in left hand, upside-down, lenses in the palm of the right hand (but without touching the surface of the lenses). (2) Depress with right thumb the latch below the Compur shutter and (3) turn the back panel up at right angles.
- II. **CLOSING THE CAMERA.** (1) Press the back panel with thumb and palm of the right hand firmly against the camera body (2) until it locks with an audible snap. (3) Secure the latch by pressing it against the camera body.
- III. **REMOVING THE BACK PANEL.** (1) Open the camera and (2) press the whole back panel slightly to the left. (3) The back panel can then be removed.
- IV. **LOADING THE CAMERA.** *Do it in the shadow!* (1) Open the camera in the usual way. (2) Insert new film spool in the groove of the film-feeding spool by (3) slightly pressing down the film container plate. Then (4) let go the plate and the spool will be fixed automatically. The coloured surface of the protective paper must be on the outside when unwinding the film. (5) The gummed seal should only now be removed. (6) Now pull the pointed end of the cover paper upwards and across the picture frame and (7) insert it as far down as possible in the broad slit of the take-up spool. If necessary (8) adjust the spool by moving the transport crank slightly backwards and forwards until (9) the slotted end fits the crank. To avoid trouble, (10) take care that the cover paper is wound on straight. A few turns of the crank suffice to secure the paper strip firmly in position. (11) Close back panel. (12) *Now be careful!* These older cameras have two film-windows, one in the back panel and one at the bottom of the camera. The first one bears the German inscription „Für Rollfilm B I 6 × 6“, meaning for rollfilms B I 6 × 6 only, relating to the time when special 6 × 6 size films were made. *Do not trouble about this film-window, leave it untouched!* (13) We are interested only in the second one, bearing the inscription „Für Rollfilm B II, 6 × 9“, that is to say “For rollfilms B2, 6 × 9”, which are the films we have to use for our camera. (14) Now turn the crank until No. 1 of the film appears in this film-window at the bottom of the camera. (15) Take care not to overturn this number. The film-window, having fulfilled its purpose, should now be closed (16) immediately. Now (17) turn back the crank until the top stop is reached, and (18) fold it into its rest position. (19) The film indicator above the crank will not show any figure at all or a 12 from the last film. To start the indicator working (20) depress



The Rolleiflex Standard (p. 40)

the small pin in the knob above the crank until (2) the counter springs back to No. 1.

- V. THE FOCUSING-HOOD** springs automatically into position when the (1) latch for the focusing-hood has been pressed backwards. (2) A slight pressure on the hinge of the magnifier brings it into position, too. *To close the focusing-hood* (1) fold down the magnifier and (2) press down the sides of the hood, using the right and left thumb alternately in this order: (3) right side, left side, back and lid.
- VI. FOCUSING** is done by (1) turning the focusing-knob, the (2) camera resting firmly in the right hand. (3) The index finger of the right hand can now easily slip to the lever on the right of the shutter to (4) set the shutter-speed, (5) while the forefinger of the left hand slips to the lever on the other side of the shutter, to (6) set the stops. The shutter-speeds as well as the stops are easily (7) to be seen in the small double peep-hole above the shutter. *For eye-level exposures* the lid of the focusing-hood can be used as a frame-finder. (1) Press the index finger against one of the leather-lined squares and (2) release the latch for the focusing-hood. (3) This causes the frame-finder to spring into the position of use, while the focusing-hood remains in its rest position. (4) A small concave mirror with a hole in the centre is in the middle of the frame. (5) When the eye is reflected in this mirror, the (6) frame or diopter shows the exact outlines of the picture.
- VII. EXPOSURE.** The Compur shutter is fully encased and is the same as in the other Rollei cameras. Those people owning a Tessar lens $f 3.8$ or $f 4.5$ will have a maximum shutter-speed of $1/300$ sec.; those with a $f 3.5$ lens one with $1/500$ sec. In any case the Compur shutter is a single-lever shutter and not coupled with the transport crank. It has, therefore, to be (1) tensioned before each instantaneous exposure by (2) means of the operating lever below the shutter. To tension the shutter this lever has to be (3) pulled to the right; to release the shutter it has to be (4) pulled to the left.
- VIII. TRANSPORT OF FILM** is operated by (1) turning the crank from (2) stop to stop. (3) After the 12th exposure the indicator will show either a red dot or a white circle, according to the time of construction of your particular camera.
- IX. CHANGING FILM.** *Do it in the shadow!* (1) Rotate the crank to and fro (2) until the film is fully wound up. (3) Open the back panel, (4) pull out the knob of the taking-up spool on the left-hand side of the camera, (5) remove the film and (6) seal it at once. The empty spool below (7) springs out following a quick depression of the container plate and has now to be (8) inserted above as the take-up spool. The slotted end must be on the right-hand side.

HANDLING THE SPORTS-ROLLEIFLEX $1\frac{5}{8} \times 1\frac{5}{8}$ in., 4×4 cm.

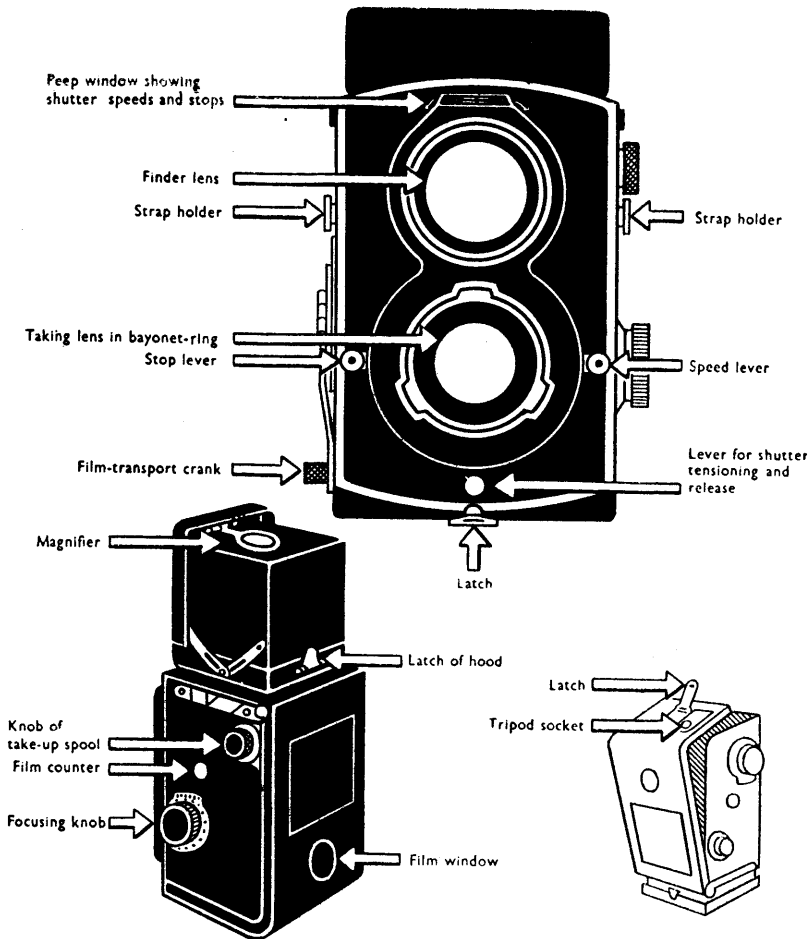
- I. OPENING THE CAMERA.** (1) Take camera in left hand, upside-down, lenses in the palm of the left hand (without touching the surface of the lenses). (2) With forefinger of right hand press down the lock-catch and (3) pull the back-panel upwards, thus opening it.
- II. CLOSING THE CAMERA.** (1) Take camera in left hand. (2) Press back-panel with the flat of the palm of the right hand firmly against camera body until (3) lock inserts with audible snap. (4) Secure catch.
- III. REMOVING THE BACK-PANEL.** (1) Pull up the two small knobs to remove the back-panel on the right and left-hand side of the camera. (2) Open camera (see I.). (3) Lift up back-panel and remove it. The camera can now be used with the ciné-film attachment or the plate adapter.
- IV. LOADING THE CAMERA.** *Do it in the shadow!* (1) Open the camera (see I.). (2) Insert the new spool of film in the groove for the feeding spool. The spool is gripped automatically. (3) Remove the seal. (4) Pull the pointed end of the backing-paper upwards and across the picture frame. (5) Insert the pointed end as deep as possible into the broad slit of the take-up spool. (6) Adjust this spool by moving the transport crank. (7) The strip must be wound on straight. (8) Give the crank a few turns to secure paper slip firmly in position. (9) Close the camera (see II.) (10) and turn crank until No. 1 appears in the film-window on the back-panel. (11) Cover the film-window at once with its slide. (12) Turn back the crank until the top stop is reached and fold it into its rest position. *The film counter or indicator will not show any figure at all; to cause it to work properly never forget to* (13) depress the pin, which is sunk in the knob above the indicator-window. Only then the indicator springs back to No. 1. The camera is loaded now.
- V. THE FOCUSING-HOOD.** *To open:* (1) Release catch for focusing-hood (2) which springs automatically into position. Simultaneously the (3) magnifier springs also into position of use, but can be folded down if desired. (4) Bring eye close to magnifier—when using it—and turn focusing-knob.—*Use at eye-level:* (1) Press index-finger of right hand on one of the leather-lined squares of the focusing-hood, and (2) release catch for focusing-hood. (3) the frame-finder alone will then spring into position of use. In the centre of the frame is a small concave mirror. (4) When the eye is reflected in this mirror the (5) frame shows the exact outlines of the picture. The pupil of the eye should coincide with the aperture in the concave

mirror. To close: (1) Fold down magnifier and (2) press down the sides of the focusing-hood, using the right and left thumb alternatively. (3) Keep the following order: right side, left side, back and lid.

- VI. FOCUSING** is done by turning the focusing - knob. (1) The lens stop is set with the forefinger of the left hand on the lever controlling the lens apertures. (2) Move it upwards or downwards until the wanted stop appears in the peep-window above the finder-lens (black figures).
- VII. EXPOSURE.** (1) The right hand is below the camera supporting it. The right forefinger (2) moves the lever for setting the exposure time which appears in the peep-window. (3) Now the forefinger or the middle finger, as you like, is put on the single-lever below the Compur shutter. (4) Pull this lever to the right and tension the shutter, then (5) if you are satisfied with the ground-glass screen image, push the lever to the left and release the shutter without shaking the camera. *When setting the instantaneous speeds see that the operating lever is pressed firmly home, as otherwise the mechanism will fail.*
- VIII. TRANSPORT OF FILM.** (1) Grip transport-crank with right hand. (2) Turn it from above at the front downward to the back until it reaches the opposite stop. (3) The film is ready for the next picture and the indicator will (4) show the next number.
- IX. CHANGING FILM.** *Do it in the dark!* As soon as a red dot appears in the indicator and a light click is heard, the film is at its end. (1) Turn the crank until the film is completely wound-off. *Sometimes a variation of thickness of the spools or the film makes a spool so thick as to prevent the crank pieces being moved after the last exposure. In such a case remove the back-panel in dim light and lift out the spool.* (2) Open the camera (see I.). (3) Pull out knob for take-up spool (see IV.). Lift exposed spool out and (4) seal it at once. (6) Pull out knob for film-feeding spool (7) Lift out empty spool and (8) insert it in the groove for the take-up spool. *Note that the slotted end of the take-up spool has always to go to the right-hand side to fit in the crank.* (9) Then start again with IV.

HANDLING THE ROLLEICORD II

- I. OPENING THE CAMERA.** (1) Hold camera in left hand and (2) release the lock-catch with right thumb. (3) Pull the back-panel upwards, thus opening the camera.
- II. CLOSING THE CAMERA.** (1) Press back-panel firmly with thumb and palm of right hand against (2) camera body in left hand until (3) lock inserts with audible snap.



The Sports Rolleiflex (p. 43)

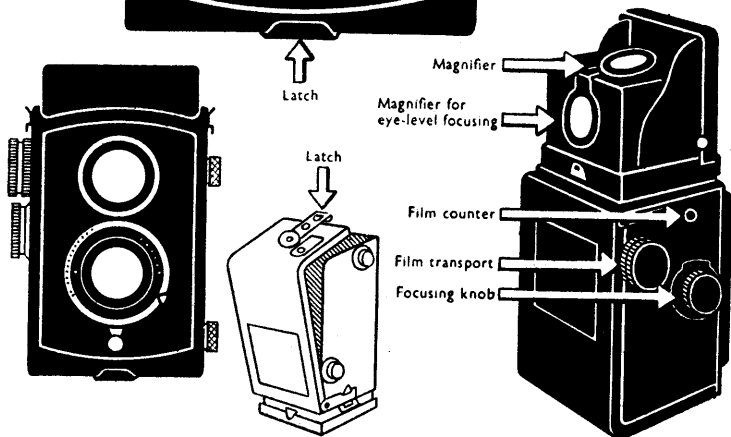
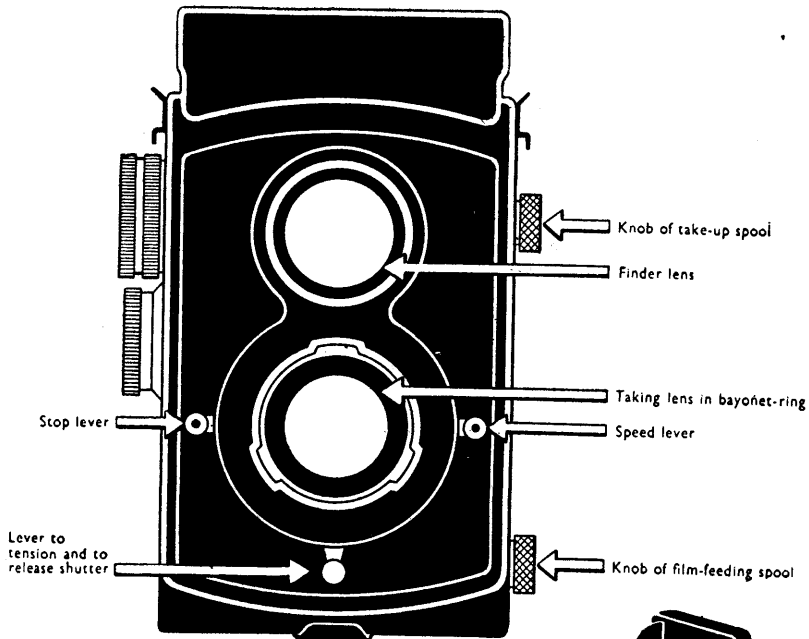
III. REMOVING THE BACK-PANEL. (1) There is a spring catch on the left on top of back-panel; press it after (2) having opened back-panel and turned it at right angles to the camera. (3) Then remove back-panel. The camera can now be used with the ciné-film attachment or plate-adaptor.

IV. LOADING THE CAMERA. *Do it in shadow!* (1) Open camera (see I.). Pull out spring-button for feeding-spool. (3) Insert spool in its groove and release button so that (4) it springs into the hole of the spool. (5) The coloured surface of cover paper must be on outside when winding on. (6) Remove seal. (7) Draw pointed end of cover paper over the picture frame. (8) Push pointed end as far as possible in the broad slit of the take-up spool. (9) If necessary, adjust take-up spool by turning the winding-knob. (10) Turn this knob two or three times until paper is taut while (11) slightly resting thumb on the paper. (12) Wind on the knob. (13) If it stops, press with right index finger on spring-locking disc in the centre of the winding-knob. (14) Wind on two more times and (15) make sure that cover paper runs straight. (16) Close camera (see II.). (17) Turn winding-knob slowly on and (18) repeat operation with spring locking-disc until (19) the film-window (at the bottom of back-panel) shows No. 1. (20) Stop winding. (21) Press down the locking-disc of the winding-knob with right index finger and simultaneously (22) move the small milled knob below the winding-knob (called "counter release-knob") backwards with middle finger so that (23) indicator springs to 1. (24) Do not forget to close the film-window.

V. THE FOCUSING-HOOD. *To open:* (1) Release catch for focusing-hood. (2) The hood springs automatically up into position.—*Using the magnifier:* (1) Press hinge of magnifier mount and (2) swing magnifier into position, (3) while pulling back at the same time. (4) Bring eye close to the magnifier and turn focusing-knob.—*Use at eye-level:* (1) Take care to leave magnifier in rest position. (2) Pull lever for mirror at eye-level up to the stop, (3) while exerting a slight pressure with thumb on the front of the focusing-hood. (4) Peep through the double magnifier provided in back panel of focusing-hood.—(5) To move back the mirror, press lightly on same lever, which springs back automatically into its initial position. *The focusing-hood cannot be closed until the mirror has been folded back!*—*To close:* (1) Fold over front edge of focusing-hood until it (2) springs home.

VI. FOCUSING is done by turning the focusing-knob.

VII. EXPOSURE. (1) The right hand is below the camera, supporting it. (2) The right forefinger moves the lever for the setting of the shutter speeds (3) upwards or downwards, until the wanted shutter speed appears in the second peep-



The Rolleicord II and (bottom left) Ia (p. 44 and p. 48)

hole above this lever. (4) Now forefinger is put on the lever below the Compur shutter and (5) pulled to the right, thus tensioning the shutter. (6) Push the same lever to the left and release shutter (or use cable release). *When setting the instantaneous speeds, see that the operating lever is pressed firmly home, as otherwise the mechanism will fail.*

VIII. TRANSPORT OF FILM. (1) Turn the winding-knob to next stop after releasing it by (2) depressing the locking-disc. (3) So carry out film transport until 12 is made.

IX. CHANGING OF FILM. *Do it in shadow!* After the 12th exposure a white circle appears in the indicator. The locking-disc is then released automatically, so that (1) the film can be wound off completely. (2) Open camera (see I.), (3) pull out the winding-knob, (4) remove film and (5) seal it at once. (6) Pull out knob for film-feeding spool. (7) Lift out empty spool and (8) insert empty spool on the right-hand winged pin and (9) push home. (10) Push opposite pin, turning it at the same time, so that spool is engaged.

HANDLING THE ROLLEICORD Ia.

- I. **OPENING THE CAMERA.** (1) Hold camera in left hand and (2) release the lock-catch with right thumb. (3) Pull the back-panel upwards, thus opening the camera.
- II. **CLOSING THE CAMERA.** (1) Press back-panel firmly with thumb and palm of right hand against (2) camera body in left hand until (3) lock inserts with audible snap.
- III. **REMOVING THE BACK-PANEL.** (1) There is a spring catch on the left on top of back-panel: press it after (2) having opened back panel and turned it at right angles to the camera (3.) Then remove back-panel. The camera can now be used with the ciné-film attachment or plate adapter.
- IV. **LOADING THE CAMERA.** *Do it in shadow!* (1) Open camera (see I.). (2) Pull out spring button for feeding-spool. (3) Insert spool in its groove and release button so that (4) it springs into the hole of the spool. (5) The coloured surface of cover paper must be on outside when winding on. (6) Remove seal. (7) Draw pointed end of cover paper over the picture frame. (8) Push pointed end as far as possible in the broad slit of the take-up spool. (9) If necessary, adjust take-up spool by turning the winding-knob. (10) Turn this knob two or three times until paper is taut while (11) slightly resting thumb on the paper. (12) Wind on the knob. (13) If it stops, press with right index finger on spring-locking disc in centre of the winding-knob. (14) Wind on two more times and (15) make sure that cover runs straight. (16) Close camera (see II.).

(17) Turn winding-knob slowly on and (18) repeat operation with spring locking-disc until (19) the film window (at the bottom of back-panel) shows No. 1. (20) Stop winding. (21) Press down the locking-disc of the winding-knob with right index finger and simultaneously (22) move the small milled knob below the winding-knob (called "counter release knob") backwards with middle finger so that (23) indicator springs to 1. (24) Do not forget to close the film window.

V. THE FOCUSING-HOOD. *To open:* (1) Release catch for focusing hood which (2) springs automatically into position.—*Using the magnifier:* (1) Turn magnifier mount across focusing-hood until it locks. (2) Light outward pressure on the view-finder frame causes magnifier to spring back.—*Use at eye-level.* (1) Press with right index finger on centre of the lid of focusing-hood until it locks. (2) Release catch for focusing-hood, which (3) will spring up without the lid, leaving the (4) frame-finder in position. (5) Bring eye close up against the peep-hole and (6) see outlines of picture in the frame. *To close:* (1) Press lightly from inside against back-panel of focusing-hood, which (2) causes the lid to spring back. (3) Fold over front edge of focusing-hood until it springs back.

VI. FOCUSING is done by turning the focusing-knob. (1) The lens stop is set by actuating the lever on the Compur shutter (2) while holding the camera upwards with lenses against the face.

VII. EXPOSURE. The right hand is below the camera, supporting it. (1) Hold the camera upwards (see VI./2) and set the shutter speed by turning the ring on the Compur shutter (2) Bring the camera back in position for use. (3) Put the fore-finger on the single lever below the Compur shutter. (4) Pull this lever to the right and tension the shutter, then (5) if satisfied with image on the ground-glass screen, push same lever to the left and release shutter, without shaking the camera. *When setting the instantaneous speeds, see that the operating lever is firmly pressed home, as otherwise the mechanism will fail.*

VIII. TRANSPORT OF FILM. (1) Turn the winding-knob to next stop after releasing it by (2) depressing the locking-disc. (3) So carry out film transport until exposure 12 is made.

IX. CHANGING OF FILM. *Do it in shadow!* After the 12th exposure a white circle appears in the indicator. The locking-disc is then released automatically, so that (1) the film can be wound off completely. (2) Open camera (see I.). (3) Pull out the winding-knob. (4) Remove film and (5) seal it at once. (6) Pull out knob for film-feeding spool. (7) Lift out empty spool and (8) insert empty spool on the right-hand winged pin and (9) push home. (10) Push opposite pin, turning it at the same time, so that spool is engaged.

FOCUSING

Holding the Camera

The camera should be slung around the neck and carried at breast-level on the black leather strap supplied with each camera. When focusing and making an exposure you can get great steadiness in holding the camera by looping the strap round the right thumb and shortening the strap by means of the loop to the right length.

To get the picture you want, you have to bring the camera in the direction of your subject. The best way to do it is to carry the camera slung around the neck and to grip it *from below* with the right hand. If you hold it sideways you cannot move the front-board for focusing. Correctly held, the camera is easy to direct in any way while the left hand turns the focusing knob.

Sometimes you may wish to take your picture from a higher view point, say at eye-level. This is made possible by special devices in the focusing hood. Take care to leave the magnifier in its rest position. Then pull the lever of the mirror device as far as it goes, while exerting a slight pressure with the thumb on the front of the focusing hood, and up springs the mirror into action. Now peep through the *double* magnifier provided in the back panel of the focusing hood and turn the focusing knob as usual. You can now focus the picture with the finder image and at eye-level.

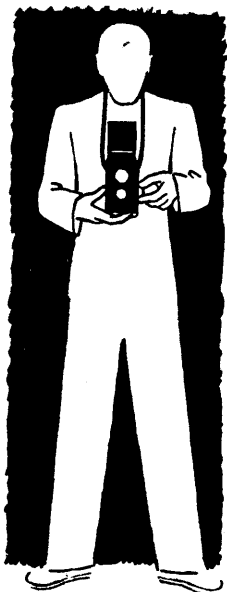
You can use the same device to take pictures round the corner, or you can do the same with the view-finder camera, by holding the whole camera at right angles to your body instead of in front of it.

To take a picture over the heads of a crowd you use the Rolleiflex upside down, either with the eye-level mirror, with which the elevation is only slightly higher than your own forehead, or with the usual view-finder. In the latter case, you look at the image on the focusing screen, which is now directed downward, from below. In this case take care to release the shutter slowly, so as to avoid shaking of the camera, which is now without the usual support of the strap.

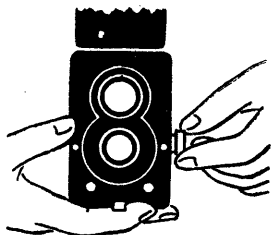
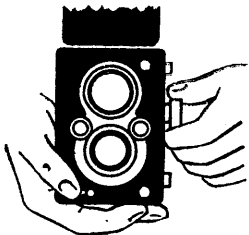
The eye-level mirror shows the image upside-down.

The Technique of Focusing

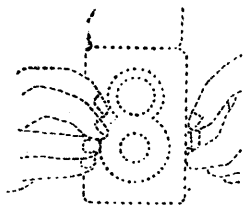
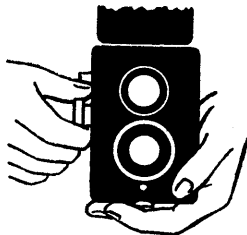
As soon as you turn the focusing knob of a Rolleiflex camera you see the front-board with the two lenses moving forwards or backwards, and very quickly the blurred colour spots on the screen become a sharp and clear picture.



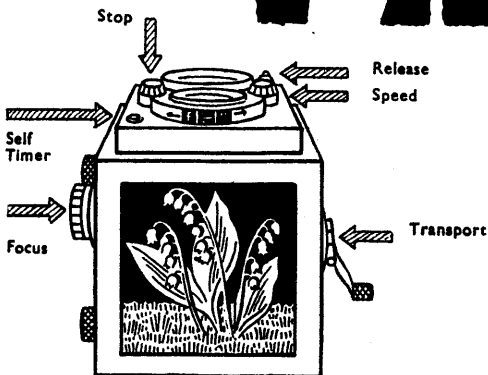
The camera should be slung around the neck and carried at breast-level or slightly lower. Stand with your legs apart.



Holding the Automatic and the Standard New Rolleiflexes (top left). Holding the Standard and the Sports Rolleiflexes (top right). Holding the Rolleicord (bottom left). The wrong way to hold any Rollei camera (bottom right).



Overhead (left), round the corner (middle) and eye-level focusing (right).



Good focusing, however, means more than merely a sharp picture; it means:

Outlining the picture.

Getting the best possible definition.

To outline the picture you have the view-finder image before you, even during the exposure, so that there is no difficulty at all in giving the picture just the outline you want. But remember that all small-sized cameras are primarily close-up cameras; the larger the image in the view-finder and the more distinctive the foreground, the more pleasing a small picture will be. When outlining the picture make sure, too, that the camera is properly levelled. Lines which you want to appear as horizontals and perpendiculars on the negative should run parallel to the horizontals and perpendiculars of the fine netting engraved on the ground-glass screen.

The best definition has to be obtained by using the focusing knob. The focusing is always under observation, so that any movement or alteration of distance on the part of the subject is at once apparent. To determine exactly when the image is sharp is sometimes not so easy. There really is a certain latitude within which you can experiment before you finally decide which is the point of maximum definition. Do not be satisfied with the very first impression of a seemingly sharp image. Keep on slowly turning the focusing knob: the image may get still sharper yet before it gets fuzzy again. When this point is reached, turn back the focusing knob and go over the ground just once more. When you think that the best possible definition has been reached, view it through the magnifier to make sure.

When focusing with the magnifier it is useless to turn the focusing knob excitedly to and fro. It is essential to give the slightest turn possible in order not to overturn past the point of finest definition. At the same time, however, you must keep an eye on the whole picture shown by the ground-glass screen, for the magnifier covers only the centre of it. As soon as this is pin-point sharp, the magnifier

Before and beyond the point of maximum definition, however, the image will appear almost perfectly sharp, and some photographers, especially those with defective eyesight, may consider this slightly unsharp image to be the right one. The small image on the ground-glass screen is too easily considered sharp until a later enlargement proves the contrary. The more a picture is to be enlarged the better the definition has to be, and—an important point—the centre of interest has always to be in the area of the greatest sharpness.

A word of warning is necessary, however, at this point. Although focusing with the Rolleiflex and Rolleicord cameras is almost automatic and practically fool-proof, yet the finder-lens cannot be more accurate than your eyes will allow it to be. So before settling your final choice on one of the admittedly first-class pieces of mechanism, make quite sure that your eyesight is good enough to do justice to the camera.

The Rollei Hood Extension is a folding leather case, which can be clipped on to the focusing hood and gives additional brilliance to the focusing image by excluding all extraneous light from the screen. A very useful gadget, especially for people with over-sensitive eyes when the daylight is very bright and interferes from above with the picture on the focusing screen.

The picture on the ground-glass screen is upright but reversed; that is to say, the left-hand side of your subject is on the right-hand side of your picture and vice versa. This means that every movement observed on the ground-glass screen is also reversed—a movement to the right, that is, appears on the screen to go to the left, but must be followed by turning the camera to the right. This must be reckoned with especially carefully when the object is moving rapidly.

Depth of Focus

A certain safety in focusing is always given by the depth of focus scale provided above the focusing knob. This makes it possible to read off how far the sharp area will stretch in front and behind the distance actually focused. In the case of

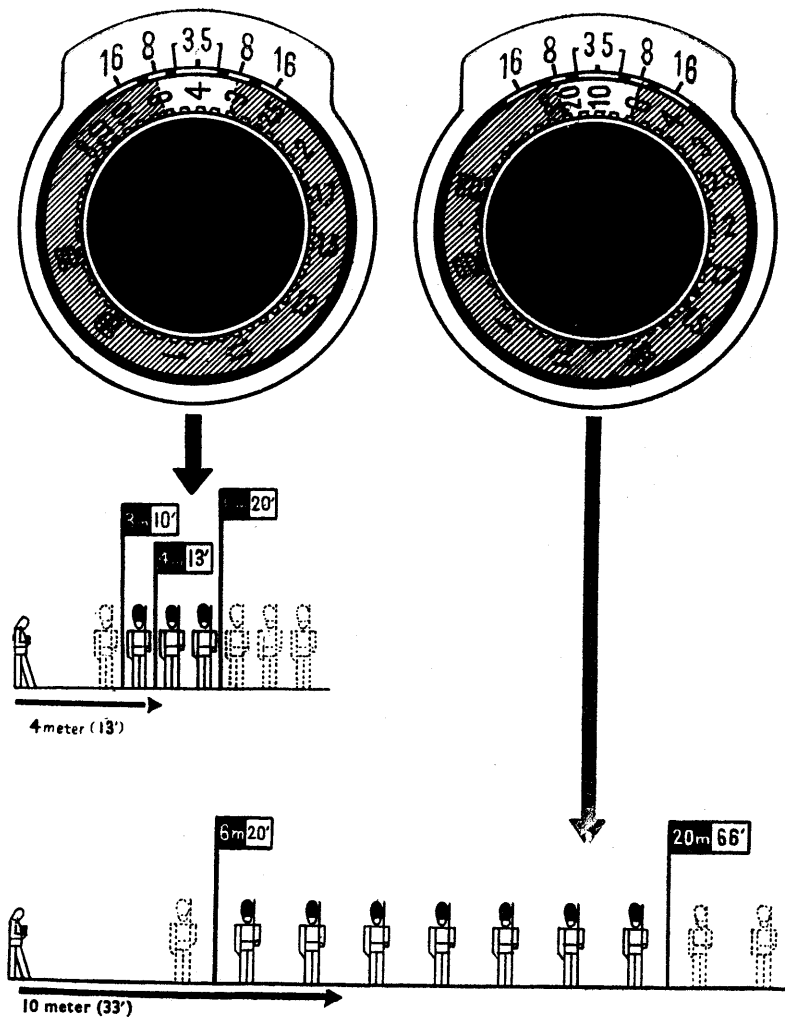
a fairly distant point the sharp area may stretch as far as the horizon, but is very much reduced in the case of near focusing, diminishing progressively the nearer the focus is set. Focusing of objects near to the camera has, therefore, to be done very carefully.

A lens of large aperture will create a smaller depth of focus than a lens of small aperture. Now look at the Rolleiflex: the view-finder lens has an aperture of $f2.8$ (in the Standard of $f3.1$), the taking-lens has one of $f3.5$; the depth of focus of the latter is, therefore, always greater than that of the finder-lens and will increase the more we stop down the taking-lens. The finder-lens has no diaphragm at all and cannot be stopped down, which means that if the picture of the finder-lens is sharp, then that of the stopped down taking-lens must be even sharper.

Now, how does the depth of focus actually work?

With any one lens one plane only of a subject can be focused for maximum sharpness at the same time. The maximum definition begins to fall off on each side of this focused plane. Whether this lack of definition is more or less noticeable depends on the focal length of the lens, on the distance actually focused at, and the lens aperture—in any case, there is a certain belt of definition on both sides of the plane that is sufficiently sharp for many purposes.

This belt is called the depth of focus area. It is possible to create much or little depth of focus by varying the three conditions just mentioned. The most variable condition is, of course, the lens aperture. The smaller the aperture of a lens the greater is the depth of focus but the less light goes through the lens. Besides, you improve the depth of focus by stopping down the lens (reducing the aperture) but not necessarily the general definition of the lens. In the case of our lens which is designed to give, when focused properly, a good all-over definition at the original aperture of $f3.5$, accuracy at the centre had, to some extent, to be sacrificed to ensure the correct focus at the edges. In consequence, nothing will be gained by trying to get maximum depth of focus and by restricting the focusing



Depth of focus (p. 58)

The larger the aperture and the nearer the focused point the shallower the depth of focus. The lens at the left is focused at 13 ft. (4 metres), the lens at the right is focused at 33 ft. (10 metres). Note the difference in depth.

FULL SIZE DEPTH

Focal length: 7.5 cm. (Circle of

Focused distance in m.		1	1.3	1.5	1.7	2
f 3.5	from	0.95	1.18	1.40	1.62	1.83
	to	1.05	1.33	1.61	1.91	2.21
f 3.8	from	0.95	1.17	1.39	1.61	1.81
	to	1.05	1.34	1.63	1.92	2.23
f 4.5	from	0.94	1.16	1.37	1.58	1.78
	to	1.07	1.35	1.65	1.96	2.28
f 5.6	from	0.93	1.14	1.35	1.55	1.74
	to	1.08	1.38	1.69	2.02	2.36
f 8	from	0.90	1.10	1.29	1.47	1.64
	to	1.12	1.45	1.79	2.16	2.55
f 11	from	0.87	1.05	1.22	1.38	1.53
	to	1.18	1.55	1.95	2.50	2.90
f 16	from	0.82	0.98	1.13	1.27	1.40
	to	1.28	1.69	2.25	2.80	3.50
f 22	from	0.77	0.91	1.03	1.15	1.25
	to	1.44	2.10	2.80	3.70	5.10

56 The table is given in metres, as all Rolleiflex and Rolleicord cameras are calibrated distances in English measures, we give the following conversion values: 1 metre =

OF FOCUS TABLE

(confusion 1/1000th focal length)

2.5	3	4	6	10	20	∞
2.24	2.63	3.35	4.70	6.80	10	21
2.83	3.50	4.95	8.40	19.0	350	∞
2.22	2.60	3.35	4.70	6.60	10	19
2.86	3.50	4.95	8.40	19.50	∞	∞
2.17	2.54	3.20	4.40	6.20	9	16
2.95	3.65	5.30	9.50	26.00	∞	∞
2.10	2.45	3.05	4.10	5.70	8	13
3.10	3.90	5.70	11.0	41.0	∞	∞
1.95	2.25	2.80	3.70	5	6	9
3.45	4.50	7.10	17.00	∞	∞	∞
1.80	2.05	2.50	3.00	4.00	5	7
4.10	5.60	10.50	78.00	∞	∞	∞
1.60	1.80	2.10	2.60	3	4	5
5.50	8.50	31.00	∞	∞	∞	∞
1.40	1.60	1.80	2.10	2.50	3	3
10.50	33.00	∞	∞	∞	∞	∞

metres only. For those who may wish to have the approximate equivalent
 at 3 feet 4 inches, 2.5 cm. (0.025 m.) = 1 inch.

to the centre of the lens, i.e. stopping down below $f8$. While it is impossible to lay down any hard and fast rule, our lenses are probably at their best at about $f5.6$, which is also a very convenient aperture for general purposes in conjunction with medium-speed emulsions.

Obviously, we cannot rely on the depth of focus for maximum sharpness. Correct focusing is as important as ever it was. It becomes vital if subsequent enlargement is contemplated. The depth of focus cannot replace correct focusing but, as we shall see presently, it can help to secure some latitude in *extending* the focus.

Selective focusing has always been used by the advanced photographers to concentrate attention on to the main subject of the picture. Now it is known that lenses afford a greater latitude of focus behind the point focused at (background) than in the front of it (foreground). Our eyes, however, have a different opinion: they accept a picture as sharp if the foreground is sharp, too. Thus we shall adjust our depth of focus according to the needs of the foreground and make use of the depth of focus scale accordingly. It shows us exactly whether the nearest point in the picture will still be in focus and how far the depth of focus will extend into the background. If we see that the foreground is not sharp, then a smaller aperture is indicated to extend the depth of focus, for it is essential that the foreground should not be fuzzy (tables on pp. 56-57).

But there is further use of the depth of focus principle.

Safety Focusing

When you are in a hurry and are dealing with quick action, it is nearly impossible to judge a hair-line focus on the reflex screen. In this case use the reflex device only as a means of composing the picture.

By selecting an appropriate aperture and focusing the camera on a certain distance chosen in conjunction with that particular stop, the lens is made to cover sufficiently the

For so-called "standard" shots, two well-known formulae for "safety focusing" have proved handy and reliable. For quick action work, focus the lens to 13 ft. or 26 ft., aperture $f8$, and press the button. The following standard exposure times for this type of shot will also come in handy:—

Bright, sunny weather	...	1/100 sec.
Good diffused light	... ..	1/50 sec.
Dull day, not too dark	... ..	1/25 sec.

But what if one wishes to take very quick actions, requiring a short exposure and therefore a larger aperture, or if the light is very dull? It must not be forgotten that a stopped-down lens necessitates a longer exposure. In such cases use the tables on p. 61 or your depth of focus scale on the camera or a full-sized depth of focus table specially calculated for use with Rolleiflex lenses and cameras (pp. 56-57).

But whenever you are able to do so, focus accurately on the ground-glass screen. This remains the best way of getting a sharp negative.

The depth of focus technique is not practicable when you are using auxiliary or soft-focus lenses. Correct focusing is in general essential for close-up photography.

Parallax Compensation

Linked with the question of focusing, especially with the *focusing of close-ups*, is the problem of parallax. What is parallax? The viewing error introduced in focusing because of the different positions of the view-finder and the taking-lens. This error is of no particular importance at distances between camera and subject matter greater than about 8 ft., but requires compensation at closer distance, because it increases rapidly the nearer the subject is to the camera.

For close-ups, parallax is an awkward thing, adding to your albums those pictures of people more or less without heads. To compensate for parallax many devices have been invented, but with little success. It needs special

SAFETY FOCUSING TABLE FOR ROLLEIFLEX $2\frac{1}{4} \times 2\frac{1}{4}$ in. (6×6 m.)
 Focal length 7.5 cm. = 3 in.

Focus to	Aperture	from	Definition to
4 m.	<i>f</i> 16	2.10 m.	31.00 m.
(= 13 ft. 4 in.)	<i>f</i> 16	7 ft.	103 ft.
6 m.	<i>f</i> 11	3 m.	78 m.
(= 20 ft.)	<i>f</i> 11	10 ft.	258 ft.
10 m	<i>f</i> 8	5 m.	∞
(= 33 ft. 3 in.)	<i>f</i> 8	16 ft. 6 in.	∞

SAFETY FOCUSING TABLE FOR ROLLEIFLEX $1\frac{3}{8} \times 1\frac{3}{8}$ in. (4×4 cm.)
 Focal length 6 cm. = $2\frac{3}{8}$ in.

Near	Focus to Distant	Aperture	Depth of Focus in the foreground from	In the background to
13 ft.	=	<i>f</i> 8	9 ft. 4 in.	20 ft.
			2.9 m.	6 m.
4 m.	=	<i>f</i> 11	8 ft. 2 in.	26 ft.
			2.5 m.	8 m.
	23 ft.	<i>f</i> 8	14 ft.	67 ft.
	=		4.2 m.	20.5 m.
	7 m.	<i>f</i> 11	11 ft. 10 in.	∞
	=		3.6 m.	

The aperture *f* 11 gives a greater depth of focus but is rather a small stop. Use it on bright summer days or when the weather is generally bright and when you really need this great depth of focus. The depth of focus scale above the focusing-knob of the Rolleiflex cameras bears the engraved distance readings from ∞ to 80 cm., that is, 2 ft. 8 in., say 3 ft. Owing to the lack of space, the apertures *f* 5.6 and *f* 11 are not given on the scale, but are represented by black-and-white fields between the ring and the calibration. There is no engraving for 26 ft. or 8 m. on the focusing-knob of the Rolleiflex cameras, so focus between 6 and 10 m. (19 ft. 6 in. and 32 ft. 6 in.).

SAFETY FOCUSING TABLE WITH LARGER APERTURES

ROLLEIFLEX $2\frac{1}{4} \times 2\frac{1}{4}$ in. (6×6 cm.)

Focal length 7.5 cm. = 3 in.

Focus to	Aperture	Definition from	to	Suitable for
10 m. (=33 ft. 3 in.)	f 3.5 f 3.5	6.8 m. 23 ft. 3 in.	19 m. 63 ft.	Night scenes of well illuminated entrances of cinemas or theatres.
6 m. (=20 ft.)	f 3.5 f 3.5	4.7 m. 15 ft. 5 in.	8.4 m. 28 ft.	Days with dull light.
4 m. (13 ft. 3 in.)	f 5.6 f 5.6	3.05 m. 10 ft.	5.7 m. 19 ft.	Days with dull light. Children at play.
3 m. (=10 ft.)	f 5.6 f 5.6	2.45 m. 8 ft. 1 in.	3.9 m. 12 ft. 9 in.	Fleeting expressions on human faces.
6 m. (=20 ft.)	f 5.6 f 5.6	4.1 m. 13 ft. 6 in.	11 m. 36 ft.	Animals, scenes in streets and market places.

SAFETY FOCUSING TABLE WITH LARGER APERTURES

ROLLEIFLEX $1\frac{1}{8} \times 1\frac{1}{8}$ in. (4×4 cm.)

Focal length 6 cm. = $2\frac{1}{2}$ in.

Focus to Metre	Feet	Aperture	Depth of Focus in the foreground from	in the background to	Suitable for
6	19 ft. 6 in.	f 2.8	14 ft. 8 in. 4.5 m.	26 ft. 8 m.	Stage photography.
12	39 ft.	f 4	27 ft. 8.3 m.	∞	Days with dull light. Children at play.
5	16 ft.	f 8	11 ft. 3.3 m.	30 ft. 9.5 m.	Animals, street scenes and markets.
9.5	30 ft.	f 8	20 ft. 6 m.	∞	Ditto.

attachments in almost every case. Only the one-lens reflex camera is free of parallax, because it uses the same lens for focusing and taking.

The Rollei cameras check parallax to a certain degree by keeping the focusing-screen smaller (56×53 mm.) than the taking-screen (59×55 mm.), thus assuring that the photographer will see less on his screen than he gets on his negative. Still, even that does not avoid parallax with close-ups.

This attempt at parallax compensation by means of reduced viewing glass is successful up to a distance of approximately 3 ft., as can be seen in the table.

DIFFERENCES BETWEEN VIEWED IMAGE AND NEGATIVE IMAGE

Distance m.	Parallax		Distance feet
	Rolleis $2\frac{1}{4} \times 2\frac{1}{4}$ in.	Rolleiflex $1\frac{1}{8} \times 1\frac{1}{8}$ in.	
∞	0	0	∞
20	0.14 mm.	0.1 mm.	65 ft.
5	0.56 mm.	0.45 mm.	16 ft. 3 in.
2	1.44 mm.	1.15 mm.	6 ft. 6 in.
1.6	1.82 mm.	1.45 mm.	5 ft. 3 in.
1.4	2.09 mm.	1.65 mm.	4 ft. 7 in.
1.2	2.46 mm.	1.95 mm.	3 ft. 11 in.
1.0	3 mm.	2.35 mm.	3 ft. 3 in.

At distances of less than 3 ft. parallax can be warded off by use of the *Rolleipar* lens that can be placed on the finder-lens with the engraved double arrow at the top. The *Rolleipar* lens introduces distortion, making thereby the pictorial image in the view-finder and the actual picture now coincide, even at close focusing, at about 32 in.

Some Rolleicords are fitted with a mask under the ground glass, which is coupled to the focusing, thus automatically compensating for any parallax down to three feet = 80 cms.

Close-ups

The nearest point at which Rollei lenses can be focused is approximately 32 in. Subjects nearer to the camera—i.e. mostly small subjects—cannot be photographed with the “naked” Rollei lens. Its focal length is too long for this type of job. There are, however, auxiliary lenses to help us.

Proxar lenses are converging lenses which shorten the focal distance and thereby permit of the reproduction of near-by objects on a large scale. By fitting these lenses the focusing range of the Rollei is narrowed down from 32 in. to 20 in. with *Proxar* set I, and to 13 in. with *Proxar* set II. Each set consists of two lenses, one to be fitted over the viewfinder lens and the other over the taking-lens, so that we can see what we are doing.

Proxar I set is recommended for flowers, still-life and copying work. It is frequently used also as a “portrait set”.

Proxar II set for insects, stamps and minute things generally.

The tables on p. 62, showing the effects of the different *Proxar* lenses, are well worth studying.

You can even try to use two *Proxar* lenses (of the same set) one on top of the other, to get a larger image or to be able to go nearer to the subject. But be careful with the parallax, which increases tremendously. You can avoid it by focusing directly on the screen of the plate adapter.

When using the *Proxar* lenses in the normal way, parallax can be avoided by using the *Rolleipar* lens. For close-ups with the *Proxar* lenses the *Rolleipar* lenses should be used in any case: *Rolleipar I* with *Proxar I* and *Rolleipar II* with *Proxar II*. The engraved double arrow should always be at the top.

Rolleipar lenses are obtainable only with push-on mount. The *Proxar* lenses are made in two patterns, with bayonet mount for the Automatic Rolleiflex, the Standard New model and Rolleicord II, and with push-on mount for all former Rollei cameras.

I. THE EFFECT OF THE PROXAR LENSES

Lens	Sport Rolleiflex $1\frac{1}{8} \times 1\frac{1}{8}$ in.				Rollei Cameras $2\frac{1}{4} \times 2\frac{1}{4}$ in.				
	Focus extends from	Focal length in inches	Scale of reproduction increases from	Focus extends from	Focal length in inches	Scale of reproduction increases from	Focus extends from	Focal length in inches	Scale of reproduction increases from
Taking-lens alone ...	...	$2\frac{1}{8}$	1 : 00 to 1 : 15.5	00 to 2.6 ft.	3	1 : 00 to 1 : 10	...	...	...
Taking-lens + Proxar 1 ...	3 ft. to 20 in.	2.3	1 : 16.5 to 1 : 7.5	3 ft. to 17.7 in.	2.79	1 : 13 to 1 : 5.3	...	...	...
Taking-lens + Proxar 2 ...	20 in. to 13 in.	2.2	1 : 8 to 1 : 5	20 in. to 13 in.	2.6	1 : 6.5 to 1 : 3.6	...	...	...

II. FIELD OF OBJECT AND SCALE OF REPRODUCTION IN CLOSE-UPS

Lens	Distance $1\frac{1}{8} \times 1\frac{1}{8}$ in.	Size of the field of the object $2\frac{1}{4} \times 2\frac{1}{4}$ in.		Reduction $1\frac{1}{8} \times 1\frac{1}{8}$ in.
		$2\frac{1}{4} \times 2\frac{1}{4}$ in.	22×23 in.	
Taking-lens alone ...	3.0 ft.	2.6 ft.	24.4×24.4 in.	15.5
Taking-lens + Proxar 1 ...	1.6 ft.	1.47 ft.	11.8×11.8 in.	7.5
Taking-lens + Proxar 2 ...	1.0 ft.	1.0 ft.	7.87×7.87 in.	5

III. DEPTH OF FOCUS TABLE FOR CLOSE-UPS WITH TAKING-LENSES 7.5 c.m. = 3 in. + PROXAR ($2\frac{1}{4} \times 2\frac{1}{4}$ in.)

Lens	Distance of subject to front of camera		f 4		f 5.6		8		f 11		f 16		f 22	
	from	to	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
Proxar 1 ...	3 ft.	37	42	36	42.5	35	44	34	46	32	50	30	57	57
Proxar 1 ...	$2\frac{1}{2}$ ft.	$28\frac{1}{2}$	31	28	32	27	$32\frac{1}{2}$	26	33 $\frac{1}{2}$	25	35	24	38	38
Proxar 1 ...	$1\frac{1}{2}$ ft.	19	20	19	$20\frac{1}{2}$	$18\frac{1}{2}$	21	18	$21\frac{1}{2}$	$17\frac{1}{2}$	22	17	23	23
Proxar 2 ...	16 in.	$15\frac{1}{2}$	16	15	16 $\frac{1}{2}$	15	$16\frac{1}{2}$	14 $\frac{1}{2}$	17	$14\frac{1}{2}$	$17\frac{1}{2}$	14	18	18
Proxar 2 ...	13 in.	$12\frac{1}{2}$	13	$12\frac{1}{2}$	$13\frac{1}{2}$	$12\frac{1}{2}$	$13\frac{1}{2}$	$12\frac{1}{2}$	$13\frac{1}{2}$	12	14	$11\frac{1}{2}$	$14\frac{1}{2}$	$14\frac{1}{2}$
Two Proxars 2	8 in.	$7\frac{3}{4}$	8	$7\frac{3}{4}$	8	$7\frac{3}{4}$	8	$7\frac{3}{4}$	$8\frac{1}{16}$	$7\frac{3}{4}$	$8\frac{1}{16}$	$7\frac{3}{4}$	$8\frac{1}{16}$	$8\frac{1}{16}$

EXPOSURE

When focusing with one hand on the focusing knob the other hand has to be busy with the setting of the aperture of the lens and of the shutter-speed. Immediately after the focusing the film has to be exposed.

The Exposure Table

An exposure table will be found on every Rollei camera, sometimes on the back panel, sometimes on the focusing hood. The calculations are made on the basis of a roll-film of 18/10° DIN (see p. 89) in sunny weather, at mid-day and in summer. It is a guide to approximately right exposure but not more (table on p. 82).

We must always bear in mind that a correct exposure depends upon quite a number of conditions:—(1) The brightness of the subject; (2) The sensitivity of the negative material; (3) The movement of the subject; (4) The stop of the diaphragm.

THE BRIGHTNESS OF THE SUBJECT depends upon the season of the year, the time of the day and the weather prevailing at the particular moment when we take the picture. On a dull December day the exposure time must, of course, be much longer than on a bright summer day, when the light is about four times brighter than in winter time, and it is obvious that even on a day in July the light will be brighter at noon than at 5.0 p.m. Indoors, the intensity of the light is even more difficult to judge.

Then there is the lighting of the subject:—*Front-light* will give a flat and dull lighting. *Side-light*, without reflected light from the other side, divides the picture into one harshly lit and one dark, shadowy part. *Top-light* casts shadows wherever an object is in its path, especially below the nose and in the eye-sockets, etc., in the case of portraits. *Bottom-light* casts similar shadows the other way round. *Against-the-light* produces silhouettes with a halo and dark shadows. Whatever lighting we choose for our subject, we must bear in mind that we have to lengthen the exposure time in proportion to the amount of shadow in the picture.

EXPOSURE TABLE FOR SUNNY DAYS

Stop	...	...	...	...	3.5	4.5	5.6	∞	11	16
Sports pictures	...	...	...	...	1/500	—	1/300	1/100	—	—
Beach and high mountains	...	...	...	...	—	1/500	—	1/300	1/100	1/50
Well-lit streets and squares	...	...	...	...	1/500	—	1/300	1/100	1/50	1/25
Landscape—far distant view	...	...	...	...		—	1/300	1/100	1/50	1/25
Landscape with dark foreground	...	...	...	...	1/300	1/100	1/50	1/25	1/10	‡
Scenes in streets	...	...	...	...	1/300	—	1/100	1/50	1/25	1/10
People outdoors	...	...	...	...		—	1/100	1/50	1/25	1/10
People in light shade of trees	...	...	...	...	1/100	—	1/50	1/25	1/10	‡
People in light interiors	...	...	...	...	1/25	1/10	‡	‡	1	2
10-15h	May, June, July, August									28° Sch.

Example 1: Scene in a street in August at 2 p.m.—Stop
f8 = 1/50 sec.

Example 1: Scene in a street in March at 2 p.m.—Stop
f 5.6.—Film 26° Sch. Exposure given:
1/100 sec.—Double the figure for "March"
= 1/50 sec.; double again for using 26°
Sch. = 1/25 sec.

Double these figures:—

- (1) In March, April, September, October.
- (2) With film of 26° Sch.
- (3) With light yellow filter.
- (4) On a day without sun.

THE SENSITIVITY OF THE NEGATIVE MATERIAL is very important and is stated by its manufacturers (p. 88). The properties of the film in use should always be well studied and the make of film should not be changed unnecessarily. The better you know your film, the better your pictures will be.

THE MOVEMENT OF THE SUBJECT. The sharpness of a photograph depends not only on accurate focusing, but also on the speed with which the subject is moving, and accordingly on the shutter-speed at which the moving subject has been taken.




If you attempt to take with your Rolleiflex an airplane travelling at 250 and more miles per hour with a shutter-speed of $1/25$ sec., the picture will be completely blurred. The plane could not leave an impression of sharp outlines on your film, because its movement was too fast relatively to the time during which your shutter was opened. The shutter speed has, therefore, always to be suited to the rapidity of the movement to be taken.

The table (p. 84) gives the speed of various subjects, together with the minimum shutter-speeds necessary to cope with them in order to produce sharp pictures.

One glance at this table will show the limitations of the Rollei cameras. The Rolleiflexes, owing to a maximum shutter-speed of $1/500$ sec., and the Rolleicords of $1/300$ sec., cannot be used for certain kinds of pictures, when exposures of $1/900$ or $1/1,000$ sec. are necessary.

On the other hand, the table shows the possibilities of taking advantage of the direction of the movement to lengthen the exposure time. A car flashing by at right angles to our line of vision cannot be taken with either the Rolleiflex or the Rolleicord. Even if we turn the camera in the direction from which it must appear or in the direction into which it will disappear, the shutter-speed of $1/500$ sec., let alone $1/300$ sec., is not sufficient, for we need $1/1,000$ sec. according to the table. But we can take a racing car with the Rolleiflex, if it is moving directly towards the camera, with $1/500$ sec. With the Rolleicord it is still impossible.

SHUTTER-SPEEDS AT 50 FT. DISTANCE FROM MOVING SUBJECTS

Subject	Moving Speed	Direction of Motion		
				
Pedestrian	2-5 m.p.h.	1/20	1/40	1/60
Street without obvious motion...	2-8 m.p.h.	1/25	1/50	1/100
Children playing, cyclists, horses } walking, etc.	5-10 m.p.h.	1/50	1/100	1/200
Foot races... ..	20 m.p.h.	1/100	1/250	1/400
Swimmer	4-5 m.p.h.	1/250	1/400	1/800
Diver	50 m.p.h.	—	1/300	1/500
Cycle race... ..	25 m.p.h.	1/150	1/400	1/1,000
Trotting horse, children running, } cars in town	5-10 m.p.h.	1/80	1/150	1/250
Racing horse	25-30 m.p.h.	1/150	1/300	1/900
Train	30 m.p.h.	1/150	1/300	1/500
Fast train	60 m.p.h.	1/300	1/600	1/900
Ordinary sea wave	5-12 m.p.h.	1/200	1/400	1/600
Sea wave in gale... ..	60-100 m.p.h.	1/600	1/800	1/1,000
Racing car... ..	80-150 m.p.h.	1/500	1/1,000	—
Close-ups of sports (tennis, golf, etc.)	20-40 m.p.h.	1/500	1/600	1/1,000
Flying birds	70-100 m.p.h.	1/600	1/800	1/1,000

We shall, therefore, need the highest shutter-speed when the moving object passes us at right angles. If the object is coming head-on towards us or going away from us the shutter-speed may be 50 per cent. slower than in the case of movement at right angles to the axis of the lens. If we arrange for the movement to be at an angle of 30 to 40° to the axis of the lens, the movement of the object travelling towards us or away from us appears to be about 25 per cent. slower than motion at right angles across our field of vision. Again, if we are far from the moving object, its motion will appear slower than if it were near the camera and can be taken with a slower shutter-speed.

If desirable, we can "swing" the camera by getting the moving object in the view-finder of the mirror device of the Rolleiflex or the view-finder frame of the Rolleicord while it is still at a great distance and keeping it constantly in the centre of the finder. That means that we have to move the camera slowly but steadily with the moving object. When the object has reached a point at which we have focused in advance, we press the release knob without ceasing to turn the camera. Thus a longer exposure may be given. The background will be blurred, but the subject remains sharp.

Another way to give a longer exposure and to avoid the disadvantage of a restricted shutter-speed is to exploit the possibilities of the "dead point" (p. 101) in all pictures of rapid motion.

THE STOP OF THE DIAPHRAGM. The photographer can approach the problem of the stop from two different directions. Either he can decide upon the stop giving the greatest depth of focus (p. 53) and then adjust the shutter-speed so as to give the necessary quantity of light, or he can decide first on the shutter-speed, adjusting the stop accordingly. The order of procedure depends upon the conditions of movement. If there is only a slight movement or no movement at all, the first method is to be preferred. If we have decided on the standpoint of the camera relative to the direction of movement and if the shutter-speed necessary cannot be decreased, we have to choose the

second way and to adjust the stop according to the shutter-speed. In any case, the exposure time has to be doubled from stop to stop (see p. 23).

Measuring the Exposure

After all these considerations for the right exposure, it is obvious that guessing the exposure should be avoided like the plague, and that even exposure discs and tables are somewhat out of fashion to-day—and this goes for the Rolleiflex exposure tables just as for any other tables—especially as exposure meters are much more reliable.

The *Rolleiflex Iris Diaphragm*, a small gadget, can be used as an optical exposure meter. It can be adapted for use with the Rolleiflex cameras $2\frac{1}{4} \times 2\frac{1}{4}$ in. and the small Rolleiflex. It must be attached to the finder-lens, so as to stop down this lens in the same way as the taking-lens has been stopped down. The depth of focus can thus be made visible on the focusing screen; it will, however, darken the screen image proportionally to the reduced size of the aperture and thus not exactly facilitate focusing.

How to use the Iris Diaphragm as an optical exposure meter. There is a scale with settings for all film speeds from $12/10^\circ$ to $21/10^\circ$ DIN and one scale for reading off the shutter-speeds, for daylight and artificial light. For exposures with artificial light multiply by 10.

There is a still older type of Iris Diaphragm that has two scales, one for daylight and one for artificial light, so make sure which model you have.

Now, the Iris Diaphragm has to be closed gradually, until in the darkest parts of the image the detail disappears. You can then read off the exposure time for every aperture for daylight under the circular mark (which stands for sun) and for artificial light under the other mark that looks like the crescent of the moon.

The new Iris Diaphragm is operated in the same way, but before closing down the iris you have to set the sensitivity of the film in use, marked in DIN, exactly on the mark

86 for the focal length of your lens. There are two marks on the

inner ring, one for 6 cm. ($2\frac{3}{8}$ in.) and one for 7.5 cm. (3 in.). If, for example, you use a film of 15/10° DIN, you put the mark 15/10 opposite the mark 7.5 cm. (when using a 6 × 6 in. Rollei) and then read off from the outer ring of the diaphragm the necessary daylight exposure time. For artificial light you multiply by 10.

The Iris diaphragm is an expedient, of course, quite reliable but by no means to be compared with a good photo electric exposure meter. The trouble with this kind of meter—and in general with all meters based on the “optical” principle—is always that different people make different readings of the disappearance of the details in the darkest parts of the picture.

THE ELECTRIC EXPOSURE METER is to be preferred, even although the possession of an electric exposure meter is, strictly speaking, no security against errors. The electric exposure meter indicates always the totality of the light that radiates from the whole field of the subject into the measuring photo-electric cell. With a landscape this is as it should be, for your subject is the wide area before your lens. But if making close-ups you cannot measure the light which radiates from your subject by simply holding the meter in the direction of the subject. You have to come close and measure the light as near to the subject as possible. When taking outdoor pictures, and especially those against the light, hold your hand over the cell to keep the bright light of the sky from it. What you want to measure is the light in the shadows of your subject and to shield the meter from the unwanted light of the sky. Point it slightly towards the ground, so that no light reflected from the sky can add itself to the light in the shadows of your subject.

Always expose for the shadows and not for the lights. The brighter the light, the deeper the shadows. A picture is a failure if the shadows are pitch-black and devoid of detail.

When using fine-grain film with the intention of fine-grain development do not forget to subtract 3° from the sensitivity of your film, that is to say, put your meter on the 23° Sch. mark when using a 26° Sch. film.

TONE RENDERING

The Negative Material

The ordinary paper-backed rollfilm is the standard negative material for all Rollei cameras.

The size of the film for the $2\frac{1}{4}$ in. square (6×6 cm.) Rollei cameras is:—

$3\frac{1}{4} \times 2\frac{1}{4}$ in. = **No. 120 or No. 20.**

For the $1\frac{5}{8}$ in. square (4×4 cm.) Rolleiflex it is the $2\frac{1}{2} \times 1\frac{5}{8}$ = **Vest Pocket (V.P.), No. 127 Film**, both sizes giving 12 pictures. All makes of film can be used; there is precious little difference in the actual quality of any of the leading makes.

The question, however, which we have to answer is, whether we shall use an all-round film or a special film, and to give a reply to that question we need some acquaintance with films beforehand.

THE GENERAL SENSITIVITY of film has been highly increased during recent years. It is defined by different measurements, and is printed on the box containing the film. There you read 26° Sch. or sometimes $16/10^\circ$ DIN, etc., indicating the sensitivity in degrees according to different methods of measurement. Our speed-comparison table (p. 89) gives an idea of the different markings of the sensitivity.

The German definition in DIN-degrees can be converted into the approximate value in European Scheiner when you add 10 degrees, disregarding the tenth. Thus $16/10^\circ$ DIN + 10° = approx. 26° Sch. (European Scheiner). By subtracting 6 degrees from the European Scheiner degrees, you get approximately the American Scheiner degrees: 26° Europ. Sch. - 6° = 20° Am. Sch. The oldest English system of measurement is by Hurter & Driffield, and another American type, used for certain electric exposure meters, is Weston.

It looks somewhat complicated, but it is not, as most of the film-speeds are now given in European Scheiner degrees.

88 The higher the figure, the higher the sensitivity: 30° Sch. is

more sensitive than 27° Sch. and so on. To be exact, the 30° Sch. film is twice as sensitive as the 27° Sch. film; the difference of 3° Sch. or 3/10° DIN doubles the sensitivity.

FILM-SPEED COMPARISON

European Sch.	American Sch.	Din	Weston	H. and D.
23°	17°	13/10°	6	1,250
26°	20°	15/10°	12	2,000
28°	22°	18/10°	20	4,500
29°	23°	19/10°	24	5,500
32°	26°	22/10°	50	9,500
34°	28°	24/10°	100	—

High sensitivity is very useful for action photography and under restricted lighting conditions, but it is not advisable to use highly sensitive films for all purposes. The reason is their comparatively strong grain.

GRAIN. The coating of a film consists of an emulsion which is built up of microscopic grains of silver. As a matter of fact, these grains are the coarser the more sensitive the film is. The grain of the emulsion is, of course, not visible when you look at a copy of your negative, but it will appear unpleasantly coarse when you enlarge the negative. It is obvious that the grain is the more noticeable the smaller the negative or the comparatively bigger the enlargement, and manufacturers of films have therefore tried to make films with a finer grain, which are, however, less sensitive. As a remedy against coarse grain, many photographers use special "fine-grain developers", but these, too, slow down the sensitivity of the film to some extent, a fact which must be taken into account when exposing the negative. As the $2\frac{1}{4} \times 2\frac{1}{4}$ in. (6 × 6 cm.) size is not a real "miniature" 89

format, you can take a normal developer, and to avoid coarse grain you use a film of medium-sensitivity whenever possible, which on the average has a sufficiently fine grain for the larger size of the Rollei pictures.

GRADATION. If you want a contrasty and brilliant picture you can take a film with steep gradation. Contrasty pictures and high brilliance are, however, not always suitable; sometimes you want a softer rendering. In this case, a film with flat gradation will do. The best thing to do, however, is to use a film of a medium gradation and to modify the process of development according to the effect desired.

A film of medium sensitivity and gradation has also a further advantage, namely, greater latitude.

EXPOSURE LATITUDE. Old-fashioned films and plates demanded a very exact exposure, otherwise the negative was over- or under-exposed beyond repair. Modern films and plates possess a certain amount of exposure latitude which allows of mistakes of from four to six times the correct exposure and still gives a serviceable negative. Double-coated films have even greater latitude, but have, however, other disadvantages. But there is no such latitude regarding under-exposure, for, of course, where there is no light there is no picture.

COLOUR-SENSITIVITY. The human eye perceives the bright colours of Nature which the film reproduces in tones of mere black and white. Consequently a photograph can only be analogous to what is actually seen and is a monochromatic abstraction from reality. The reproduction of the actual colours in the black-grey-white tones of a photograph, however, is so important that we have to treat it in a special chapter.

Colour Tone Accuracy and Colour Filters

All photographic films are highly sensitive to blue. While the human eye sees blue as quite a dark colour, the film sees it very light. Thus the film reacts differently from the human eye to the brightness of the various colours. Yellow, for
90 example, which appears light and brilliant to the human

eye, is rendered unsatisfactorily dark. Modern films are more colour-sensitive and approach considerably closer to our own way of seeing things, but there are differences here, too. The aim is not only to make the films colour-sensitive, but to make them reproduce accurately the three colour-groups of blue-violet, yellow-green and red-brown. Modern *orthochromatic* and the *panchromatic* films are designed to satisfy these requirements.

The *orthochromatic film* reproduces green and yellow nearly correctly, but blue is still dominant, while red will be rendered much too dark. It is, nevertheless, the most suitable film for the beginner.

The *panchromatic film* gives an almost ideal reproduction of all colours; it is nearly correct for all of them, even if blue is still dominant. For the greatest possible degree of faithful reproduction of tones the panchromatic film is recommended.

The *panchromatic film* of highest sensitivity (ultra-pan) as mostly a particularly high degree of sensitivity to red, which exaggerates this colour at the expense of others: it renders red too light; on the other hand, this very sensitivity to red makes this kind of film priceless for photography in artificial light, as most of the artificial light sources are very rich in red and orange rays. Without this kind of film, night photography would be impossible.

You select your film, therefore, according to the type of subject you wish to photograph.

WHAT TYPE OF FILM TO USE

Slow speed	... 20-23° Sch.	for big enlargements or enlargements of a part of the negative.
Medium speed	... 26-29° Sch.	for universal use as a standard film, orthochromatic or panchromatic film.
High speed	... 30-32° Sch.,	panchromatic film for night and stage photography and for use in poor light as well as interior photography with artificial light. Guard against coarse grain by fine-grain development.

COLOUR FILTERS. As the sensitivity of all films for blue is still dominant and as the accurate reproduction of colour values as grey tones is sometimes important, corrective colour filters are used. They are fixed in front of the lens. The effect of a filter is to help the lens to receive rays of light which are the same colour as the filter, thereby rendering that colour lighter than the film on its own would do. At the same time, they bar the way to rays of light which are of the opposite (complementary) colour, thereby rendering that colour darker than the film on its own would do. As filters "filter out" some of the light, they naturally prolong the exposure time.

For ordinary use the following table may give sufficient advice when to use filters :—

FILMS AND FILTERS

<i>Type of Film</i>	<i>Daylight</i>	<i>Artificial Light</i>	<i>Exposure Time</i>
Orthochromatic	Light yellow filter	No filter	... 2 ×
Panchromatic ...	No filter	... No filter	... —
Panchromatic of highest sensi- tivity ...	... Blue-green filter	Blue filter	... 0.5 ×

Whether a filter is necessary, why and when it is needed for special work is set out clearly in the table on pp. 94-95.

There are different Rolleiflex filters on the market which match the cameras, either with bayonet mount or with push-on mount. Here they are:—

Yellow filter for distant views and landscapes, for improved rendering of tones and clouds. Subdues blue. Exposure factor for light yellow filter approximately 2, for medium filter approximately 3, for dark filter approximately 4.

UV-Filter (Ultra-violet). Very light yellow-green filter to absorb ultra-violet rays, particularly suitable with deep blue sky. Strongly recommended at high altitudes above 6,000 feet, to prevent loss of definition owing to the presence of excess ultra-violet rays, not to be confused with the useful infra-red rays. Exposure factor 1½.

Green Filter. This is an all-round filter for panchromatic films. The yellow-green filter can be used like a yellow filter with ortho-pan and standard pan films. It doubles the exposure time. The blue-green filter is for daylight exposures with ultra-pan films, and is the best remedy against pale lips in portrait work with ultra-pan films. Exposure factor 2-3.

Orange Filter. For use with pan films to remove light mist in landscapes and mountain views, especially for long views. Exposure factor is 4-7 according to the density of the mist.

Light Blue Filter for exposures on ultra-pan films with artificial light only. Filter factor 2-3.

Light Red Filter. This filter has the same effect as an orange filter, but stronger. It can be used for pan films and infra-red material. The exposure factor is 6-10 according to the density of the mist.

Rolleiflex Infra-Red Filter. It is used with infra-red plates or films for photographing through mist and fog, e.g. for distant views with poor visibility. Also for night effects taken in daylight.

The Graduated Filter. This filter, yellow at the top only and gradually becoming white, establishes a balance between the brightness of the sky and the darker landscape and gives an excellent rendering of cloud effects. Graduated filters, placed immediately in front of the lens, cannot by themselves be effective. With the Rolleiflex cameras this filter is placed in front of the lens hood, that is to say it can only be used with the latter, thus ensuring the necessary distance between the lens and the filter. The possibility of adjusting the desired effect by means of the focusing screen is another innovation. Filter factor 2.

Universal rules for the use of filters are: the better the film the less a filter should be needed. All films, however, have the tendency to reproduce certain colours too light and other ones too dark. The filter has to correct this tendency, making its own colour appear lighter in the picture and the complementary colour darker. For normal snapshots, for bad weather photography and especially for pictures of fog, no filter should be used.

Do not "kill" the air in your pictures by the use of too strong a filter. That turns the fine atmospheric tones into a dull and uniform tint.

Colour Films

There is no doubt that with the colour film a new era of photography has approached. We are still too much black-and-white-minded not to have preconceived notions about colour photography, but it is obvious that we all 93

WHEN AND HOW TO USE A FILTER

For photographs of	Film or plate	Daylight	Artificial light	Filter effect	Filter factor	Remarks
Landscapes with little sky in picture. Buildings not painted in colours. Landscapes, etc., early morning, or late afternoon about evening	Ortho	Light yellow	—	Subdues blue	2	This is a case where no filter is really needed when using Pan or Ultra-pan material
	Pan	Light yellow or green	—	Subdues blue	2	
	Ultra-pan	Light blue-green	—	Subdues red	2-3	
Coloured buildings. Landscapes rich in variety of atmosphere. Sunny winterscapes with blue sky. (Filtering increased 50% more than normal.) Alpine landscapes up to 5,000/5,000 ft. height	Ortho	Light yellow	—	Subdues blue	2	Here the graduated filter comes in handy. Filter factor 2
	Pan	Light yellow-green	—	Subdues blue	2	
	Ultra-pan	Light green	—	Subdues blue	2	
Landscapes with pale blue sky. Objects round midday. Landscapes with strongly marked clouds. Landscapes with marked atmospheric conditions. Sunny winterscapes with clear blue sky	Ortho	Medium yellow	—	Subdues blue	3	Graduated filter may be recommended
	Pan	Medium yellow-green	—	Subdues blue and slightly red	3	
	Ultra-pan	Medium green	—	Subdues blue and slightly red	2-3	
Photos where exact reproduction of red colouring is desired (red walls, roofs, etc.) or where all gradations of autumn leaves are to be reproduced	Pan	Yellow green	—	Subdues blue and slightly red	2-3	Ultra-pan is little suited for this kind of picture
	Ultra-pan	Green	—			
	Pan	Light yellow	—	Subdues blue	2	
Pale spring green against a blue sky. Large flower-beds. Field-paths, cornfields. Plants of all kinds	Pan	U-V-Filter	—	No effect on colour reproduction, protects against ultra-violet rays		Prevents blurred pictures by cutting out the ultra-violet rays
Alpine landscapes above 6,000 ft. and higher	Pan	U-V-Filter	—	No effect on colour reproduction, protects against ultra-violet rays		Prevents blurred pictures by cutting out the ultra-violet rays

For photographs of	Film or plate	Filter for		Filter effect	Filter factor	Remarks
		Daylight	Artificial light			
Sunlit architecture standing out brilliantly against the sky. Oriental landscapes, villages, buildings	Ortho Pan	Light red Light red	—	Absorbs blue and accentuates red. Penetrates mist	6-10 6-10	Pictures will be slightly over-filtered, but this kind of picture cantakeit. Otherwise take the graduated filter
	Ortho Pan	Light Yellow	—	Subdues blue	2	
Open-air portraits in the sun. (Ladies take off hats)	Ortho Pan	Light Yellow	—	Subdues blue	2	With pan film the filter is often useless
Beach and seascapes, portraits, genre-snapshots, etc.	Pan Ultra-pan	No filter Light green	—	Subdues blue and red	2	If the sea is blue, an orange filter will render dark. With muddy water filter as indicated
	Pan Ultra-pan	Orange or red	—	Absorbs blue and filters away atmospheric haze	4-6 6-10	
Long distance views in mist and fog	Infra-red	Infra-red	—	Penetrates mist and fog	6-10	Increase of exposure depends upon the degree of moisture and is variable, so give a generous exposure
	Pan Ultra-pan	No filter Light blue-green	Light blue filter	Reduces the super-sensitivity to red	2-3 2-3	
Portraits of people with spectacles, windows, pictures or machinery with glossy surfaces	Pan	Bernotar	Bernotar	Eliminates or diminishes disturbing reflections	2-4	Filters to counteract pale lips. With flashbulbs use light yellow filter
	Pan	Bernotar	Bernotar	See the instructions for use	2-4	

have to re-learn our craft, and that the old values will no longer hold good. Colour film, which records the colours as they really are, brings its own problems and requires its own technique. To change over from black-and-white to colour implies far more than a mere change of films. The technique of colour photography is as easy as that of black-and-white photography, but the products of the former rarely deserve the name of colour photographs. They are too loud and too aggressive. We would like to have them more true to Nature, and their colours well balanced. A pure blue sky may be natural, but on top of a portrait it destroys the unity of the picture. It is nonsense to accumulate colours to get good colour photography; on the contrary, the less colour in the subject the more pleasing the picture will be.

There are different makes of colour films:

Kodachrome, Daylight	ASA 10
Kodachrome Type A for artificial light	ASA 10
Anso Color, Daylight Type	ASA 12
Anso Color, Tungsten Type	ASA 12
Kodak Ektachrome, Daylight Type	ASA 10
Kodak Ektachrome, Type B for artificial light	ASA 10

The artificial light or tungsten type films may also be used in daylight together with an appropriate conversion filter as recommended by the makers.

Colour films, being *reversal* films, have much less latitude than black-and-white films, and the exposure time must be as correct as possible. They differ from black and white film in yet another respect, in their inability to cope with too large contrasts in lighting. Heavy contrasts, though sometimes mastered successfully, should, therefore, be avoided.

Infra-red

The infra-red rays are invisible rays beyond the red end of the spectrum. These long rays are less liable to absorption than the shorter waves when passing through the atmosphere of the earth. Thus the infra-red rays pass through mist and fog more readily than the visible rays.

Films or plates sensitized for infra-red rays are, therefore, especially useful in long-distance and fog photography. These negative materials are, of course, also highly sensitive to blue, which would blot out the infra-red picture. The blue rays, therefore, must be excluded with a special filter. There is a light-coloured Rollei ruby filter and there is a special Ilford filter for this purpose. Without a filter infra-red photography is impossible.

When taking a picture with this outfit in full sunshine the copy will look like a picture taken by moonlight.

You can also photograph in a darkroom when using a photoflood-lamp covered with a black-red infra-red filter which excludes all visible light.

Reproductions of old and faded documents will have greater clarity and stronger contrasts when taken with infra-red material.

When taking long-distance views it is advisable to avoid scenes with large portions of green, because the green of the trees reflects the infra-red rays in a high degree, and green fields, therefore, often look as if they were covered with snow.

Infra-red rays produce a focus difference, that is to say, a sharp-focused picture taken with infra-red material will not be sharp, because the focal point for infra-red rays is nearer to the lens. With a stop of $f/11$ or less this difference can be neglected, but with larger apertures the help of a depth of focus scale of the Rollei cameras should be sought. After sharply focusing with the view-finder lens, we look at the scale and turn the focusing knob to the next lower number. If, for example, the picture of the view-finder is sharp at 20 m., we turn to the mark of 10 m. in order to have a sharp infra-red picture. The exposure time for infra-red material is about six to ten times longer—with filter, of course—than for the usual 25° Sch. film.

Infra-red material is available in ciné-film size as roll-films and plates. These are made by Kodak, Ilford Ltd., and Agfa-Ansco. A larger variety is available in plates, which are produced in various makes by the same manufacturers. Roll-films in 6×6 cm. and 4×4 cm. sizes are produced by Ilford Ltd. only.

ROLLEI ACCESSORIES

Accessories of a modern camera are what the different gadgets are to a modern car; they are not absolutely necessary, but they come in handy, making the camera more versatile and more efficient.

Old accessories can be used. In 1937 the Rolleiflexes and Rolleicords were equipped with bayonet ring for fixing things in front of the lenses. Rollei cameras which have been bought earlier are without this ring. Thus, while most of the old accessories can be used on the new cameras, not all the new ones will automatically fit the old cameras. There are three ways of attaching an accessory to the lens of the taking-camera: a push-on mount, a bayonet ring and a clamp mount.

Lens Accessories

LENS-HOOD. A lens-hood is a shade for the lens. It keeps back all light that does not emanate from the subject itself, preventing strong sources of light outside the camera's range from striking the surface of the lens and causing fogged pictures. A lens-hood is essential everywhere and indispensable when the camera is pointed against the light.

SOFT-FOCUS EFFECTS. The clear-cut definition given by the Tessar lens is not to everybody's liking. Some people believe that occasionally it is preferable to produce what is called "soft-focus" effects. Softness should not be confused with unsharpness. There is always a sharp core in a really softened picture, but the lights have a certain halo effect, which makes the contours diffused with a soft radiance. It is the Duto Rolleiflex lens that does the trick, a plano-parallel glass disc with concentrically ground-in grooves, between which the light rays can pass unimpeded to the film and produce a sharp impression, forming thus the real basis of the image. At the grooves, however, the light is deflected, with the result that bright objects show that fine halo, the soft-focus effect. When a subject is only poorly lit the Duto lens is not a practical proposition, because of its effect of toning down light contrasts. *Duto lens 0* is the weaker one, and when used for hard contrasts and brilliant objects, it produces fine light effects in against-the-light exposures and portraits. *Duto lens 1* mellows the piercing sharpness of the Zeiss lens further, and is intended for medium contrasts when the effect at lens 0 would be too weak. Both lenses alter neither the focal length nor the aperture of the taking-lens. It is no use to stop down the lens below $f 4$ with lens 0, $f 5.6$ with lens 1, because the softening effect is lessened by reducing the aperture.

ELIMINATION OF REFLECTIONS. The Bernotar, formerly known and still occasionally sold as *Herotar*, is a special filter to "polarize" and trap the light reflected by objects with glossy surfaces. It eliminates or diminishes disturbing reflections from objects with a shiny appearance and is, therefore, particularly helpful in making reproductions of

pictures and articles under glass, in photographing shop windows, and in taking portraits of people wearing spectacles. The filter is first placed on the finder-lens and slowly rotated, while the screen image is carefully watched. You can then see how reflections in the image disappear or are diminished. Then the filter is transferred from the finder-lens to the taking-lens, whereby it is essential to see that it is placed on the taking-lens in just the same position as it was on the finder-lens. The Bernotar looks like a yellow-green filter, but has on its mount a pair of marks opposite one another showing the plane of polarization of the filter. Owing to a slight scatter on the surface of the screen, it is essential to employ the lens-hood with it. On account of diminished light as a result of polarization, an increase of 2 to 4 times the exposure is necessary. The Bernotar should be handled with particular care, as it is a cemented filter even more liable to damage than the one-lens filter. That is to say, that all filters are quite as delicate as the lens in the camera and require the same care in handling. The Bernotar is also easily affected by heat, for which reason it is advisable to protect it from direct sunlight. A mistake sometimes made in the use of the Bernotar filter is that of over-elimination. A very highly-polished surface should be allowed to retain some of its shine, and a careful inspection should be made of the subject whilst gently rotating the filter, so that a waxed wood, for example, is not transformed into a dull velvet. A little experimenting to obtain the most satisfactory effect will be fully repaid in the final result.

TELESCOPE EFFECTS. The new supplementary Zeiss *Magnar* lens has been built on the principle of the telescope and has to be placed in front of the taking-lens. It increases the focal length of the camera lens four times, that is to say, the focal length of the Rolleiflex cameras $2\frac{1}{2} \times 2\frac{1}{4}$ in. of

3 inches will then be 12 in. (30 cm.),
 while the focal length of the Rolleiflex 4×4 ($1\frac{1}{2} \times 1\frac{1}{2}$ in.) of
 $2\frac{3}{4}$ ins. will then be $9\frac{1}{4}$ ins. (24 cm.).

It is obvious that with the *Magnar* a large-scale reproduction can be obtained of distant buildings, mountains or landscapes, of inaccessible architectural detail taken at a great distance. It can also be used for portraits in order to obtain a large picture without sticking the lens under the victim's nose. What does the *Magnar* really do with our picture? Well, take a steeple with the normal lens and it may appear in your picture half an inch high. Now you take it with the *Magnar* from the same distance and your steeple will be 2 inches high, but whereas you had on the small picture, not only the steeple but the whole church and other things besides, you now have only the steeple and its nearest surroundings, the roof or the gable of the church. To get an estimate of what section of the whole picture you will obtain with the *Magnar* you use the special masks for the focusing-screen to suit the $2\frac{1}{2} \times 2\frac{1}{4}$ in., the $1\frac{1}{2} \times 1\frac{1}{2}$ in. or the 24×36 mm. size. Of course, if you like, you can place the *Magnar* first in front of the view-finder lens, but then you obtain an inverted image and have

to turn the camera into a horizontal position and to observe the image from the side. The Magnar is fixed to the front of the taking-lens by means of the simple but reliable bayonet mount. The Magnar is fitted with a metre focusing scale, enabling focusing *without* the ground-glass screen. A depth of focus scale combined with the metre ring shows the depth of focus for each focusing distance. The focusing range is ∞ to 8 ft. 6 in. (2.5 m.). The exposure time should be 1.5 to 2 times longer than usual. Owing to the increased focal length and the resulting small depth of focus, a moderate speed of lens is indicated: it is f 9 with the $2\frac{1}{2} \times 2\frac{1}{2}$ in. size, and f 7.3 with the smaller size. Instantaneous exposures in good weather at high altitudes or at sea (1/100 sec.) are quite practicable. A tele lens, however, is no anastigmat; at full aperture f 9 the sharp definition will be in the centre of the picture only in a section of about 1.2 square inches, the edges of the picture will be less sharp. If, therefore, the maximum aperture is used, it will either be necessary to accept a certain loss of definition at the edges or to use the sharp central section of the picture only. Sharp definition, sufficient for all purposes and over the whole of the size, is to be obtained by stopping down to f 22, that is to say, that there will be a pretty heavy loss of light. To avoid risk of blurring with such a long focus lens, exposures longer than 1/50 sec. should always be made with a tripod. A special tripod clip may be used for fixing and supporting the Magnar lens.

Long distance views are dangerous to photograph with a telescope lens on hot days, especially across sand or stony fields exposed to the sun. The shimmer in the air, the heat-waves, cause blurring of distant objects, making sharp pictures impossible. There is no remedy, preventive or curative. Tele lenses eliminate the distortion or exaggerated perspective which a short focus lens produces when a subject is too near the camera. On the other hand, when tele lenses are used at a great distance from the subject, there is a flattening of perspective, and the distance between objects one behind the other is not apparent. Tele lenses are, therefore, ideal for subjects filling the negative area whilst the camera is used at a reasonable distance.

The Use of Lens Accessories

All lenses and filters may be used separately or at the same time, but there are a few combinations which should be learned by heart.

FOR USE IN FRONT OF THE FINDER-LENS:—

Finder-lens.

Finder-lens + Rolleipar lens.

Finder-lens + Proxar lens.

Finder-lens + Bernotar.

Finder-lens + Rolleiphot Iris diaphragm.

Finder-lens + Proxar + Rolleipar lens.

Finder-lens + Proxar + Bernotar.

Finder-lens + Proxar + Iris diaphragm.

Not possible:—

- Finder-lens + Iris diaphragm + Bayonet lens-hood.
- Finder-lens + Iris diaphragm + Push-on lens-hood.
- Finder-lens + Rolleipar lens + Bernotar or Iris diaphragm.

FOR USE IN FRONT OF THE TAKING-LENS:—

The lens-hood with bayonet mount is used for all cameras with bayonet ring, as Rolleiflex $2\frac{1}{4}$ in. square, $1\frac{1}{8}$ in. square and Rolleicord II. The hood is mounted on the outer bayonet ring by slowly turning until it springs into position. The inner bayonet ring takes the filters, etc., independently of the hood.

The lens-hood with clamp mount is used for Rolleicord Ia and for all those Rollei cameras not provided with the bayonet mount. It is slipped over the lens and secured by tightening the larger lever. The smaller lever serves to secure the filters provided with push-on mounts, which have to be inserted in the lens-hood and fixed by tightening the lever.

The lens-hood with push-on mount is supplied with a simple push-on mount for the Rollei models without bayonet ring. It cannot be used with Rollei filters.

If you want to use a part with a bayonet mount together with a part with a push-on mount, an intermediate ring must be inserted.

Further combinations with other accessories:—

- Taking-lens + Proxar.
- Taking-lens + Proxar + Filter.
- Taking-lens + Proxar + Duto.
- Taking-lens + Proxar + Duto + Filter.
- Taking-lens + Proxar + intermediate ring + Bernotar.
- Taking-lens + Duto + intermediate ring + Bernotar.
- Taking-lens + Proxar + Duto + intermediate ring + Bernotar—
and for all these combinations together.

Lens-hood + graduated filter.

in all these combinations the sequence mentioned above should be observed. Some more combinations are:—

- Taking-lens + Magnar.
- Taking-lens + Magnar + Special Magnar Filter.

NOT possible are other combinations with the Magnar and—

- Taking-lens + Filter + Bernotar.
- Finder-lens + Iris diaphragm + Taking-lens + Bayonet lens-hood.

When looking for filters you may find that there are three different kinds of Rollei filter: 28.5 mm. push-on mount (old type), 28.5 mm. push-on mount with 33 mm. filter (newer type) and filter with bayonet ring (newest type). If possible and if you have a new camera with bayonet ring, choose filters with this mount. On the other hand, all three mounts can be used with the new camera, with the one exception, namely, that you cannot use the combination of a 33 mm. filter + a push-on lens-hood.

Always keep your filters and lenses clear, and clean them with a piece of frequently washed, soft wash-leather, that you may keep in a small glass tube, e.g. an old aspirin tube.

Changing the Type of Material

THE PLATE ADAPTER. In spite of the universal use of the roll film, the plate still offers advantages of its own. Certain technical photographs, copying and scientific work, such as micro- and infra-red photography, often entail the use of special negative material, sometimes obtainable only in plate form. The plate is particularly useful in cases where immediate development of a single negative is necessary or desirable.

For all these purposes there is a special Rollei plate adapter, which can be fixed in place of the roll film back panel and permits the use of special plate slides on the Rollei cameras. The slides are so designed as to ensure the plate being properly positioned before the exposure is made.

The plate-adapter is available for $1\frac{1}{8} \times 1\frac{5}{8}$ in. and for $2\frac{1}{4} \times 2\frac{1}{4}$ in. cameras. It has exactly the same size and shape as the usual back panel of the Rollei cameras and can, therefore, easily be exchanged.

NOTE.—Always remove first the empty roll film spool. Otherwise the plate will be out of focus.

The plate slides for $2\frac{1}{4}$ in. square take $3\frac{1}{2} \times 2\frac{1}{2}$ in. plates, the smaller $1\frac{1}{8}$ in. square slides $2\frac{3}{8} \times 1\frac{1}{2}$ in. vest pocket (V.P.) plates (4.5×6 c.m.), both giving the same picture size as the film used in the same camera. When in the plate-holder the plate is *not* in focus, it has to be brought into the focal plane by means of the lever on the back of the plate-holder. On top of a small plate in the centre of the back you see the number of the plate-holder, e.g. 1, below which the small plate-lever is folded down. Before making the exposure there are two important operations to be made:—

- (1) Pull out the cover of the plate-holder and
- (2) Allow the plate-holder to spring into position by turning the plate-lever a quarter turn to left or right.

For certain purposes you may prefer to see the picture on a focusing-screen in the back of the camera and instead of focusing by means of the reflex device, which can, of course, still be used. A special focusing-screen slide, similar to the plate-holder and inserted in the same manner, is provided. This *adapter focusing screen* is used only for special work, e.g. with double Proxar lenses, for reproductions, insects, etc. When you withdraw the slide cover, the screen automatically slips into the focal plane; replacing the cover makes the screen slip back.

When travelling, it may be useful to have at hand both plates and roll films. To avoid carrying two different back panels, a special film

pressure plate slide is supplied to insert in the adapter. It thus takes the place of the roll film pressure plate provided in the back panel of the camera, and roll film can be loaded in the usual way.

Great care must be taken while inserting the plate adapter. Press it with thumb and palm firmly against the body of the camera and secure the catch.

The normal plate-adapter and plate-holder are available for the $2\frac{1}{4}$ in. Rolleiflex cameras as well as for the $1\frac{3}{8}$ in. camera. The special focusing-screen slide and the film pressure slide are made only for the $2\frac{1}{4}$ in. size. Cut films can be used by means of special cut film sheaths.

To insert a plate in the plate-holder, first pull out the cover-slide, give the plate-lever a quarter turn to left or right until the plate-holder springs out, now insert the plate, in the darkroom, of course, from the open right-hand side. Withdraw the plate-holder again and fix the plate-lever by a quarter turn and then turn downwards. To insert the plate-holder lift up the latch of the adapter to the left.

The exposure is made in the usual way after having focused the picture with the reflex device, but before touching the shutter pull out the cover-slide and allow the plate-holder to spring forward, as when inserting the plate. Press the shutter-release. Pull back the plate-holder, fix it and turn the lever upwards to indicate "exposure taken". The then visible letter "B" means "Belichtet" (German for "Exposed"). Insert the cover-slide. Failure to take this last precaution will spoil the whole work.

THE CINEFILM ADAPTER. The cinefilm adapter Rolleikin is for use with the Automatic Rolleiflex, the Rolleiflex Standard, the Rolleicord II and the Rolleicord Ia models only. The cinefilm equipment makes colour photography possible with those makes of films which are only available in the 24×36 mm. cinefilm size. With the cinefilm adapter the size of the picture is reduced to 24×36 mm., but there is no change in the lens; the focal length of 3 in., which is fairly normal for the $2\frac{1}{4}$ in. square picture, remains the same for the smaller picture. That is to say, we are now using a long-focus lens. Thus, used with the cinefilm adapter, the Tessar or Triotar of the Rolleiflex cameras is—so claim some prophets of the Rolleiflex—equivalent in actual practice to a small-sized telephoto lens. This is, of course, an overstatement. The image projected on to the small cinefilm is in no way different from that drawn by the same lens on the corresponding central area of the larger original Rolleiflex-size film; thus, it can be obtained by enlarging the equivalent part of the original negative and without employing the cinefilm attachment. Neither would it be correct to claim that the cinefilm attachment is quite as versatile as an interchangeable lens, which within a few seconds—and just to take one or two special shots—can be fixed in place of the standard lens.

The equipment consists of a back panel with counter mechanism, a film-guide frame, a mask for the focusing-screen, a special spool holder and a spool, one re-winder knob and one uncoupling knob.

daylight loading cassettes, loading packs and daylight loading spools with paper lead and trailer, all of standard 35 mm. size.

The back panel of the cinefilm attachment, fitted with its own counting mechanism, is inserted in place of the camera back panel. By placing a mask over the focusing-screen a picture field of cine-film size (24×36 mm.) is obtained. One special take-up spool and a special spool-holder for the film cartridge are inserted and you can start the work.

The film transport—for 36 pictures—takes place automatically by cranking in the case of the Rolleiflex or by turning the knob in the case of the Rolleicord. The counter shows the number of exposures made.

When using the camera in the normal way an upright picture is obtained; for horizontal pictures the focusing-screen has to be observed sideways, as in photographing round the corner.

The re-winder enables the film to be taken out any time in full daylight after winding back, with the result that black-and-white or colour film can be used at will. The counter shows the number of exposures already made.

HOW TO CHANGE PLATES OR CINE FILM TO ROLL FILM AND VICE VERSA. If the Rollei is loaded with plates we can easily replace them by roll film or cine film. When using the cine film equipment we can take advantage of the built-in cutting device in conjunction with the Agfa cassette. So we can change the cine film to plate or roll film at any time. The position is somewhat different when the camera has been loaded with roll film, which is more often the case. To overcome the difficulty we turn the roll film forward right to the end without exposing. With the Automatic Rolleiflex it is essential after each turn of the crank to release the shutter—of course, with the lens-cap on! Then we remove the spool and can now insert plate-adaptor or Rolleikin equipment, making a note on the film stating the number of exposures made. Later on, in the darkroom, we wind the film back on to an empty spool, taking care that the coils are wound tightly together, and that the leading end of the film comes to lie correctly between spool and protective wrapper. After having wound on the film in exactly the same way as it was when supplied by the dealer, we have only to transport the counter mechanism forward by the number of exposures previously made. This is done by means of the release lever or pin.

Special Techniques

THE PANORAMA HEAD. To take a panoramic view of a landscape the camera should be fixed on a tripod and turned after each exposure from left to right, or the other way round. To facilitate this movement the Rollei cameras can be supplied with a panorama head, by the use of which a continuous series of overlapping partial views can be obtained. The panorama head has to be fixed on a strong and solid tripod, and its

level must be carefully aligned, a small spirit-level being very useful. The camera is then fixed on to the panorama head. The advantage of this head is that it is divided into ten equal sections, each section corresponding to one picture, thus covering a panoramic circle of 360° . After the first exposure, which is best done on the left-hand side, the camera is turned through 36° to the right until the panorama head snaps into the next figure (No. 2), and so on, until the whole circle, or that part of it you want, has been covered. The adjoining pictures will then exactly fit on to one another. To get a good panorama, the single pictures should overlap slightly, so that the exact place where they match can be neatly cut with a razor blade. Then the pictures in their proper sequence are stuck side by side on to a piece of cardboard and the stuck edges slightly retouched, to conceal the joins. It is advisable not to take panoramas in bright sunshine, because the shadows, being in a different position on each picture, would reveal the composite nature of the panorama. You can show the picture as it is, or, as a refinement, you can make a reproduction of the whole strip with a larger camera to obtain a continuous picture without stripes. It is, of course, essential that the single pictures have been printed before to the same colour and density. The full panorama of 360° is, of course, a fake, showing as it does a circular view in one continuous straight line.

THE STEREO ATTACHMENT. Owing to their square shape, Rollei pictures are ideal for stereoscopic purposes. The camera has to be fixed on to the stereo attachment and the latter on to a strong, firm tripod. Now, you make one exposure of the subject. This is done with the camera pushed either to the right or left, and then moved to the opposite side for taking the second exposure, the stereo attachment giving a lateral interval or "basic line" of $2\frac{1}{2}$ in. To obtain good three-dimensional pictures, both exposures should be made in the same conditions as regards focusing, lighting, exposure time, aperture, etc. The development and printing of the two exposures should be similarly uniform and simultaneous. Stereo-pictures have to be mounted on a piece of cardboard of $2\frac{3}{8} \times 5$ in. They should *not* be changed over, but the left-hand exposure should be mounted on the left, the right-hand one on the right. The identical points of the two pictures should be on absolutely the same level, and the distance between the identical points has to be $2\frac{1}{2}$ in. (65 mm.)—the average distance between the human eyes. Stereo-pictures with a "basic line" of $2\frac{1}{2}$ in. give the best stereoscopic effect if they are close-ups. The nearer and greater the subject in the picture, the more fascinating the effect. In long-distance views the effect decreases rapidly. A good subject is a picture with a near and interesting foreground and a somewhat indifferent background.