Minolta
XD XG

Clyde Reynolds

Minolta
XD XG

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Minolta XD XG

for models
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XG–1 XG–2

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Contents

Contents

Photography

There are two almost separate aspects to photography: your vision, and your control over the image that the camera records.

Shapes and light

Most photographers record the shapes, tones and colours of everyday life. The easiest and, perversely perhaps, the most difficult pictures are simple records of places and events. The scene is there, the action is happening, you frame it and press the button. The camera records exactly what you see through the viewfinder. Our eyes are controlled by our brains to select and interpret the things we see; until we look at the final pictures, we do not notice anything unsightly or that the subject is so far away as to be virtually unrecognizable.

To take photographs you can be proud of, look at the whole picture in the viewfinder before you press the button. Do not worry about rules of composition, clashes of colour, or any other theoretical things. Just ask yourself "Is this the best way to picture this? Does it show just what I want to show?". Whenever possible, move to the best place, and choose the right instant.

When you can move the subject, you have greater control. You can place it exactly as you want in relation to background and lighting—or you can manipulate the lighting to suit your purpose.

Forming the image

A camera has three basic controls—focus, lens aperture and shutter speed. To keep the subject sharply focused, the lens' focus is set to the distance from the subject to the camera. The lens aperture determines just how much of the light from the scene reaches your film; the shutter speed determines the time that it falls there. The aperture and shutter speed combine to control the *exposure* by balancing the subject brightness to the film sensitivity.

The reflex design is ideal for accurate focus setting, as we see later. The exposure meter's electronic circuitry takes care of exposure determination most of the time; thus removing a very basic problem.

The right combination

The choice of aperture and shutter speed does, though, affect your pictures. In fact, selecting the right combination is the major technological theme of this book (see especially pages 58–63). Throughout, though, the practical operation of Minolta cameras and their comprehensive range of accessories is related to the needs of vision. Both the camera controls and the handling of the equipment are explained; we also show how the camera's controls influence your pictures, how to select equipment, and viewpoint; the way lighting moulds your images and a host of other equally important facets of photography.

The Single Lens Reflex

The modern single lens reflex (SLR) camera is a marvel of design and manufacture. Its heart is the reflex viewing system. Look into the eyepiece, and you seem to see straight through the camera. In fact, you are looking at an image formed on a screen set horizontally below the viewfinder. It is an image of the picture the camera takes when you press the shutter release.

Just behind the main camera lens is a mirror, set at 45° to the viewing screen. The mirror reflects light coming through the lens up on to the screen. Immediately above the screen is a five sided prism (the pentaprism). This acts like another mirror set at 45°, and turns the light path back parallel to its original direction, giving the appearance of direct through vision.

The pentaprism is much more complicated than a mirror. As it reflects the viewfinder image from the screen to the eyepiece, it also reverses it from left to right; because it is laterally reversed in the viewing screen.

The position of the viewing screen is critical. It is mounted so that light from the lens travels exactly the same distance (via the mirror) to the viewing screen as it does to the film. So, what you see on the screen is the picture you record on the film. You can see how the various parts inter-relate, and where the lens is focused.

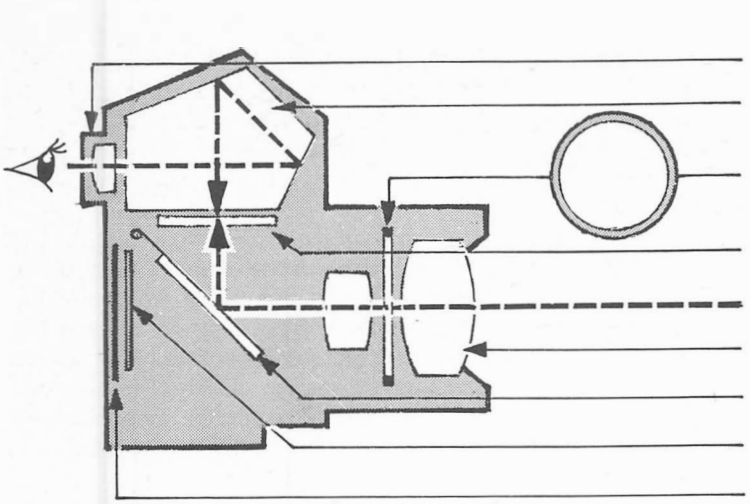
Because the lens that you use to take the picture also forms the viewing image, the viewfinder shows exactly what your picture will look like whatever lens you fit (from a 7.5mm fisheye to a 1600mm reflex) by itself, or through close-up accessories, filters, etc.

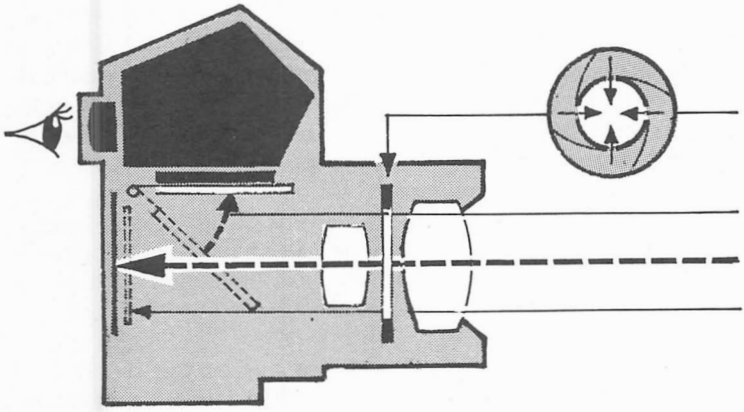
With a standard lens on your camera, the viewfinder image is slightly smaller than life size. With long focal length (tele) lenses, it is larger, and with wide-angle ones, smaller.

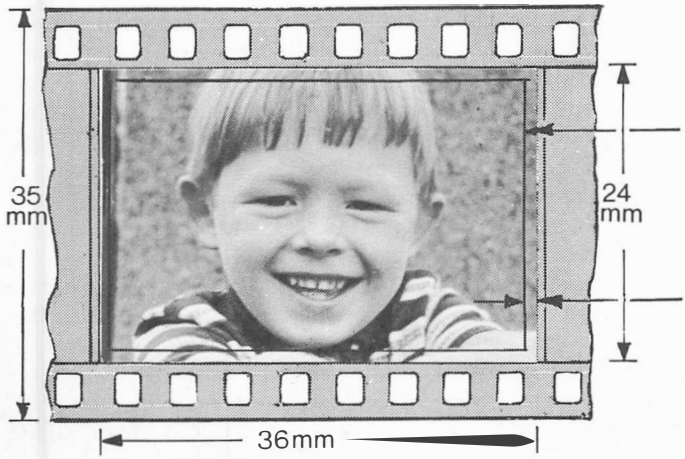
How it works

The mechanical sequence of picture taking is complicated. When you press the shutter release, first the light-controlling diaphragm in the lens adjusts to the right aperture (see page 88); then the mirror rises up out of the way, the focal-plane shutter opens to expose the film for a measured time (see page 48), then closes; finally the mirror drops back and the lens opens up to full aperture again. For most pictures, the effect is little more than a blink in the viewfinder. Inside the Minolta, though, each action has to be carefully controlled so that the whole process is accurately coordinated, and does not produce any movement.

Around the reflex mechanism, Minolta have built compact cameras with quickly changed, bayonet mount lenses. They are fitted with electronically timed focal plane shutters which, with their accurate through-the-lens meters, provide fully automatic exposure control.


Viewing
viewfinder
pentaprism
diaphragm open
viewing screen
image light rays
lens
reflex mirror
shutter
film


Exposing
diaphragm closes
mirror swings up
image light rays
shutter operates


35 mm
24 mm
36mm
image seen in viewfinder
negative allowance

The Minolta SLRs

Minolta has been making 35 mm SLRs since 1959. The original SR cameras developed into the SR-T series with through-the-lens metering. More recently, the XM (XK) and XE cameras incorporated electronics to give automatic shutter speed selection. In 1977, Minolta announced two entirely new ranges of electronic SLRs—the XD and XG models.

Minolta XD

The *Minolta XD-7 (XD-11)* has one of the world's most sophisticated exposure control systems and is one of the simplest high quality cameras to use. The XD-5 is a slightly simpler version which operates basically the same way. The details are given in the handling section on pages 20–25. The controls are discussed later in full but consider here the exposure system which gives the choice of three totally distinct ways of working: 1) you select the shutter speed, and the XD sets the correct lens aperture; 2) you set the lens aperture, and the camera selects the appropriate shutter speed; or 3) you set both the aperture and the shutter speed, while the meter simply suggests the best shutter speed for the aperture you have chosen. In the manual mode, naturally, you are free to follow or ignore the meter.

The meter measures the light reflected from the subject and passing through the lens. It then takes into account the speed of the film in the camera (see page 32), calculates and displays either the aperture corresponding to the shutter speed set, or the shutter speed corresponding to the aperture preset on the lens diaphragm ring. The information is displayed by a series of LEDs (light emitting diodes) at the right-hand edge of the viewing screen. XD cameras make excellent point-and-shoot SLRs with the added advantage of allowing full creative control when you want it.

Minolta XG

The *Minolta XG-9* has a meter which sets the shutter speed to suit the film speed, light level, and preselected lens aperture (called aperture priority automation) and also allows you to select exposure combinations manually. It has a touch-sensitive meter switch in the shutter release button and also features an unusual electronic self-timer, whose operation is indicated by a light on the front of the camera. The *Minolta XG-2 (XG-7 or XG)* introduced the XG line, and is identical to the XG-9 except that it does not show the lens aperture in the viewfinder, uses a normal (not acute-matte) focusing screen, and has no depth of field preview button. The *XG-1* is a simplified version of the *XG-2*. For XG details, see pages 26-31. Like the XD cameras, the XG models use the simple Minolta bayonet lens mount and can be fitted with a power winder.

There is a choice of MD Rokkor (or MD Rokkor X) lenses available for each of the cameras. (Most Minolta lenses are called 'Rokkor'.) The 'standard' lenses are a 45mm *f*2, 50mm *f*1.7, 50mm *f*1.4 or 50mm *f*1.2 lens. The 50mm *f*3.5 MD Macro Rokkor is a good alternative if you find close-focusing ability more important than low-light capability. The XD-5 and XG-1 are sold with the 45mm *f*2 MD lens.

The Minolta XD Cameras

The Minolta XG Cameras

Viewing and Focusing

The major advantage of a single lens reflex is that the picture in the viewfinder is the one you take whatever the lens or accessory fitted. Look through the finder and you see the scene in front of you. As the focus ring is turned, the plane of sharp focus changes. Turn it clockwise, and near objects come sharp on the viewing screen. When you can turn the ring no further, objects about 0.5m (18 in) away are sharp with the standard lens. Turn the ring the other way, and the sharpness moves back into the distance.

What is focus?

When a lens is a particular distance from the film (or from any other flat surface) it forms a sharp image of distant subjects. As it is moved further away, so the lens forms a sharp image of nearer subjects. The focus ring simply moves the whole lens backward or forward to achieve this; and the result is seen in the viewfinder.

The screen

The viewing screen surface is highly important. The XG-1 and XG-2 screen has a normal matte surface, like all the older Minoltas. The screen in the XG-9 and all XD cameras has a new type acute-matte surface. This uses a regular array of prismatic elements in place of the more usual random grain, with two effects: the viewing image is brighter, and focusing particularly easy and positive.

In the middle of each screen is a compound focusing aid. The very centre is formed of two prisms that divide an out-of-focus subject into two separate parts. When you bring the subject exactly into focus, the two images become continuous. This *split-image* device is an extremely accurate way of setting the lens distance whenever the subject has straight edges or lines. Surrounding is a collar of *microprisms*. These break up the out-of-focus image into a multitude of parts, which coalesce to a smooth picture at the exact point of focus. This type of focusing aid is especially useful with rough-textured subjects and short focal length lenses—when the slightest deviation from absolute focus causes a striking shimmer. In the same conditions, the split-image centre does not work well, and it is difficult to be confident of the exact point of sharp focus on the plain part of the screen — even when it is acute-matte.

To ensure an evenly bright image right out to the corners, the screen incorporates a Fresnel condenser lens. Surrounding the focusing aid is a Fresnel-free collar. However, the Fresnel rings are so fine that you can hardly distinguish the edge of this area; and you can focus as easily anywhere on the screen.

At the right side of each screen is the LED meter read-out array. Below the screen on the XD-7 (XD-11) is the lens aperture and shutter speed display; on the XG-9 the aperture display is there.

Focusing the lens

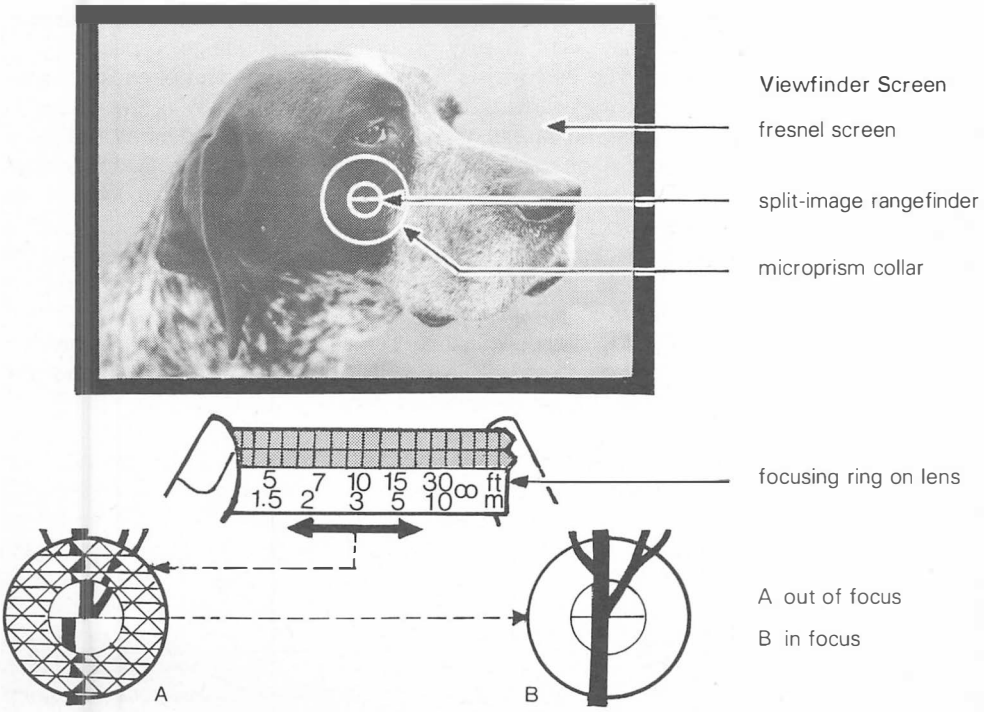
To focus on the subject, look at it through the viewfinder. Turn the lens focus ring backward and forward, past the point of sharpest focus. Reduce the movements each time until the picture is sharp. Use the split-image or microprism areas whenever they help. Note,

though, that they only work well with lens apertures wider than about *f*5.6.

For all normal photography, focus the lens at its full aperture (smallest *f*-number). This gives the brightest image; and, more importantly, it gives the smallest zone of sharp focus (depth of field, page 62). All MD and MC Rokkor lenses have automatic diaphragm mechanisms to arrange this. When you choose an *f*-number you just *preset* the diaphragm. Instantly before the shutter opens the lens physically closes down to this aperture (or to the meter-chosen aperture on an XD in its shutter priority mode). Thus, with all normal lenses, you have a constantly bright focusing image.

Although the lens is focused on just one plane, some of the subject in front of and behind that plane comes out sharp. This *depth of field* increases the further away you focus, and the smaller the lens aperture you select. Thus, to produce the image you want, you must decide on where to focus, and on how much of the scene you want sharply defined.

To be ready for unexpected action, though, keep your camera set for a useful zone of sharp focus. For example, set a standard (50mm) lens at *f*11 and focus on 5m (17ft), and you can expect sharp pictures between about 4m (12ft) and 10m (33ft).



Composing your pictures

The most important part of picture taking is the picture in the viewfinder as you press the button. That is why so much camera development has been concentrated on the viewing system.

Rules

There was a time when magazines and books were full of rules of composition. It seemed that you could compose a 'perfect' picture just as you could calculate a 'perfect' exposure.

More recently, people have come to realize that good photographs are not easy to define. Some follow all the rules, others follow virtually none. However, there are a few points to bear in mind as you compose your scenes—or as you wonder why one or other of your pictures does not have the impact you expected. The first consideration is 'what is the main subject?'; then, 'how is it to be portrayed?' after that 'is there anything to spoil the result?'

The main subject

You may be picturing a person, a piece of machinery, a scene, or whatever. The picture should show that. Make sure that what you want to portray is large enough in the viewfinder to be seen properly in the picture. When you decide on its size, bear in mind that the distance from your subject can affect your picture.

Backgrounds

Whatever your subject, wherever it is, and however large you want it, its surroundings are an important part of the picture. A picture of a child playing in a bare room tells a different story from a similar picture of the same child playing in a carefully maintained garden.

You may want to play down the surroundings, especially in a portrait. The best way is to choose a suitably neutral background—pale coloured curtains, a white-washed wall, or whatever you think looks right. Be careful, though, when you choose nondescript backgrounds. A dirty old piece of canvas, for example, seems neutral enough, but produces a definitely seedy, run-down look to the pictures.

The background can effectively dominate your subject—a tiny kitten exploring an enormous kitchen, or a mountaineer clinging to a gigantic peak. Make sure that the result is not a pointless picture of an untidy kitchen with a very small cat in it, or a rather amorphous mountain peak where, "Jack is that dark blob just by the other two dark blobs which are rocks—I think".

Angles and viewpoints

Choosing the right lens is important. Of course, you sometimes have to select it just because the subject is either a long way away, or because it is large and close. Whenever possible, though, select the best lens you have to produce the picture you want. If the foreground is important you may want to choose a wide-angle lens, and go in very close. Alternatively, you may want to compress the whole scene into almost two dimensional unreality, then you should choose a very long-focus lens. Once you learn to estimate the effect of each lens, the easiest way is to look for pictures and choose your viewpoint,

then decide the lens that covers the right amount of your subject. If you go in close with a relatively wide-angle lens, you get characteristic distortion. In a normal print, everything near the camera looks too big in relation to the rest of the picture. This effect comes out all too often in pictures of people. To fill the frame with a head and shoulders portrait you need to be within 1m (3 – 4ft) or so with a standard lens. Unfortunately you really need to stay 2 or 3m (7 or 10ft) away to take a natural-looking undistorted portrait. There are two possible solutions—fit a longer focal length lens, or enlarge the centre of your negative at the printing stage. The 'ideal' lens for portraits is one about 1¾ times the standard focal length—say 85mm.

Enlarging a distant part of your subject with a long focal length lens (say 2½ times the standard lens or more) 'compresses' the subject making it appear much closer to the background than it really is. The same effect is achieved by enlarging just a small part of a frame taken through a normal lens.

The other consideration of course is, where to place the main subject. Choose the right part of the frame for the effect you want—perhaps the bottom corner for a child leaving the scene, or the top for an aeroplane landing. Unless you want to create a particular impact, avoid the exact centre or the very edges of the frame.

Pitfalls

Once you have decided on the subject, and its relationship with the surroundings, you have composed your picture. Check the focusing screen once more, though. Look for anything that could spoil the result. Is there a branch growing out of your model's shoulder? Is there an untidy litter of books and toys in your child portrait? Or any other problem?

If there is, stop, move and put things right—if you can. It is very easy to concentrate on your main subject. Keep focusing, check the exposure, take the picture and be quite satisfied—until you see the result. All the things you did not notice then stand out.

This is especially a problem with reflex viewing. You see the subject focused sharply on the screen, and the rest of the scene more or less blurred. With the lens stopped down as you take the picture, depth of field is much greater, so all the rubbish in the background comes out sharp.

Bearing in mind these few points, it is still the picture you compose that the camera will record. If that is an attractive composition, then you will be pleased with your picture.

1

2

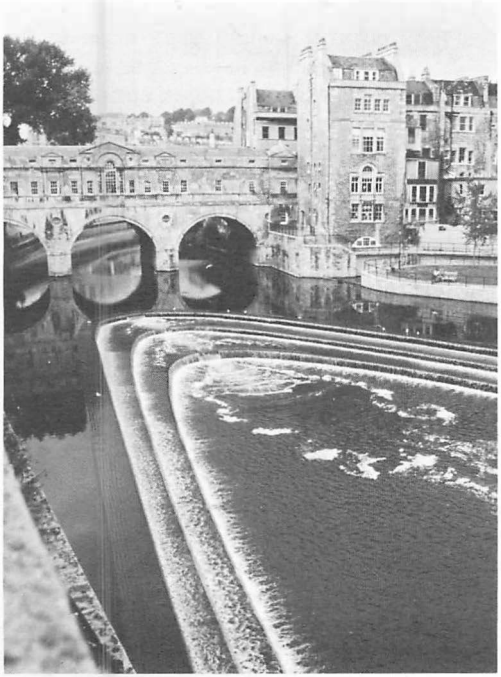
1 It is not always necessary to include all of a subject to convey its shape.

2 Choosing an extra long, or wide-angle, lens gives two very diffferent views of the same subject.

3 A less dramatic change of angle can give two similar portrait shots an effective change in emphasis.

4 An example of how varying angles can substantially alter shapes, particularly of curved features.
Sidney Ray

3



4

The Minolta system

Let us consider the range of equipment and accessories you can choose for your Minolta; it is this range that makes your camera such a versatile photographic instrument.

Lenses

Minolta is one of the few camera companies to make its own lenses from start to finish. So they offer a number of rather special items, along with the more usual ones. Their straightforward lenses range from a 17mm ultra-wide angle to two 300mm units. Two of the wide-angle lenses feature the unusual variable field curvature facility—the 24mm *f*2.8 VFC Rokkor, and the 35 mm *f*2.8 Shift CA Rokkor. This allows you to mould the 'plane' of sharp focus to the contours of your subject. In the 35mm optic, the facility is combined with a shift ability (rising or cross front) to make some otherwise impossible pictures easy.

Minolta, also has two series of really long focus lenses. For convenience they offer the 250mm *f*5.6, 500mm *f*8, 800mm *f*8 and 1600mm *f*11 RF Rokkors. For the ultimate in refinement there are the 400mm *f*5.6 and 600mm *f*6.3 Apo Tele Rokkors, each of which comes with a 2x converter to double its focal length.

At the other end of the scale are the 7.5mm *f*4 and 16mm *f*2.8 Fisheye Rokkors, both designs make use of curving reproduction to cover an angle of 180°. The former produces a circular image occupying part of the film. The 16mm version, however, fills the whole frame, covering 180° from corner to corner.

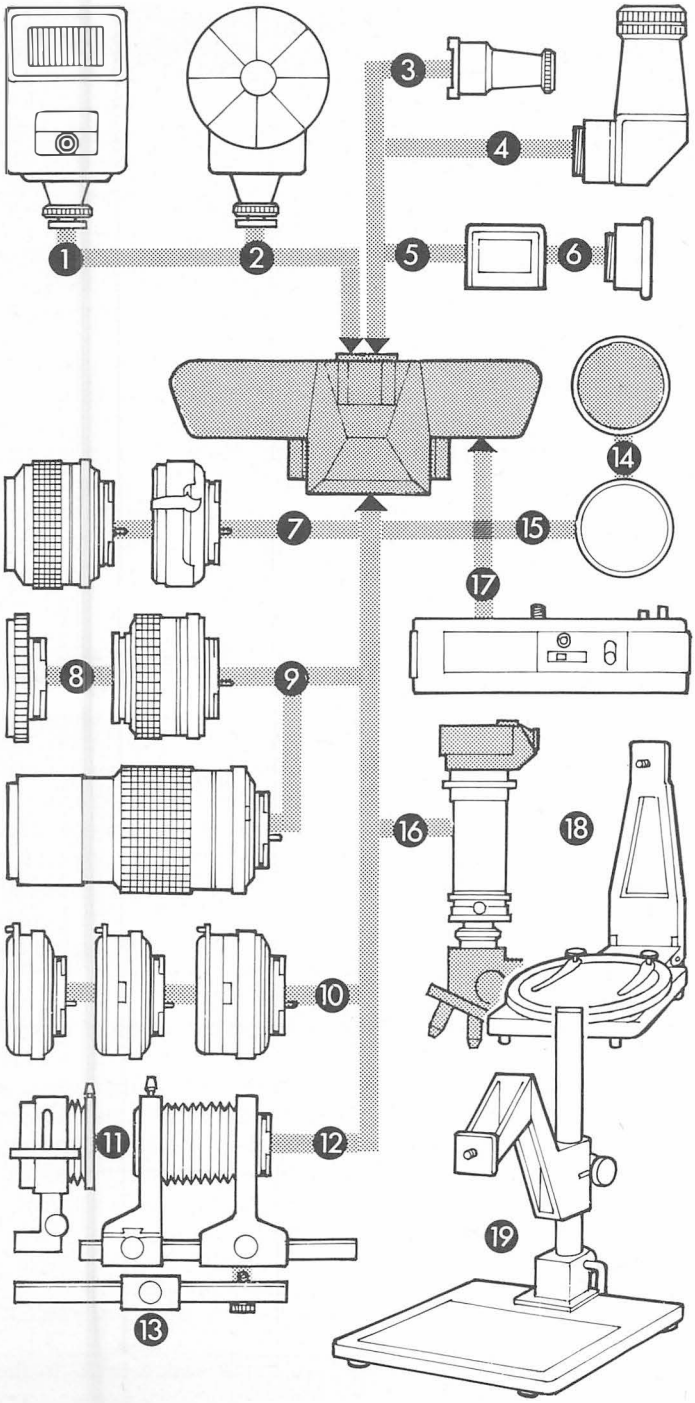
Close-ups

A major field of photography involves getting extra close to the subject. The Minolta range of equipment includes: close-up lenses; automatic meter-coupled and manual extension tubes; automatic and manual bellows units; a simple adaptor for fitting the camera to a microscope, and the Leitz micro-attachment for more sophisticated microscopy; and macro lenses of 12.5, 25, 50 and 100 mm focal lengths.

The MC Auto coupled extension tubes are particularly useful as they allow normal full aperture metering and automatic diaphragm operation. The Auto-bellows III is a sturdy unit, which gives fully automatic diaphragm operation. The manual extension tubes and bellows are simpler and lighter than their automatic counterparts, and are photographically their equal, but not so convenient to use. Either bellows may be fitted with a slide copier or the macro stand for supporting small specimens.

Viewing aids

A number of accessories alter the viewfinder image: the clip-on focusing telescope, which can be hinged out of the way, allows critical focusing of the central part; the right-angle finder, which can be swivelled through 360°, allows you to see in awkward situations, such as low level or microscope work; and eyepiece correction lenses, in nine dioptre strengths from −4 to +3 can be fitted for spectacle wearers who do not like wearing them for photography.



Flash Equipment

1 electronic

2 bulb

Eyepiece Equipment

3 focusing magnifier

4 angle finder

5 eyesight corrections

6 eyecup

Lens Mount Equipment

7 macro lens and extension tube

8 reversing ring

9 interchangeable lens

10 extension tubes

11 slide copier

12 bellows

13 focusing rail

14 filters

15 close-up lenses

16 microscope adaptor

17 power winder

18 macro stand

19 copy stand

Handling the Minolta XD

The sophisticated electronic circuits of any Minolta XD camera allow you all shades of exposure control. However, it is one of the simplest cameras of all to use. The more you know, the better you can use it.

There are two XD models. The full-specification XD-7, which is also sold as the XD-11 or XD; and the XD-5 with fewer features, but exactly the same electronic system. All the XD models are considered together, the differences are mentioned only where they are relevant.

The XD-7 (XD-11) is normally supplied with a 45mm *f*2, 50mm *f*1.2, *f*1.4 or *f*1.7 MD Rokkor lens; the XD-5 most commonly with the 45mm *f*2 lens. The lens is mounted in the three-claw Minolta bayonet.

Simple auto-exposure

With the standard lens, or any other MD Rokkor lens (see page 88) set the mode selector to 'S', set the dial at the other end to the correct film speed (ASA, see page 32) and choose a suitable shutter speed—1/125 or 1/250 sec outdoors on a bright day, 1/60 sec in dull conditions with medium-speed films. Now, all you need do is focus on the subject and press the shutter release. The XD-7 adjusts the lens aperture to give correct exposure every time for a normal scene. Of course in unusual conditions, you must give the electronics a little help (see page 56).

Film

The camera uses normal 35mm film. To load a film (see also page 32), pull up the film rewind knob, which allows the camera back to swing open. Put the cassette into the chamber at the left-hand end. Pull the film leader across the shutter, and push it down into a slot in the film take-up spool. Wind on with the transport lever to make sure the film is gripped. Then close the cover. Wind on until the frame counter reads '1' (press the shutter release between each stroke). If the film is winding through properly, the rewind knob turns counter-clockwise with each stroke. On the XD-7 (XD-11) you can check that the orange safe-load signal shows on the camera back. Set the film speed by depressing the release button and turning the ring until the correct ASA speed shows in the cut-out.

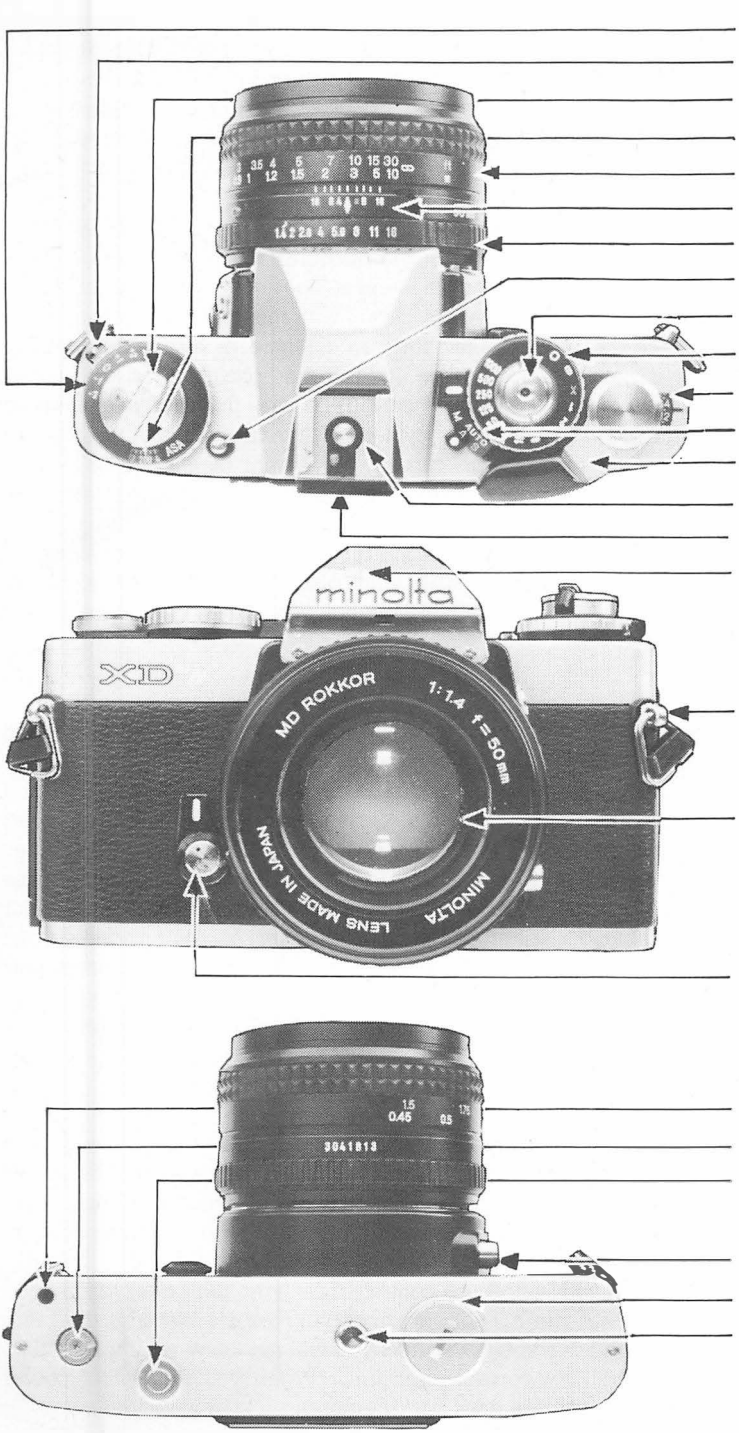
Exposure controls

The normal way to use the XD is with automatic exposure control. Once the film speed is set, the camera allows just the right amount of light to reach the film from any normal scene. There are occasions, which we talk about later, when you may want to alter the metered exposure, but they are outnumbered (by about ten to one for most photographers) by those in which automatic exposure control is ideal. The exposure compensation system (see page 51) allows you to remain automated even when the lighting is unusual.

Aperture priority

The XD cameras allow you to choose either the lens aperture or (with MD Rokkor lenses) the shutter speed; then automatically selects the other.

If the aperture is important, set the mode switch to A. In the viewfinder, to the right of the focusing screen, you will see an array


minolta
XD
MD ROKKOR 1:1.4 f=50mm
MINOLTA LENS MADE IN JAPAN
Exposure compensation scale
Compensation lever
Rewind crank
Film speed scale
Focusing ring and scale
Depth-of-field scale
Aperture ring
Film speed dial release
Shutter release button
Shutter speed knob
Frame counter
Mode selector
Film advance lever
Hot shoe
Viewfinder
Viewfinder scale illuminator
Strap lug
Lens
Self timer
Motor drive pin socket
Motor drive coupler
Interlock release button
Depth-of-field preview button
Battery compartment
Tripod socket

of figures from 1 to 1000. These are shutter speeds. Compose and focus on your scene. Now just touch the shutter release button, and one or two red dots will light by this scale. They show you the automatic shutter speed. Two, of course, indicate an intermediate setting. It does not matter what speed is set on the shutter speed dial (except X, B or O), it is the LED-indicated speed that you will get.

You can see the lens aperture just below the picture in the XD-7 (XD-11 or XD). As you turn the aperture ring of any MD or MC-coupled lens or accessory to alter the aperture, so the shutter speed LED changes. When you are happy with the combination (see page 48), take the picture. Now you can continue picture taking without worrying about the exposure at all. If the light changes, the shutter speed will change to compensate. Take care that it stays at 1/60 sec or shorter with a hand-held camera. Otherwise you are in danger of spoiling the picture with camera movement (see page 58). If the shutter speed does become too long, select a larger lens aperture (smaller *f*-number).

If the top, triangular, LED lights up then you should select a smaller aperture, because otherwise your pictures will be over-exposed. Conversely, if the bottom LED lights, you are in danger of under-exposure.

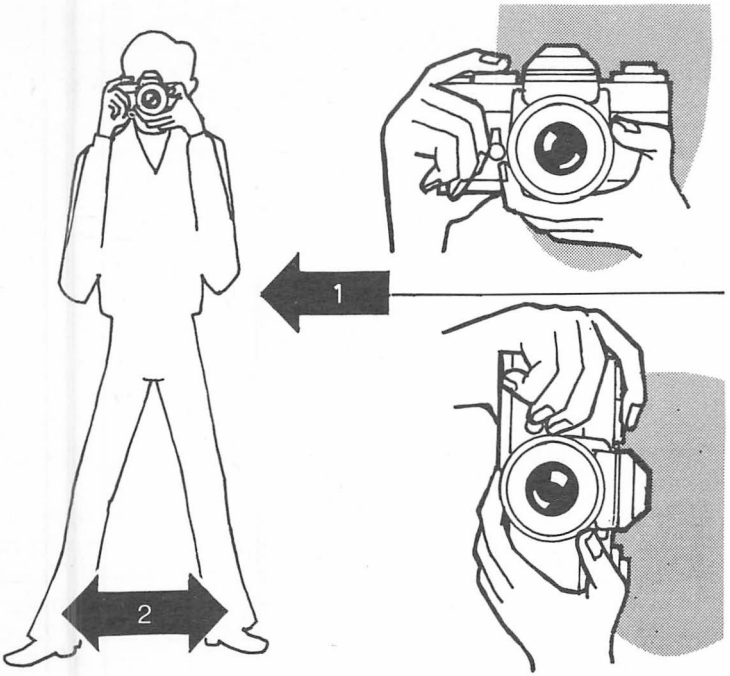
Shutter priority

More often, probably, you will want the shutter speed to remain constant. This is what happens with shutter speed priority exposure and any MD Rokkor lens. In that case, set the Mode Switch to S, and turn the lens diaphragm ring to its smallest aperture. This is coloured green to remind you. Now, the viewfinder scale shows lens apertures from *f*1.4 to *f*32 (*f*1.2 is indicated by the *f*1.4 LED and the triangle lighting together). Beside the lens aperture on the XD-7 (XD-11 or XD), the shutter speed setting now appears. As you turn the shutter speed dial, this figure changes—and so does the LED-indicated lens aperture setting on any XD camera. Choose a suitable speed, say 1/125 sec and you can rely on the camera to set the aperture for all normal scenes.

Batteries

To power the automatic exposure system and the shutter, the camera uses two 1.5 volt silver oxide cells housed in the baseplate. You need battery power even when you select manual exposure control. Two shutter settings: 0 (1/100 sec) and B operate mechanically even without batteries.

As long as the exposure control LEDs light, the battery is in good shape. In fact, the XD will go on working for a while after the LEDs have ceased to shine. Of course, you will not know what it is setting, but you will get correct exposures. When you run out of power entirely, the camera does not operate.



Horizontal Hold

rest camera in left hand

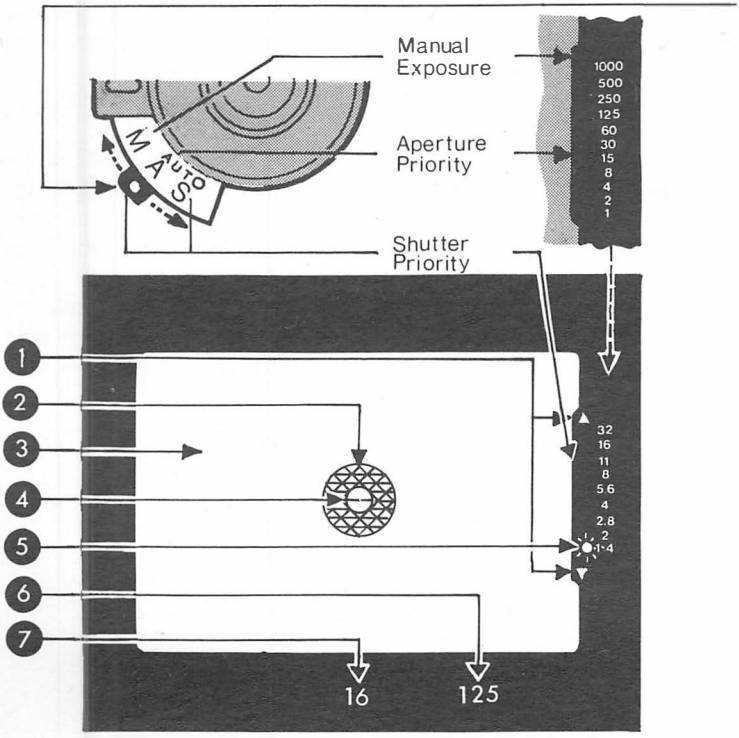
focus with forefinger and thumb

tuck elbows in (1) and stand firmly, legs slightly apart (2)

Vertical Hold

rest camera on palm of left hand

priority setting lever



Viewfinder XD cameras

1 LEDs over- and underexposure

2 microprism

3 fresnel screen

4 split-image

5 LED exposure light

6 shutter speed set at S or M mode (not XD-5)

7 aperture set (not XD-5)

If you are without battery power, set your XD on 0 (1/100 sec) and calculate the aperture manually. If you have no meter (or second camera) with you, follow the film instructions or the following table:

Film speed	Extra bright	Sunny	Light cloud	Dull	Rain
25–40	11	8–11	8	4	2.8
50–80	16	11–16	11	5.6	4
100–160	22	16–22	16	8	5.6
200–300	22* (11)	22* (11–16)	22	11	8
400–600	22* (16)	22* (16–22)	22* (11)	16	11

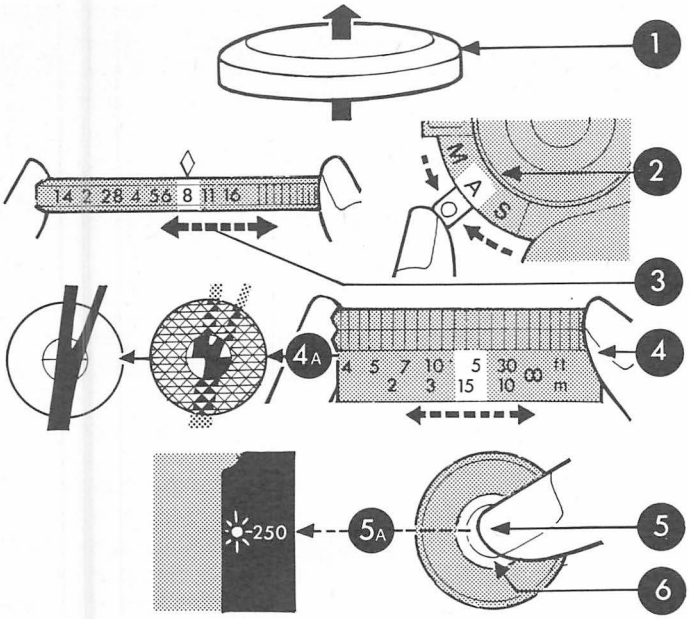
*Over-exposed: satisfactory on negative films, but not for transparencies; fit a neutral density (x4) or polarizing filter and use figures in brackets.

Accessories

There are a few special accessories which fit the XD models alone, or are designed to make use of their special features.

The accessory shoe of these cameras (and the XG models) has two flash contacts. The centre one is a normal 'hot shoe' contact for cordless flashguns. This is X-synchronized, and will synchronize all normal electronic flashes. The second contact is to couple with Minolta flashes, such as the Auto Electroflash 200X, 26X and 34X. When one of these units is ready to fire on the shoe, the camera automatically selects 1/100 sec (the required shutter speed), and the top LED triangle flashes to indicate that the flash is operational. Set the lens aperture to suit the computer flash requirements and then (see page 70), point, focus and shoot. If you release the camera before the flash is ready to fire, you get the shutter speed dictated by the conditions.

The Autowinder D fits directly below the XD cameras held in by a screw in the tripod bush. Because the camera uses an electromagnetic shutter release, operating the winder is particularly simple. You press the normal shutter release button. The camera winds on and fires continuously until you release it. The rate depends on the shutter speed, as the winder does not start to operate until the exposure is over. On speeds of 1/60 sec and shorter, the camera fires about twice a second.



Aperture Priority.

1 remove lens cap

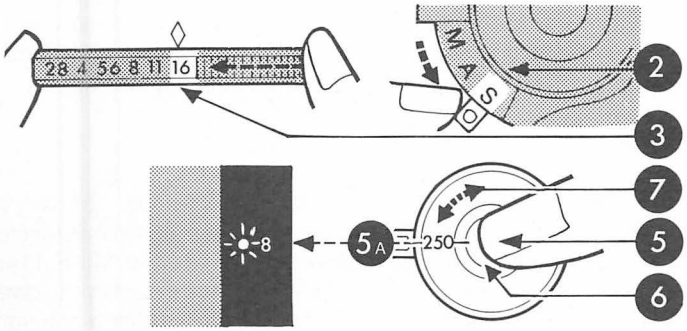
2 set mode selector to A

3 select aperture

4, 4A focus on subject

5, 5A check shutter speed (light touch)

6 release (slight pressure)



Shutter Priority

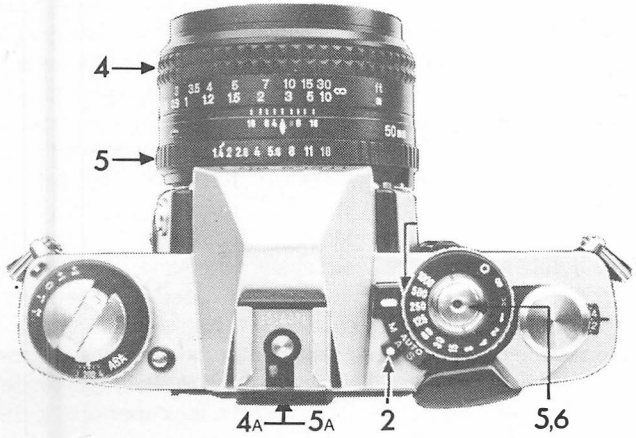
2 set mode selector to S

3 set minimum 'green aperture

7 set shutter speed

5 check aperture (light touch)

6 release (slight pressure)



Control Points on Camera

Handling the Minolta XG

The XG-9, its predecessor the XG-2 (XG-7 and XG) and the simpler XG-1 are all electronic cameras designed primarily for automatically controlled exposure. They are powered by two 1.5 volt silver oxide cells, housed in the baseplate. The XG-9 uses the same acute-matte focusing screen as the XD cameras to give especially crisp viewing images. It has a depth-of-field preview button and displays the lens aperture in the viewfinder. The earlier XG-2 has a normal screen, no preview button and does not show the aperture. The XG-1 is like the XG-2, but displays shutter speeds from 1 to 1/15 sec with a single LED. Like the XD cameras, the standard lenses are usually the 45mm *f*2, 50mm *f*1.2, *f*1.4 or *f*1.7 MD Rokkors. The XG-1 is normally supplied with the 45mm *f*2 lens. The cameras use the same Minolta bayonet mount, and thus accept the same range of accessories.

Films

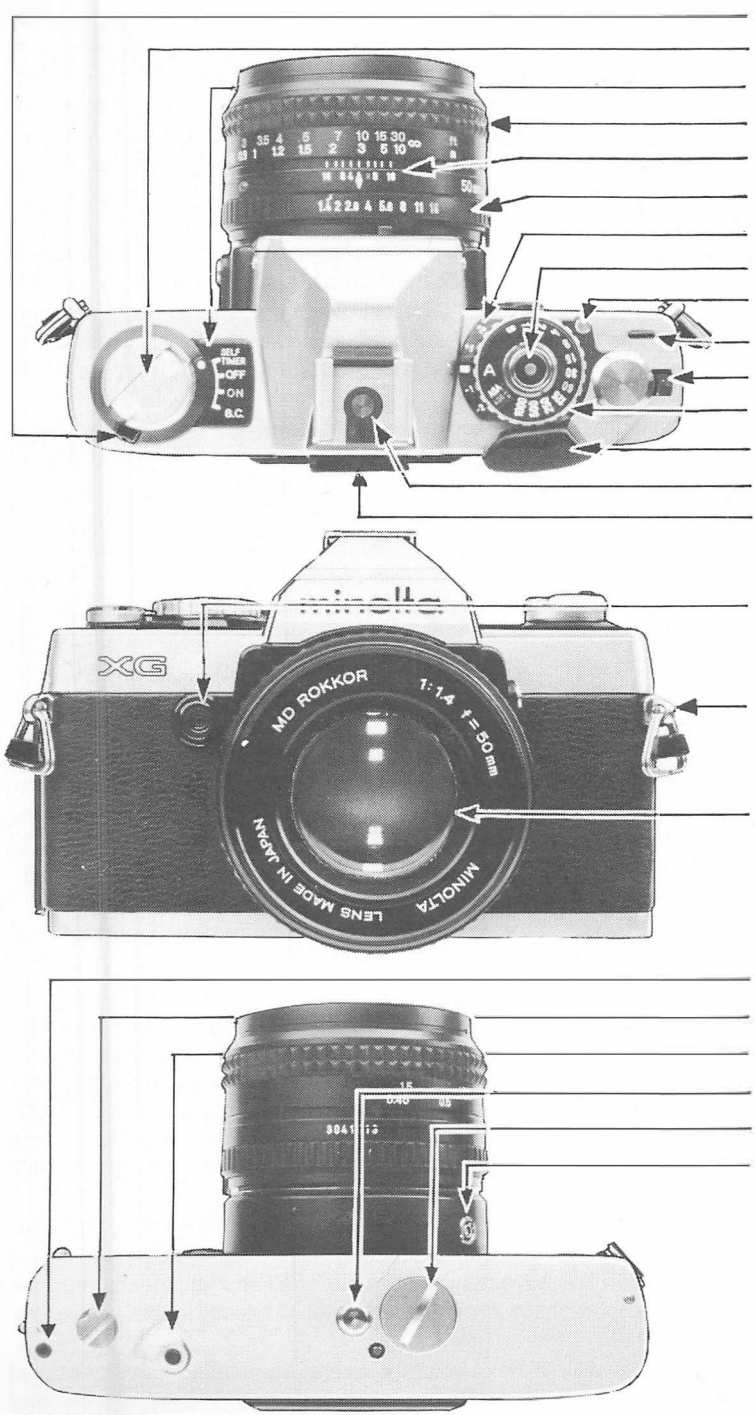
The XG cameras use normal 35mm film in cassettes. Loading (described in detail on page 33) is straightforward. Pull up the back release/rewind knob to open the back cover. Put the cassette in its chamber; push back the knob, and draw the leader across the film guides. Push the leader down into a slot on the take-up spool so that the tooth engages a perforation. Operate the film transport lever to wind the film round its spool, and close the back. Wind on until the frame counter reads '1', releasing the shutter after each stroke, check that the safe-load indicator shows its orange band, and the film is loaded. Set the film speed (ASA) by raising the shutter speed dial and turning it until the correct setting appears in the cut out.

Exposures

Once you have set the film speed, make sure that the big 'A' on the shutter dial is against the main index. It locks into place there for normal automatic exposures. Now switch on the camera, the switch is beside the rewind knob. The camera measures the light reflected from the subject, and the aperture preset on any MC or MD Rokkor lens. From that it adjusts the shutter speed automatically to give correct exposure to normal scenes. There are occasions when you will want to give a different exposure; but they are far less common than the normal scenes where the meter is right. When you have unusual lighting, you can set the camera to compensate (see page 52). Occasionally, too, you may want to use manual exposure control.

When the camera is set to 'A' (with or without compensation), the automatically selected shutter speed is indicated by one or two LEDs lighting against the shutter speed scale (from 1 to 1/1000 sec) at the right of the viewfinder image. The display lights up when you touch the shutter button with a bare finger. With a gloved finger, you have to press lightly to illuminate the display. Of course, when two LEDs light up, the camera sets an intermediate speed. On the XG-1 any speed from 1 to 1/15 sec is indicated by a single LED.

As you turn the lens aperture ring to alter the aperture, the shutter speed changes to maintain the same exposure. Both are displayed in the XG-9 viewfinder. So you can choose a lens aperture or shutter



meter switch
rewind crank
main control switch
focusing scale and ring
depth-of-field scale
aperture ring
exposure compensation
shutter release button
auto exposure release
film load indicator
frame counter
shutter speed dial
film advance lever
hot shoe
viewfinder

self-timer and battery indicator light

strap lug

lens

motor drive pin socket
motor drive coupler
interlock release button
tripod socket
battery compartment
coaxial socket

speed as a basis for the exposure control. Then, if the light changes, the XG alters the shutter speed to compensate. For hand-held shots, keep it above 1/60 sec if you want to avoid camera-shake induced blur. If the top LED lights, you would expect to get over-exposure; so the camera will not take a picture. You should then select a smaller aperture. Likewise, the bottom triangle indicates that you are in danger of under-exposure.

Other features

The main camera switch has four positions: OFF and ON are self-explanatory. BC is to check the battery; push the switch to this position, and the red light on the front glows if you have good batteries. SELF-TIMER introduces a delay of about 10 sec between pressing the shutter release and picture taking. During this time the same red light flashes (see page 84).

The shutter release socket on the side of the lens is threaded to accept either a normal cable release or an electric remote release cord.

Accessories

The accessory shoe on the XG cameras, as on the XD models, has two contacts. The second contact connects with specially designed electronic flashes, such as the Minolta Auto Electroflash 200X, 26X or 34X. These units indicate to the camera when they are charged, setting the correct shutter speed, and activating a viewfinder ready light. The units themselves provide automatic (computer) light control to match selected lens apertures (see page 74).

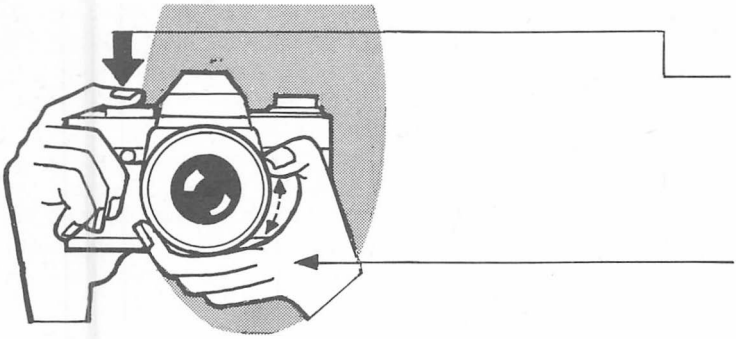
The XG cameras have contacts to allow direct fixing of the Autowinder G; which provides electric film transport, while maintaining all the camera's normal functions, including the normal shutter release button. The autowinder can provide continuous shooting at up to two frames a second (depending on shutter speed see page 80).

Holding the camera

The way you hold your camera can influence the quality of your pictures. If the camera moves, even minutely, while the shutter is open, the picture will not have quite the absolute sharpness you would expect from a good quality instrument. Camera shake, as such movement is called, is one of the most common causes of lack of definition—even in pictures taken by experienced photographers. The effect is not necessarily the serious multiple-image effect produced when a beginner waves around a camera while using a long shutter speed; it may just be a slight thickening of lines and smudging of fine detail.

Naturally the danger of camera shake is greatest at long (slow) shutter speeds, as is the magnitude of its effects. However, image blur caused by movement is possible at all shutter speeds, and the risk is proportionally greater the longer the focal length of the lens in use.

The only way to be absolutely sure of eliminating movement is to support the camera firmly—on a tripod or other solid object—and



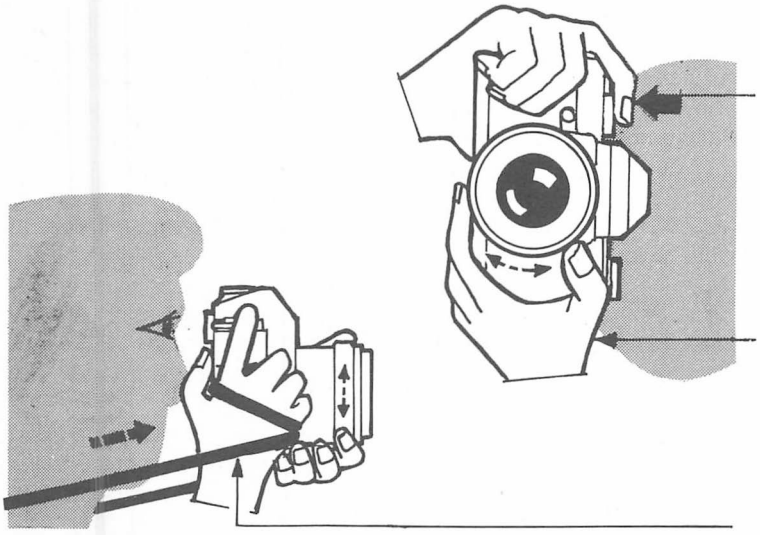
Horizontal Hold

release with forefinger

slight pressure

rest on palm of left hand

focus with forefinger and thumb



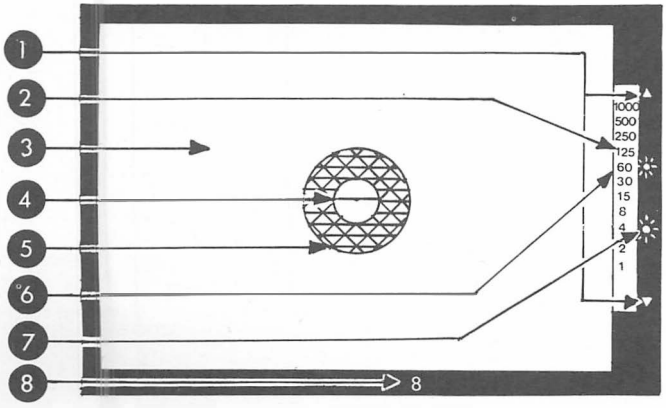
Vertical Hold

release with forefinger

cradle in left hand

focus with forefinger and thumb

for steadier hold, twist neck strap round hands



Viewfinder XG Cameras

1 LEDs over- and underexposure

2 shutter speeds

3 fresnel screen

4 split-image

5 microprism

6 measured exposure

7 XG-2 uses single slow-speed LED

8 lens aperture display on XG-9

use a cable release or the self-timer to release the shutter. This is, of course, impractical in many situations; but when hand-holding, you should try to find a firm support for yourself or the camera. For example, you may be able to lean against a wall or a lamp-post, or perhaps sit or lie on the ground.

However, whether or not you use any additional bracing, make sure that you are in a comfortable and stable position. Generally the steadiest unsupported stance is that pictured on page 23, with the weight evenly distributed on slightly parted legs. Your elbows should be kept well in to your sides, and the camera held firmly against your face with both hands.

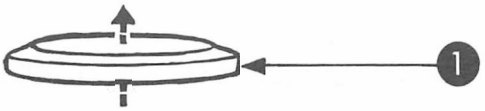
While the right hand should be in a comfortable position to operate the shutter release and wind on the film, the left hand operates the focusing and aperture selection rings on the lens. In general, at the instant of picture-taking, this hand should hold the camera more tightly than the right. Convenient grips for both horizontal and vertical pictures are shown on page 29. Some photographers prefer to hold the camera the other way up for vertical photos, using their right thumb to release the shutter.

Shooting with the XG

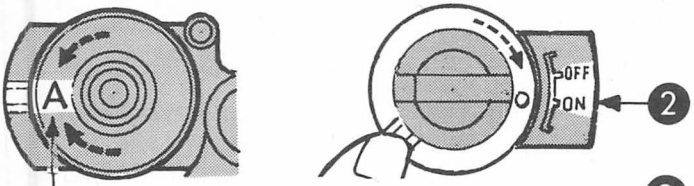
Once you have set the film speed, you can rely on the automatic exposure system for most of your photography. Compose and focus your picture in the normal way, then touch the shutter release button. Note the shutter speed indicated by the LED. If that is suitable (see page 58), check that you have an appropriate lens aperture (see page 62). If both are right, then hold the camera steady, and gently squeeze the shutter release button. As it is an electromagnetic switch, it needs very little pressure.

If on the other hand, the shutter speed is unsuitable, you can alter it by changing the lens aperture. Choose a wider aperture (smaller *f*-number) to get a faster speed, or a smaller aperture (larger *f*-number) for a slower one.

XG Shooting Procedure

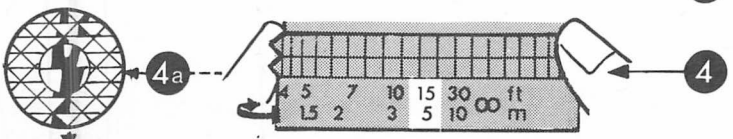


1 remove lens cap

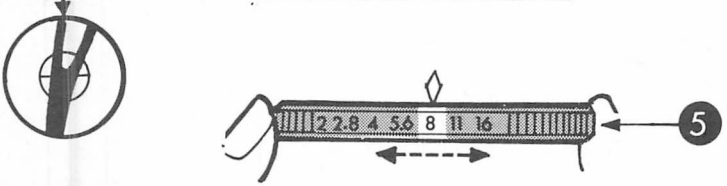


2 switch on meter

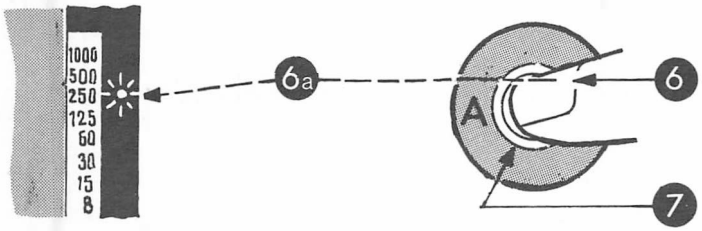
3 set to A



4 focus on subject



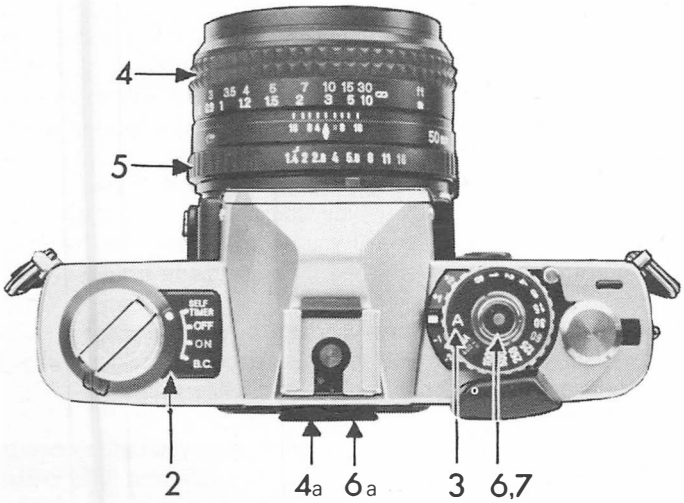
5 set aperture



6 check shutter speed (light touch)

7 release (slight pressure)

Control Points on Camera



Films

The camera forms an image of your vision—the size, angle, shape and colour. The film in the camera records that image; so, you must choose the film that suits your pictures best.

First you have to decide on the final picture form—do you want prints, or would you rather have transparencies? Is your purpose best conveyed in colours—or do you favour the more severe tones of monochrome?

Most often, prints are better for showing or displaying on a casual basis, and the obvious choice for decorating your house or office. On the other hand, transparencies when projected can have a much greater impact, and are ideal for communicating on an organized or semi-formal basis.

Prints

The choice between colour and black-and-white is, for prints, purely a personal one. The world is coloured, and undoubtedly colour prints more accurately portray its reality. They show the bright and the dull with equal impartiality. Monochrome prints are, on the other hand, a further abstraction. They rely on the viewer's memories to distinguish between the drab greys of, for example, derelict dockside and the brilliant colours of a funfair. However, it is much easier to control monochrome images. With quite simple materials, you can manipulate the framing and the tones to produce the effects you want. You can make your own colour prints, but to get a first class print requires considerable care and accuracy. Few enthusiasts have the time or the patience to go beyond the mastery of normal print making.

The easiest way to make good prints is to use negative film, colour or black-and-white. Modern materials, though, are allowing better and better colour prints to be made from transparencies.

Slides

The main problem with colour transparency photography is that there is no second chance: you cannot rescue the picture by careful cropping in the enlarger; by choosing an unusual grade of print material; or by dodging or printing in. The mounted slide comes back from the laboratory with exactly the picture you took. If the exposure was wrong, then the transparency is too light or too dark; if the camera was tilted, the horizon is sloping; if you had to stand too far away, your main subject is too small; and so on.

Of course, the most direct way to make transparencies is to use colour reversal film. However, you can achieve equal quality by printing from colour negatives. If you want a number of duplicates, the results are usually better when they are made from a negative than from a transparency.

If you are unsure of the best medium to work in, choose colour negative film, that allows you to make excellent colour prints or transparencies, and reasonable black-and-white prints.

Film speed

When you have decided on the film type, then you can choose the other characteristics that you want. The way different films portray

a scene can be quite strikingly different. Some produce rough grainy-looking results, others are silky smooth. Some aim for strong blacks and whites, others for muted greys. Sometimes colours are particularly vibrant, others much more subdued; and so on. Most of the differences are to some extent related to the 'speed' or sensitivity.

The speed of a film is a measure of the amount of light that must fall on it to produce a perfect exposure (of a normal subject). Film manufacturers do not usually give strict scientifically determined film speed ratings. They quote the ASA and DIN *meter settings* that they calculate will give optimum exposure. When using a new type of film, you should make some test exposures to discover whether the manufacturer's meter settings give the results that you want with your equipment.

ASA speeds

The ASA speed is an arithmetical system in which a doubling of the film's sensitivity is denoted by a doubling of the speed rating. Thus in any given condition, 100 ASA film requires twice the exposure needed by a 200 ASA film; and half that required by 50 ASA film. The ASA figure is the one you set on the Minolta meter to ensure correct exposure measurement.

DIN speeds

The DIN speed ratings are expressed on a logarithmic scale. An increase of three points indicates a doubling of the film's sensitivity: thus 50 ASA is rated at 18 DIN, 100 ASA film at 21 DIN, and 200 ASA film at 24 DIN. The scales cross over at the figure 12:

ASA	12	15	20	25	32	40	50	64	80	100	125	160	200	250	320	400
DIN	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27

Influences on film speed

The speeds given by the film manufacturer are likely to give the best results under normal conditions, including the recommended processing.

Many films can be specially processed to enable a higher setting to be used, but such processing almost always results in some loss of image quality. Black-and-white films may be processed in special fine-grain developers which necessitate the use of a lower meter setting. Using specific processing times to give the contrast you want may also change the effective film speed. Even with quite ordinary treatment, you may prefer to use a different speed setting for some films. This is especially likely for transparencies. If you have a powerful projector, for example, then you may want darker than normal slides, and so should choose a higher film speed (say 32 or 40 ASA instead of 25 ASA).

Exposure latitude

You must be especially accurate when exposing transparency films because you determine the final picture density. In practice, most transparency films still give acceptable (but not excellent) results when given as little as half the correct exposure or nearly double it. Each doubling or halving alters the exposure by one stop (one whole

1

Choose the film that suits your pictures.

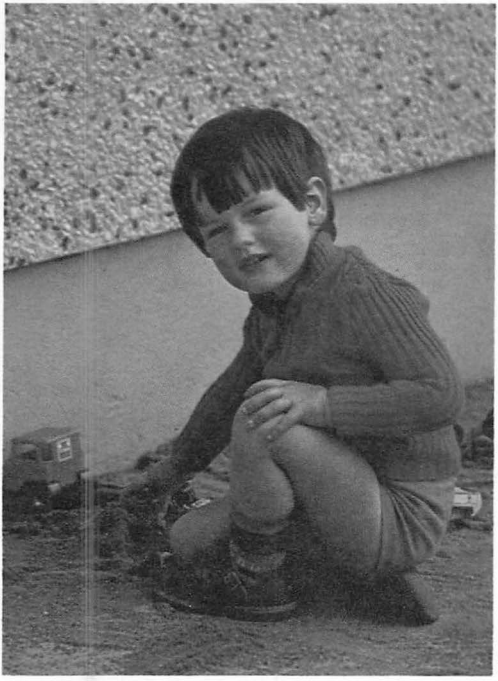
1 Children's fleeting expressions need a fast shutter speed, so a fast film is ideal.
Percy Poynter

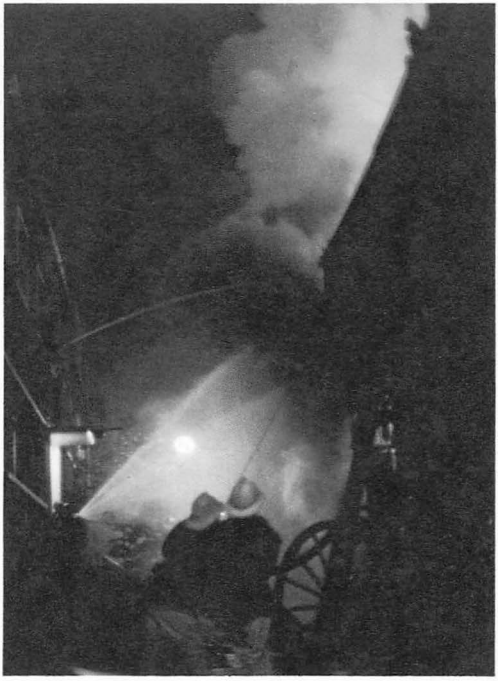
2 Plenty of light allows you to use a slow film to record the finest details needed on a wide-angle shot.

3 Fast films are usually chosen for action shots, but here the photographer chose a stationary point to 'freeze' this trampolinist on medium speed film.
Neville Newman

2

3





1/2

3

Colour film can vary greatly. It is always best to choose the slowest film that lets you photograph the subject.

1 The small boy is pictured on 25 ASA film.

2 Sometimes, as outdoors at night, you need a really fast film – here 400 ASA 'pushed' to 800.
Clyde Reynolds

3 When the sun is shining you can use fast shutter speeds on a medium-speed film to produce really sharp results
Michael Barrington-Martin

aperture or shutter speed step). So the latitude in exposing a colour transparency film is most easily expressed as from 1 stop under-exposure to $^{2}/_{3}$ stop over-exposure, or '$1^{2}/_{3}$ stops'.

Negative films are much more tolerant of exposure deviations because the density can be corrected at the print-making stage, and they are of much lower contrast.

So, the latitude of colour negative films is from about 2 stops under-exposure to about 3 stops over-exposure. For black-and-white negatives the range can be even greater. However, with both film types, the latitude for absolute quality is much narrower. So, always try to make your exposures as accurately as possible.

Contrast

The range of tones between black and white, and their relationship to the subject, is called the contrast of the film. Extremely high-contrast films record most of the subject as pure black or pure white. Low-contrast materials on the other hand give a wide range of greys between the two extremes. Given a low-contrast subject such as a warehouse on a dull day, a low-contrast material will record it only in shades of grey. The difference between the darkest and lightest parts in the picture will be less than it was originally. A high-contrast material, conversely will make the difference greater than it was in the subject.

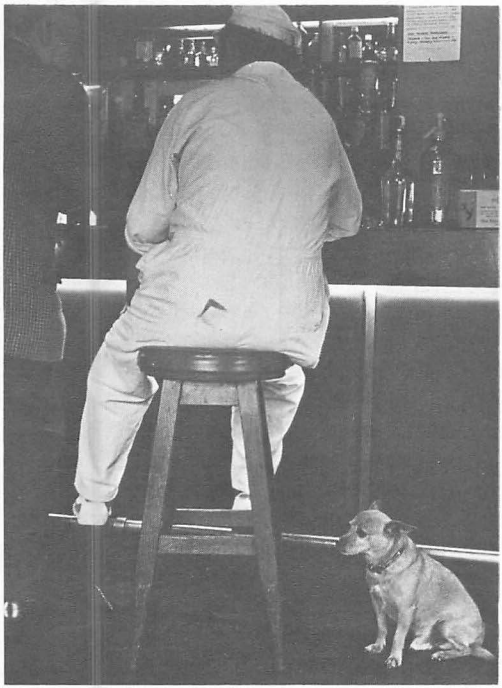
With a high-contrast subject, perhaps a bright suburban house on a sunny day, the high-contrast material will lose much of the detail in the highlights and shadows, while the low-contrast one records that detail, by picturing the scene in a series of greys.

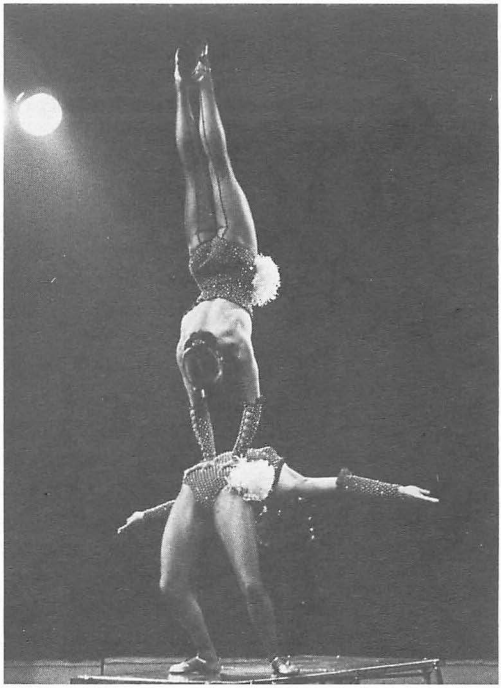
Although contrast is basically a tone concept, it extends quite naturally into colour reproduction. The differences between black and white are the same, but the shades of grey are represented by shades of all colours of the rainbow. In general, contrast and colour saturation go hand in hand. Thus, high-contrast materials tend to produce strongly coloured pictures, and low-contrast ones more muted tones.

In general, and given normal development, the higher the speed of a film, the lower its contrast. This, though, is not very noticeable with films over the normally-used range (25–500 ASA, 15–28 DIN). For these materials, the manufacturer's recommended processing produces quite similar contrast levels. Prolonging the developing time usually increases the contrast.

Graininess

If you magnify a piece of developed film, you can see that the image is formed of little clumps of colour or tone. The faster the film, the grainier the results. The film speed, though, is not the only influence. Any major deviation from the recommended exposure and processing recommendations is likely to increase the grain.





Film speeds and image qualities

For most purposes, a medium-speed film (64–125 ASA, 19–22 DIN) should prove ideal. Carefully processed negatives should produce acceptable 12 × 15 inch prints, and transparencies will appear sharp on a normal home screen.

Slow films (12–50 ASA, 12–18 DIN) are the natural choice when you want to make really big prints, or to show your slides on a large screen. However, choice of aperture and shutter speed is often limited. On dull days, especially with longer focal length lenses, you may find that it is impossible to take really sharp pictures on slow film, because you cannot choose a shutter speed fast enough to be able to avoid blur from camera or subject movement.

Fast films, on the other hand, allow you to shoot in practically any light level—even indoors and at night. Of course, the pictures will be quite grainy; but many photographers find this an attractive feature, at least in black and white. If you concentrate on available-light photography, choose 400–500 ASA film; colour negative, transparency or monochrome as your purpose dictates.

If you need still more sensitivity, you can shoot 400 (or 500) ASA films at 800 (1000), 1600 (2000), or even higher ASA settings, and process them to compensate. It is easy to arrange for such 'push-processing' for colour transparency materials (except Kodachromes, which *must* be normally rated) or black-and-white films. With colour negatives it is more difficult, so ensure that the film can be processed at the meter setting you want *before* you set the film speed dial.

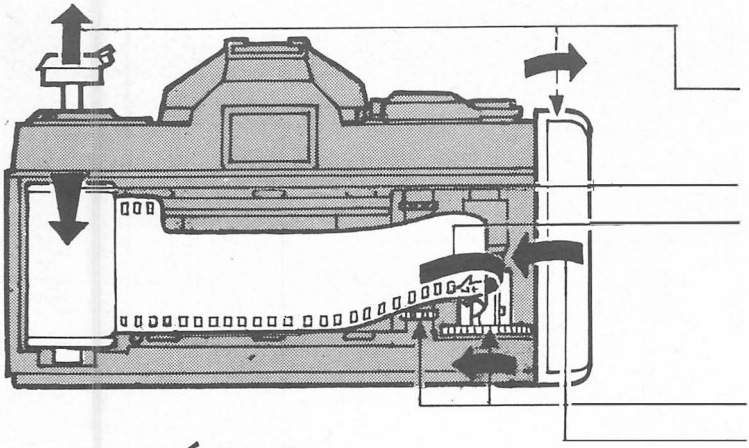
In available light you need the fastest film that will give you the resolution. This is where it is really necessary to use extra-wide apertures – such as on the 85mm f1.7 MD Rokkor.
Neville Newman

Loading and unloading

Always load your Minolta in the shade—turn your back on the sun if necessary. The loading sequence is identical whichever camera you use. First unlock the back by pulling up the rewind knob and open the back cover. Place the film cassette in the film chamber and push the rewind knob back in, turning it slightly to engage the cassette spindle. Push the end of the film leader firmly behind one of the tabs on the lower flange of the take-up spool. Wind on the film leader by turning the film transport lever, releasing the shutter if necessary, until the drive spindle sprockets engage both the top and bottom perforations of the film, and that it lies flat between the outer film guides. An orange bar appears in the safe-load system window (on all but the XD-5) when the camera is correctly loaded. It moves across the window as you wind through the film. Turn the rewind knob gently in the direction of the arrow to take up any slack in the film. Close the camera back, pressing firmly until it clicks.

To wind on the film exposed to the light during loading, operate the film transport lever twice, releasing the shutter after each stroke. The frame counter should now indicate 0. Wind on a third stroke, and the frame counter should indicate 1, showing that the camera is ready for the first exposure on the film. Finally, set the film speed in the cut-out on the shutter speed dial on the XG or around the rewind knob on the XD. The dial is calibrated in ASA speeds; a DIN to ASA converter is fitted on the backplate. You can put the end of your film pack into the slot on the back of most of the models to remind you of the film type.

At the end of the film, press the rewind release button, and wind the film back into its cassette. Then you can open the back and take it out. Send all films for processing as soon as possible.



Loading Camera

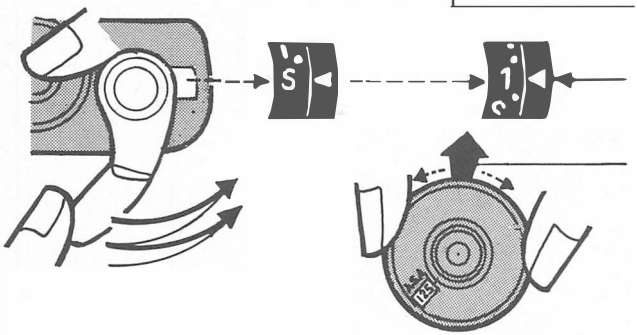
lift knob and open back

insert film cassette

thread film onto take-up spool

tighten and engage sprockets

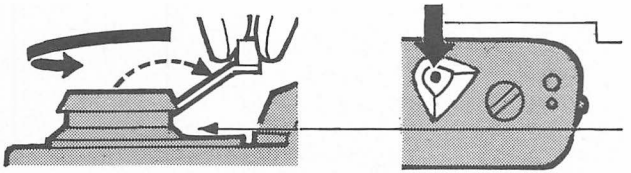
close camera back



make two blind exposures

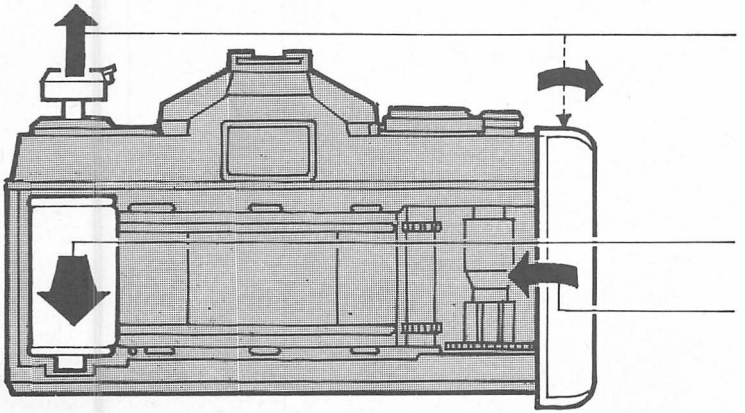
set film speed

Unloading



press and hold rewind hold

rewind film



lift and open camera back

remove cassette

close camera back

Colour and filters

Lighting varies greatly in colour, from the almost red light of an open fire to the strong blue of a blue sky (without sunlight). Normal daylight is a mixture of blue skylight and yellow sunlight. Our eyes adapt to the colour of lighting, but colour films do not. Compensation can be made when printing from colour negatives, but transparency films must be balanced for the light source in use. Manufacturers produce different types: Daylight—for use in daylight and with electronic flash or blue flashbulbs; and Type B (tungsten) for use with studio lamps or tungsten halogen lamps. A white object lit by a 60 watt bulb and pictured on a daylight-type film comes out a bright orange colour; whereas lit by daylight it comes out blue on a tungsten-light film.

Colour temperature

For convenience, the colour of normal lighting can be given a 'colour temperature' on a scale stretching from about 2000K for firelight to 12000K for a strong blue sky. This allows you to select just the right filter to match it to the film. Of course, there are a whole range, but only two are at all widely used—an orange filter, for use with tungsten-balanced film in daylight; and a blue one for use with daylight-type film in artificial lighting.

Colour conversion filters

To obtain a normal colour balance when using a colour reversal film with a light source other than that for which it is intended to be used, you must use a conversion filter. Many manufacturers supply them for using commonly available film types in normal types of illumination. In general, filters for use with daylight films are blue in colour, and those for use with artificial light films are orange. The filters are normally used on the camera lens, but are equally effective when used to filter the light-source. If you are to use two light sources of different colour temperatures, one of them must be filtered to the colour of the other. For example, with daylight coming through a window, you need a blue filter on any tungsten lamps for an orange filter covering the window.

Ultra-violet filters

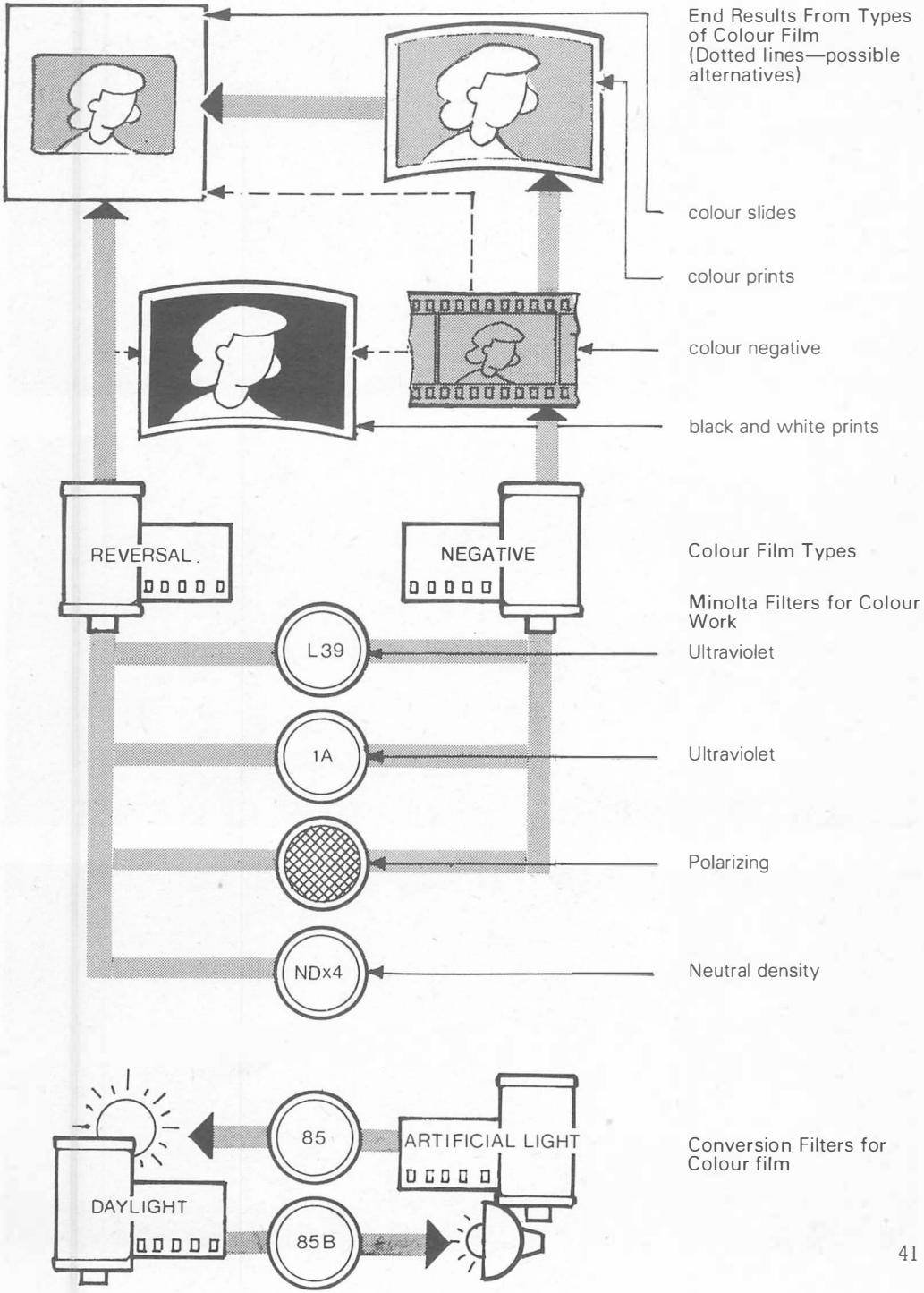
Ultra-violet absorbing (UV) filters reduce the effect of atmospheric haze which would otherwise be exaggerated because photographic emulsions are sensitive to ultra-violet radiation (which is invisible to the eye). The radiation is scattered strongly by haze and records on colour film as a blue veiling of distant objects.

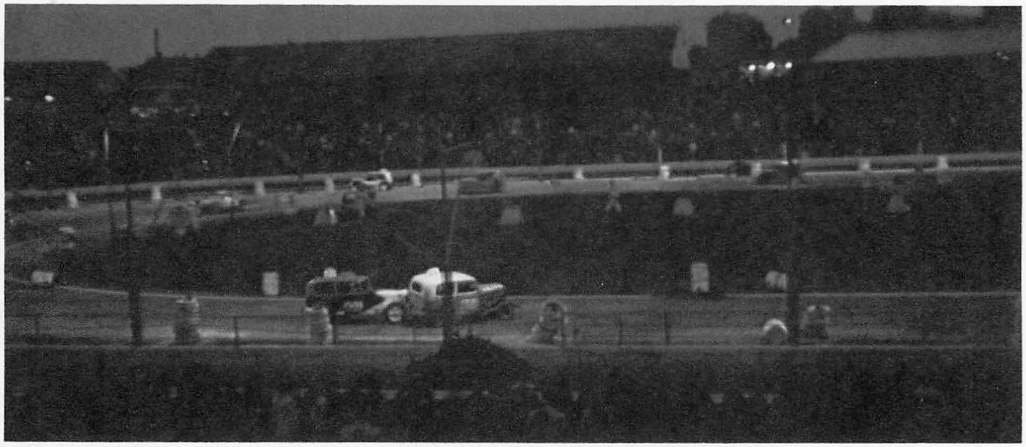
Skylight filters

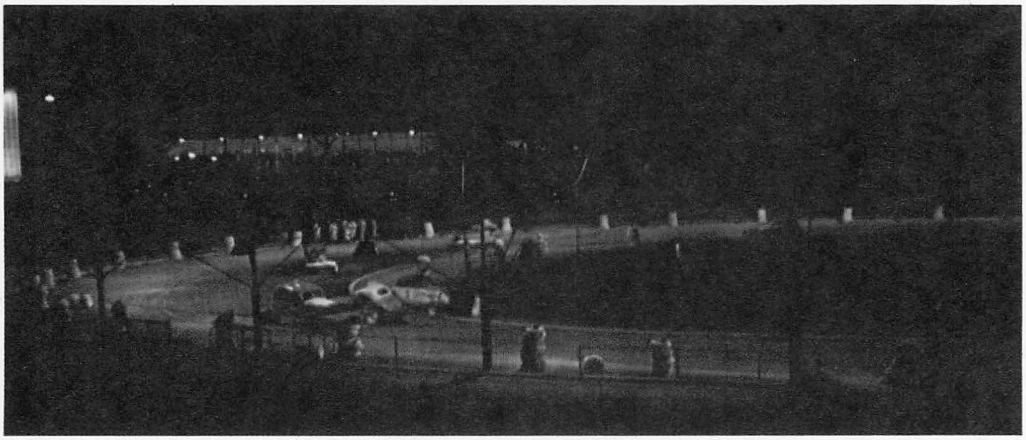
Skylight filters are UV absorbing filters coloured a pale salmon or rose. They are used with reversal films to give slightly warmer colours in transparencies, as well as the normal UV filter effects. They require no exposure increase, and are a more useful alternative to plain UV filters.

Neutral density filters

Neutral density filters (or attenuators) reduce equally the transmission of all wavelengths of the visible spectrum. They come in two forms: *photographic silver density*, which is simply accurately


End Results From Types of Colour Film (Dotted lines—possible alternatives)
colour slides
colour prints
colour negative
black and white prints
REVERSAL
NEGATIVE
Colour Film Types
Minolta Filters for Colour Work
L39
Ultraviolet
1A
Ultraviolet
Polarizing
NDx4
Neutral density
85
ARTIFICIAL LIGHT
DAYLIGHT
85B
Conversion Filters for Colour film





exposed and developed film; and *dyed filters*, often using colloidal carbon. Because of its high light-scattering effect, silver density is not suitable for use over the camera lens. Dyed neutral density filters are, however, intended for this purpose, and can be used to produce high quality images.

Neutral density filters do not affect the colour balance whatever film they are used with. They simply allow the lens aperture to be widened, or the time lengthened by using a slower shutter speed, while keeping the exposure at its normal level. They are normally available in the range of densities from 0.1 to 4.0 (transmitting from 80% to 0.01% of the available light) with filter factors varying from just over 1 to 10,000. A density between 1.0 and 2.0 (10% to 1% transmission) enables you to use full aperture in bright sun with medium-speed films. A density of 3.0 (0.1% transmission) allows exposures as long as 30 sec under the same conditions.

Polarizing filters

The effect of a polarizing filter is the same with all types of film. It can—in some circumstances—reduce reflections; and can darken a blue sky, without otherwise altering the balance in a colour picture.

Light coming directly from the sun or other light sources is not polarized: the rays vibrate in all directions. Sometimes, however, light can be restricted to rays all vibrating in one plane. It is then said to be polarized. For the photographer there are two important polarizers: polarizing filters, which restrict the passage of all light not vibrating in their plane of polarization; and smooth reflective non-metallic surfaces which polarize light reflected at certain angles. Although polarizing filters may be fitted over light sources for special applications, they can normally be regarded as camera fitments used to take advantage of light polarized by reflection.

The most common use is in restricting the passage of polarized light, thus reducing its influence on the film. From certain angles this can result in a dramatic reduction in reflections from glass, water and other substances (but not from metal surfaces). A special instance of this is the blue light reflected from the sky on a sunny day. An area of the sky at right angles to a line from the sun to the camera position polarizes the sun's rays strongly, and thus careful use of a polarizing filter can selectively darken a blue sky in a colour picture.

The effect of a polarizing filter depends on its orientation to the polarized light. It passes almost all light polarized parallel to its polarizing plane and is opaque to the light polarized at right angles. Minolta polarizing filters are supplied in rotatable mounts. You can see the effect on the viewing screen as you turn the filter. The easiest way to work is to keep your eye to the viewfinder as you move around, and rotate the filter; choose the most effective picture, and press the shutter release.

Three shots of the same scene on tungsten film. As the light fades, the tungsten lights predominate, so changing the overall colour. Tungsten-light film shows the effect well.
Sidney Ray

Colour and Pictures

The correct colour balance is important to your photography; but it is only the beginning of taking the colour pictures you want. To convey the correct impression, you have to choose the right combination of colours. Of course, this is a highly personal choice, but there are various points that are worth remembering.

Harmony and discord

Some colours go with others sympathetically, while different combinations 'clash' violently. Where the picture is intended to be restful and soothing, it is a good general principle to include only colours that harmonize. For a more strident impact, go for colour contrast, or even clash. In most pictures you accept the colours as they are. With a relatively small and close main subject, you can often alter the background by changing the camera position. In choosing the background, you should avoid obtrusive detail that has no relevance to the picture. Be particularly careful of red or other bright colours in the background. An outdoor portrait for example might be perfectly acceptable in black and white if a telephone kiosk or post box appeared out of focus in a small part of the background. In colour, such a defocused red blob would be distracting.

Mood and perspective

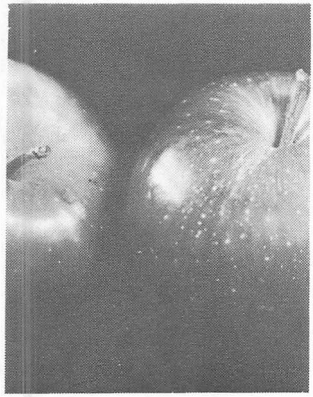
Individual colours, whether or not they harmonize, tend to convey different moods. Colours in the red half of the spectrum give an impression of warmth, gaiety, garishness, danger, etc. according to the type of picture. The bluer colours are cooler, more sober, sometimes even depressing. Saturated colours are brash, brilliant, harsh, etc. whereas desaturated, pastel colours are delicate, soothing and soft. The bluer colours are less insistent and tend to sink into the background while the redder colours tend to thrust forward and to attract the eye. For example, red flowers can appear to 'float' in front of a pastel garden scene.

Pictures of colour

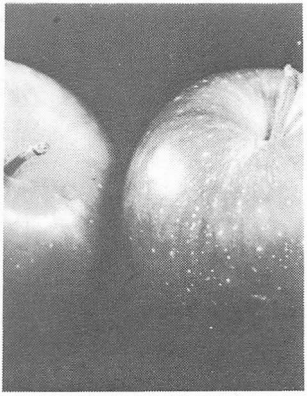
While colour is an integral part of many scenes, it can become the reason for taking some pictures. Go in close to isolate nature's brilliance to produce a real feast of saturated colour; or look for man-made examples. With either subject, you can often reduce your picture to a few (or even a single) brilliant colours.

Composing pictures like this is exacting. A change in balance of just a fraction can mean the difference between a striking picture and a failure. So, you need to look at your focusing screen with a new eye. The results, though, are well worth the trouble; one or two brilliant primary colour transparencies can transform an ordinary holiday slide show.

Filters for Black-and-White Film



A

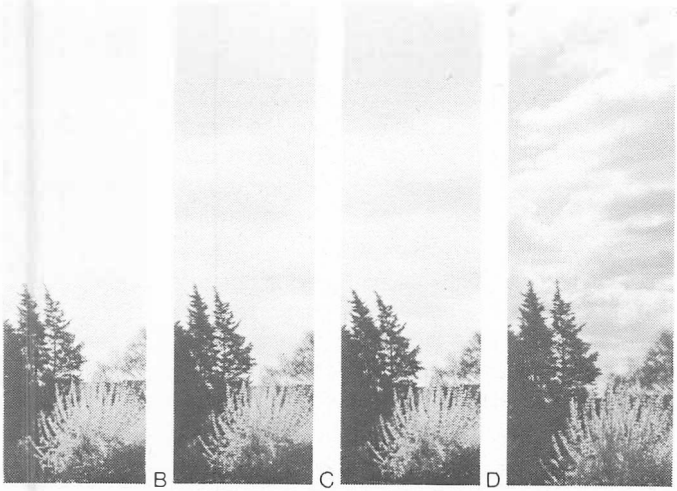


B

green filter

A without

B with



A B C D

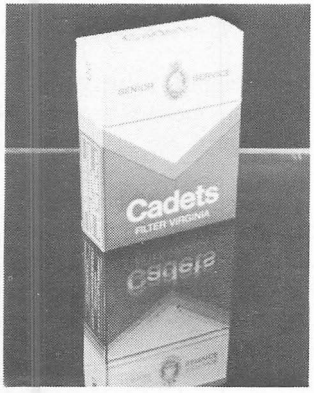
A light yellow

B orange

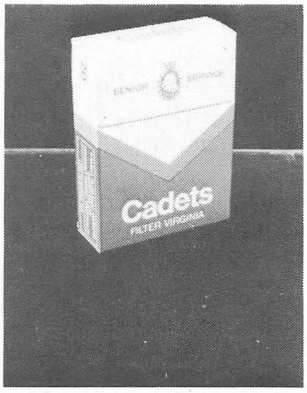
C red

D polaroid

Polarizing



A



B

A without

B with

Minolta filters

Minolta produce solid glass filters for use with Rokkor lenses. They are your best choice for the filters that you use most often. You can be quite sure that they are of optical quality to match your lenses.

For colour transparency films

Coloured filters used with reversal films alter the colour of the final transparency. Some are for use in daylight.

Filter	Colour	Effect
Ultra-Violet (L39)	UV-absorbing	Reduces distant blue haze.
1A	Very pale pink	A slightly warmer UV filter.
ND × 4	Grey	Reduces the light reaching the film without altering the colour.
Polarizing	Grey	For reducing reflections or darkening skies.

Special filters give normal colour balance in the 'wrong' lighting.

Filter	Colour	Effect
80B	Dark blue	For using daylight film with studio floods.
85	Orange	for using type A (tungsten) film in daylight.

For colour negative films

Colour negative films do not need accurate filtration in the camera because the colour balance can be corrected in printing. A polarising filter acts exactly as it does with transparency films, and UV-absorbing filters may afford some degree of haze penetration. Optimum colour, however, will be attained with professional type colour films only if they are approximately balanced to the light source.

For black-and-white films

Polarising and neutral density filters have the same effect as they do with colour films, and ultra-violet absorbing filters may reduce haze. Coloured filters, simply alter the relative tones of different coloured parts of the subject (see p. 116). The range includes green (60), yellow (Y48), orange (O56) and red (R60).

Availability

All the filters come in 49, 52 or 55mm mounts. UV (L39) and yellow (Y48) also in 46, 62, 67, 72, 77 and 126mm mounts, and red (R60) in a 126mm mount.

Exposure

Many filters require some increase in exposure. Polarising filters and colour converting filters have factors (for exposure increase) of several stops, while 1A and UV absorbing filters, and indicate an exposure which takes account of the filter factor. You will, however, more nearly duplicate the manufacturer's intentions if you meter without the filter, and modify your exposure by the factor.

The shots opposite exemplify the fact that pictures can be made by their colours.
Below Percy Poynter

Components of Exposure

As discussed briefly earlier, the exposure controls adjust the light from the subject to suit the film. They influence both the intensity and the duration of the light that reaches the film. The intensity is controlled by altering the aperture of the lens' diaphragm. This alters the proportion of the light from the subject that enters the camera. The length of time it falls on the film is determined by the shutter.

Lens aperture

The diaphragm consists of a number of metal leaves, which form a roughly circular hole of variable size (the limiting aperture). Minolta camera lenses, and most others, are marked with an aperture scale in *f*-numbers or relative apertures. These are calculated as the focal length of the lens divided by the diameter of the effective aperture (the area of the light beam striking the front glass which actually passes through the diaphragm at each setting). Most *f*-numbers are on the scale:

1 1.4 2 2.8 4 5.6 8 11 16 22 32 45

Each number is $\sqrt{2}$ times the one before, and represents half its area. Thus, a lens set to *f*4 passes twice the light of one set to *f*5.6. The ends of the scale vary for different lenses, and often the maximum aperture is intermediate between two of the standard settings. The light reaching the film, from any subject, is the same at a given *f*-number for any lens, except when taking close-up photographs (see page 108). Most lenses have click stops at each setting on the standard scale, and some also half-way between these. However, these are just for convenience, and you can use intermediate settings whenever you want to.

Shutter speeds

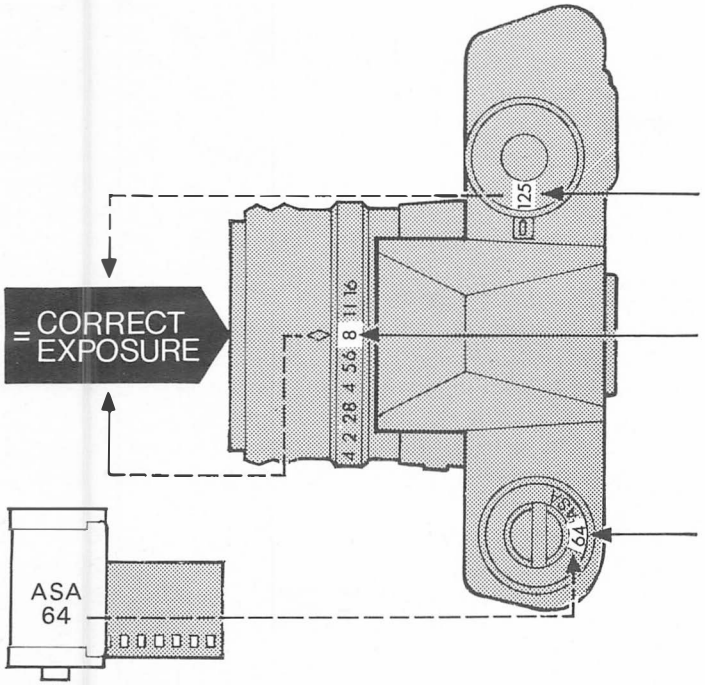
Shutter speeds are simply the times for which the shutter remains open. The Minolta XD and XG cameras have electronically timed shutters which can choose the time steplessly in response to the meter reading. When you choose a specific shutter speed, in the manual mode, or with the XD set to 'S' they are calibrated on the usual scale:

1 ½ ¼ ⅛ 1/15 1/30 1/60 1/125 1/500 1/1000 sec.

Each successive speed is half the one before. Changing by one speed thus either halves or doubles the light which falls on the film. Some cameras do not allow all the settings, other allows more, extending the range at one or both ends of the scale. The Minolta XD and XG both allow exactly these speeds, chosen manually or automatically. In practice, the automatic exposure system times speeds up to 15 sec or so, but the exposures may not be accurate. The fractions of a second are indicated by their denominators only, thus 1/250 sec is marked on the shutter speed dials as 250.

A change from one *f*-stop to another, or from one shutter speed to another, is called one *stop*. Thus, to increase an exposure of 1/125 sec at *f*8 by one stop, the camera must be set either to 1/60 sec at

*f*8 or to 1/125 sec at *f*5.6. Any particular exposure can be produced in a number of ways. For example: 1/4, *f*22; 1/8, *f*16; 1/15, *f*11; 1/30, *f*8; 1/60, *f*5.6; 1/125, *f*4; 1/250, *f*2.8; 1/500, *f*2; and 1/1000, *f*1.4 all expose the film the same amount.



Components of Exposure

shutter speed
governs subject movement

aperture
governs depth of field

film speed
governs exposure range

Exposure meters

The XD and XG cameras read exposure through the lens normally at full aperture. The silicon cell meter is coupled electronically to the exposure controls to give automatic exposure control. For all normal subjects, you can rely on the camera to give exactly the right exposure. All you need do is to focus on the subject.

Aperture priority metering

All the automatic-exposure Minolta SLR cameras offer aperture priority exposure control. With MC or MD Rokkor (or Celtic) lenses, as you alter the lens aperture, the meter selects the shutter speed to suit. If you want to shoot at a particular shutter speed, compose the picture, and then alter the aperture ring until the LED display indicates that speed.

Set the XD mode switch to 'A' (for aperture); or the XG shutter dial to 'A' (for automatic). Lightly press the XD shutter release, or touch the XG one, and an LED lights. If necessary move the lens diaphragm ring to give the exposure combination that you want. When you press the shutter release fully, the shutter will give you the speed indicated on the display. When the meter calculates a shutter speed between one of the marked figures, then two LEDs light up. The XG-1 has a simplified display. If the speed is between 1/15 and 1 sec the same single LED lights up. Note that on the XD cameras, the shutter speed set on the dial has no influence in the aperture priority mode unless you select X, O, or B. So, the viewfinder shutter speed display (not on the XD-5) does not show the setting.

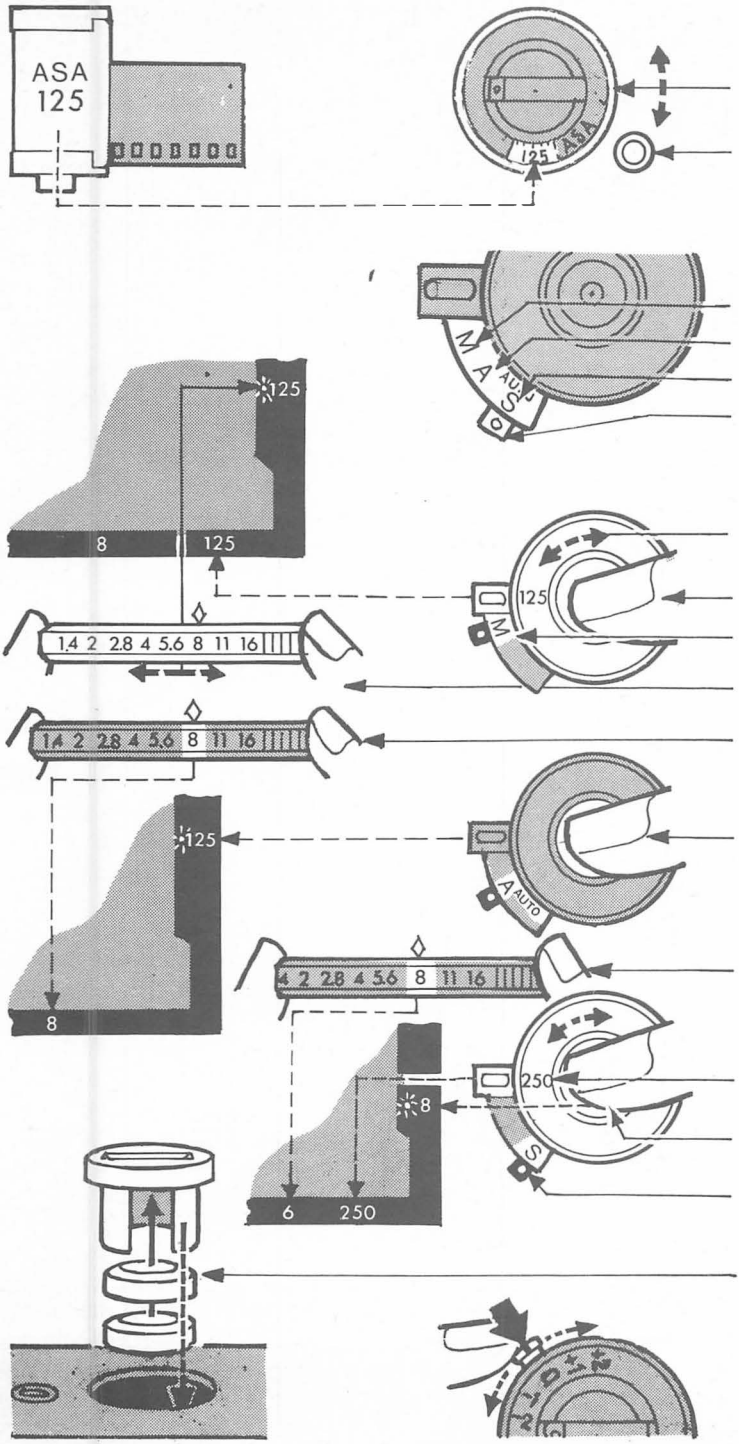
When the meter works out that you need an exposure time longer than 1 sec, the bottom (triangular) LED lights. In most cases, you can select a wider lens aperture to bring the shutter speed back into the accurately timed range. Remember, though, that you will not get sharp hand-held pictures if the shutter speed is much longer than 1/60 sec with the standard lens. For really long exposures, select B, and time the shot with a watch.

When the meter calculates that you need less than 1/1000 sec, the top triangular LED lights. On the XG, the shutter locks as well, preventing you from over-exposing the film. The XD does not stop you, but you still do not want over-exposed pictures. So, when the top triangle lights, choose a smaller aperture. If you cannot do that, reduce the light coming through your lens with a neutral density or polarizing filter; or change to a slower film (lower ASA rating).

You can expect to use the XG camera in the automatic mode most of the time; and the XD in its aperture priority mode whenever you use an MC-coupled lens or accessory, or when you want to control the depth of field precisely.

Shutter priority on the XD

When you move the XD mode switch to 'S', the shutter speed scale in the viewfinder is replaced by a lens aperture scale. The shutter speed dial setting is displayed below the viewing image, except on the XD-5. To complete the transformation, you must set the MD-



XD–7 Exposure Meter Operation

turn to set film speed

after

pushing button

Priority Selection

manual

aperture priority

shutter priority

selector lever

select shutter speed

light touch

manual

adjust aperture

select aperture

shutter speed auto (light touch)

Aperture Priority

set minimum 'green' aperture

select shutter speed

aperture auto (light touch)

shutter priority

Changing Batteries

Exposure Compensation

Press and set

Rokkor lens to its smallest aperture (highest *f*-number); which is marked green.

Now the LEDs indicate the aperture that the meter calculates is correct for the shutter speed you set. When you take a picture, the lens closes down to this aperture to give you the metered exposure. To make quite sure that the exposure is accurate, the meter checks after the lens has stopped down; it makes any fine adjustments by altering the shutter speed slightly. In normal conditions, the speeds in the 'S' mode are closer to the set value than you could expect with a manually set, mechanically timed shutter.

The 'final check' has an extra benefit. If the meter calculates an aperture outside the range of the lens you are using, either the top or the bottom triangular LED lights up. In that case, the lens closes down fully (top LED) or stays wide open (bottom LED) and the metering system adjusts the shutter speed to give you the correct exposure. Of course, you do not know the actual speed.

The shutter speed priority mode is ideal for most photography. You choose a suitable shutter speed—perhaps 1/250 sec outdoors on a bright day, or 1/60 sec indoors—and the camera sets the aperture for you. With the final check system, you can be confident of the exposure in almost any light level. If the bottom LED lights, remember that you may have a very long shutter speed.

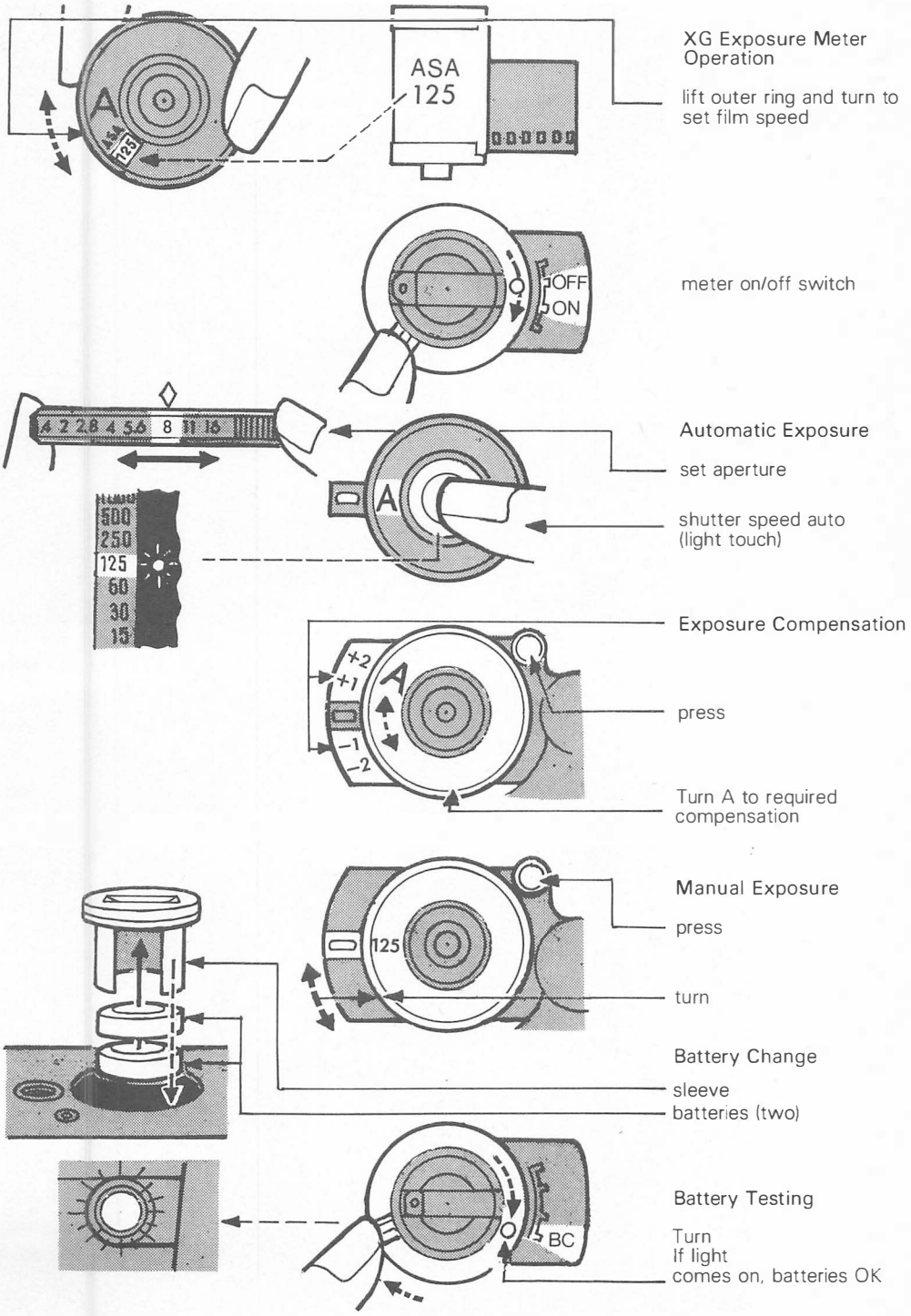
Exposure compensation

All reflected-light meters, including those built-in to Minolta cameras are adjusted to measure the light from a normal scene; and most give excellent results with straightforward automatic exposure control. Some, though, can fool the camera. For example, if you are photographing a spotlit subject or an especially dark one, you get considerably more exposure than required; conversely when the primary target occupies a relatively small area against a much lighter background or the scene is particularly light, it will be underexposed. For these situations, you can use the exposure compensation control. For spotlit subjects, or mainly dark-toned subjects, set the control to −1 or −2. For backlit, or mainly light-toned (such as a snow scene) ones, choose +1 and +2.

You need some experience before you can judge the setting, but it is easy to measure. Take a reading in the normal way from the palm of your hand, or a similarly mid-toned target. Then focus on the whole scene, and adjust the exposure compensation dial to match the exposure to your first reading. When you have finished, put the dial back to its normal place, otherwise, you will spoil future shots.

Manual exposure

Imagine you are photographing a subject against a brilliant sky. You weave and turn to take shot after shot—high up, low down, close by, further away and so on. With each position, you alter the composition, and thus the balance between the subject and the surroundings. With each change, the Minolta's auto-exposure system would change the exposure. Yet you want your subject's skin the same tone in each



XG Exposure Meter Operation

lift outer ring and turn to set film speed

meter on/off switch

Automatic Exposure

set aperture

shutter speed auto (light touch)

Exposure Compensation

press

Turn A to required compensation

Manual Exposure

press

turn

Battery Change

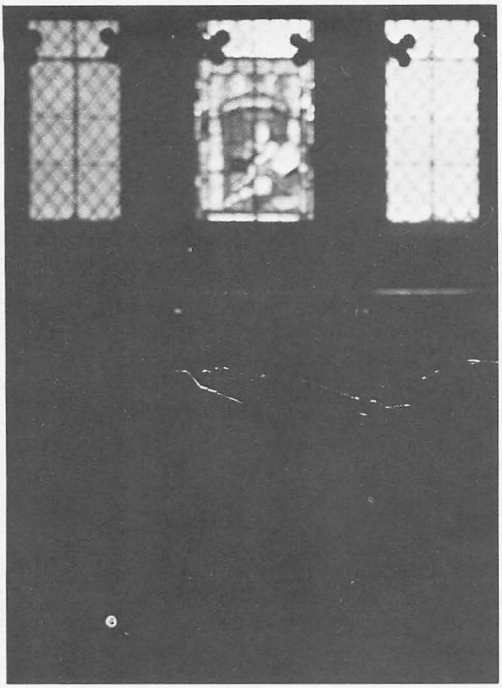
sleeve

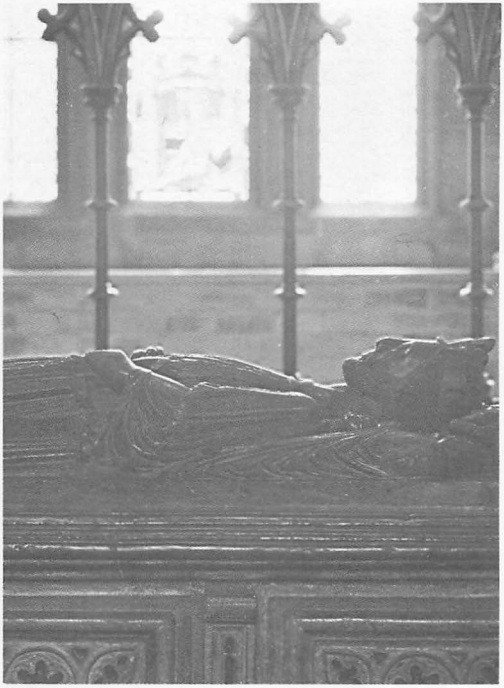
batteries (two)

Battery Testing

Turn

If light comes on, batteries OK





1/2

In high contrast situations you cannot expect detail in the whole picture.

1 Following the highlight reading 1/30 sec. exposure is needed to give detail, with an aperture of f2.

2 Following the shadow reading, an exposure of 1 sec. is necessary.
Sidney Ray

3 With a high contrast subject the meter may give the wrong reading, especially if the subject is backlit. The lefthand picture was taken as per the meter reading. The righthand picture is much better, taking the meter reading plus 1.
Sidney Ray

3

picture. The answer is to take a selective meter reading (close-up or from your hand), and set that exposure manually.

Manual exposure is ideal when you want to maintain one particular setting irrespective of the way the subject changes. It is also convenient with some non-coupled lenses and accessories, such as the 35mm Shift CA Rokkor, and the Autobellows I. The Shift lens does not give accurate automatic exposures when it is shifted far from centre, and the Autobellows (and other non-coupled accessories) *must* be stopped down before automatic exposure with the Minolta XG cameras. Often it is easier to meter and set the exposure manually, thus retaining full automatic *diaphragm* operation.

On all the XD and XG models you can select the shutter speed and lens aperture manually irrespective of the meter reading. The shutter and electromagnetic shutter release are still powered from the battery. To set the camera for manual exposure, turn the mode switch of an XD to 'M'; or press the automatic release button and turn the XG dial away from 'A'.

In the manual mode, the XD-7 (XD-11) displays the shutter speed and the lens aperture below the viewfinder. At the same time, all XD meters continue to operate in the aperture priority mode, displaying the shutter speed they measure for the conditions.

Stop-down metering

Some lenses and accessories have no meter coupling. In that case, the Minoltas measure at the shooting aperture. For automatic exposure, this implies the aperture priority mode, because to meter at a particular aperture, you must actually close the lens down to it, then only the shutter speed can vary.

For automatic exposure, simply close the lens down; touch the shutter release button to check the speed if necessary; and take the picture.

On the XD cameras and the XG-9, you can stop down non-coupled automatic diaphragm lenses (such as the 35mm *f*2.8 Shift CA Rokkor) by pressing the stop-down (preview) button if you want to check the shutter speed. This is not necessary, though, for metering accuracy with the XD models. The silicon cell meter measures finally after the lens has stopped down, and sets the correct shutter speed irrespective of whether you have selected 'A' or 'S'.

On the XG models, though, you must stop down the lens before you press the shutter release. As the XG-1 and XG-2 have no stop-down button, you cannot use non-coupled automatic diaphragm lenses and accessories with automatic exposure unless they have their own stop-down button.

That's Fine, But . . .

With a little care, you can be sure that your exposures are accurate, the camera can do that for you. However, an important area of photographic control remains. As you alter the exposure, you make the picture lighter or darker, and you alter the amount of detail in the highlights and shadows. The more exposure you give the lighter the picture becomes (and the darker the negative). At the same time, you lose details in the highlights and gain them in the shadows.

With transparency films, you can adjust the overall tone of the picture by changing the exposure. However, in a high-contrast sun-lit scene, even with ideal exposure, the film has trouble recording both highlight and shadow detail together. So you are bound to lose something. On dull days, however, you can be up to two stops away from the meter setting without losing details. So, you can overexpose to produce glowing etherial lightness, or underexpose for sombre gloom.

Even in harsh lighting, you can often compose the picture to make the highlights or shadows irrelevant. Then you can let them go either white or black without harming the picture. In that case, you can still overexpose for pastel results, or underexpose to produce more saturated colours. Then, though, one stop is probably enough.

As exposure has such a marked effect on a transparency film, whenever there is the slight doubt, bracket your exposures. Take one at the metered setting, and then a series at one-stop intervals (or even half-stop intervals) either side. You can do that quite simply by altering the exposure compensation dial between each slot.

Negatives

With negative materials, the camera exposure has less effect. The final density is decided during printing. That is why you do not need to be quite so careful with these films. However, you cannot produce shadow detail in a print if the information is missing from the negative; or add highlight detail if the negative is solid black.

Negatives, though, usually hold far more highlight detail than you can get on a normal print. So you seldom need to underexpose to assist at that end of the scale. Shadows, though, are another thing. When shaded areas make an important contribution to your composition, then you must be generous with your exposure. Do not, though, overexpose all your shots 'just in case'. The more you expose, the less detail your negative will record. Not only does it become rather more grainy, but light reflected within the image degrades it quite noticeably.

Which combination?

For any exposure level, you can choose from a whole range of shutter speeds and lens apertures. These main creative controls are discussed in detail in the next few pages.

1 Short shutter speed to 'freeze' people necessitates a wide aperture, so minimizing depth of field.
Clyde Reynolds

2 Long shutter speed blurs people but allows you to use a tiny aperture, so giving you considerable depth of field.
Clyde Reynolds

Movement

Whenever your subject moves, you risk blurred pictures; and the larger you picture it, the greater the effective movement. So, if you go close to the subject, or magnify it with a long-focal-length lens, the movement is magnified, too. Also, when something moves across the field of view, it appears to move much faster than if it moves toward or away from you.

Stationary points

Many actions include stationary points. Think of a child on a swing; at the top of each swing, he is totally stationary for an instant. If you take a picture then it shows no movement blur.

Shutter speeds

Obviously the longer a moving image is focused on the film, the further it will move during that time, so the greater will be the blur on the final picture. The effect of choosing a short, fast, shutter speed (perhaps 1/500 or 1/1000 sec) can be quite dramatic. You can picture a fountain as a mass of glittering drops each individually defined; or show a pole vaulter suspended in mid air.

Normal everyday subjects do not pose so much of a problem. Children playing, traffic passing your door, even animals running around usually come out quite sharp enough at 1/125 or 1/250 sec. Of course, if your subject is totally stationary, then you can use any of the whole range of shutter speeds down to 1 sec or longer, when the conditions demand. Such times are often needed for interior shots, where there is little light, and you have to select a small aperture.

Camera shake

For sharp pictures you must keep the camera absolutely still. If it moves, even minutely, while the shutter is open, the picture will not have absolute sharpness.

With a standard lens most photographers take sharp pictures at 1/60 sec and with extra care can usually take acceptable pictures at around 1/30 sec. At slower speeds than this shake is virtually inevitable with a hand-held camera. Unfortunately, when you double the focal length—fitting, for example, 100mm lens instead of a 50mm one—you double the effect any shake has on the picture. So, if you are happy with your pictures at 1/60 sec with a standard lens, you have to go up to 1/125 sec when you use 100mm lens, or 1/250 sec with a 200mm lens.

Blurring for effect

With a short shutter speed you can produce pin-sharp pictures. You can portray a horse galloping past with every hair absolutely sharp. That might be an excellent portrait of the horse, but it is unlikely that it would convey a particularly strong impression of the horse's movements. Of course, the shape of your subject and the composition can provide strong keys to the movement but that is often not enough.

The strongest way to convey a sense of action is to blur part or all of the picture to a carefully controlled degree. With each doubling of the exposure time you double the amount of blur, so probably you want to choose 1/60 sec or perhaps 1/125 sec to provide the right

The movement of the running child was captured by panning at 1/60 sec. and using a 75–200 zoom lens.
Clyde Reynolds

amount of movement in your picture. Often, it is not possible at the time to decide exactly the right shutter speed, so the best thing to do is to take a number of shots at a range of shutter speeds.

There are occasions when even a little camera movement does no harm to the picture at all. Suppose you want a picture of the jubilant crowds streaming out after the home side has just beaten their greatest rivals. The individuals are not important; the team colours tie the whole crowd together as a unit. With 1/8 or 1/15 sec and the camera on a tripod, you can convert the crowd into a wave of movement. The effect may be magnificent but it is very much from the point of view of an onlooker. Suppose instead you hold the camera in your hands. The movement of the people will look less smooth; on the walls the posters will not be sharp, but the picture is likely to convey a much more personal and part-of-the-crowd atmosphere.

Panning.

To produce exciting photographs of strong movement, such as motor racing, you follow the moving subjects with the camera (pan) just as you do with your eye. Turn to the direction from which the car will appear; when it comes into view sight it in the camera viewfinder, and swing gently round with its movement so that the image remains quite stationary in your field of view. As the car comes to the point that you previously selected for your picture, gently release the shutter; follow through the movement just as you would a golf shot.

Perhaps surprisingly, you do not need extremely long shutter

speeds to take effective panned pictures. Once again it is a subject for experiment, but a good starting point is to use a speed of four times the length of that which you would expect to produce a sharp picture. With a smooth pan, you can afford to use a speed much longer than that which would severely risk camera shake with a static camera. If you are working, for example, with a 200mm lens 1/60 sec is quite a suitable speed for panning.

Time and distance

Moving subjects introduce two other complications to photography: timing the shutter release to produce the most impactive shot and achieving the correct focus. There is always some reaction-time delay, which you have to learn to allow for. With comparatively short exposure times you can get a very good impression of the instant that the picture was taken from the blink of the viewfinder image as the mirror comes up and drops again.

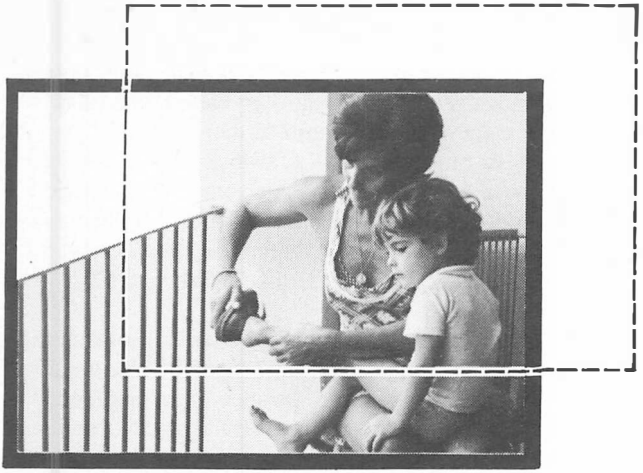
With fixed or repetitive actions such as motor racing or high-jumping, you can focus well before the time that you have to take the picture and be quite sure that the subject will be sharp. This is obviously essential when you are panning, but perhaps more critical when you are taking pictures of the subject approaching or receding. With a pre-focused camera, the subject becomes steadily sharper as it approaches the point at which you want to take the picture. This is an excellent cue for timing the picture. You press the shutter release as the subject becomes *nearly* sharp.

Zone focusing

With more randomly moving activities, you have to attempt to follow the action with your focusing, or to use the zone focusing method (see page 62). Sometimes, with children on the beach, for example, you may be able to arrange that the subject remains within the zone of sharp focus that you have defined. On other occasions, you may know the range of subject movement and thus have to choose your shooting position and lens so that the zone of sharp focus covers that field of activity.

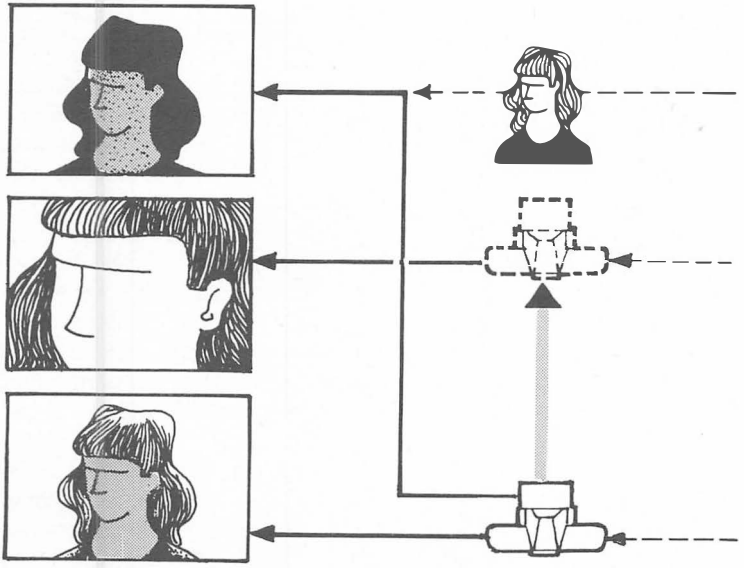
Automatic exposure

Obviously the shutter speed is the most important control in the photography of moving subjects, so when you use automatic exposure you must be quite sure that it is giving you the shutter speed that you want. With the XD cameras this is quite simple, select shutter speed priority. As long as the automatically determined exposure remains within the aperture range of the lens, the camera gives the dialled shutter speed. With any XG or an XD and a lens or accessory which requires the aperture priority mode, adjust the lens aperture until the display in the viewfinder indicates the shutter speed you want. As light levels vary, though, it is that shutter speed which changes automatically so you cannot be quite sure of exactly the shutter speed that the camera will set. It is unusual, though, for the speed to change very markedly from shot to shot.



Measure from the right place

Move the camera to avoid large brightly lit areas when metering

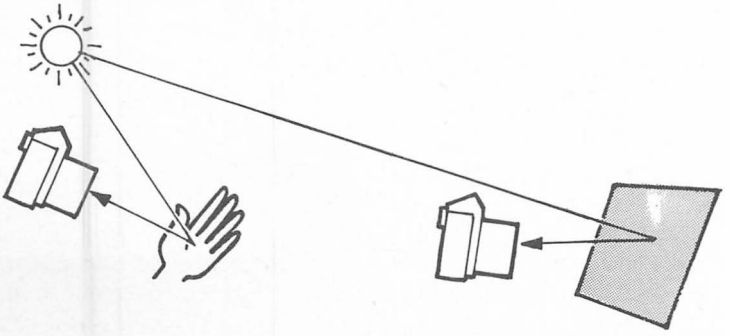


Back lighting

Back-lit subject may be underexposed

Meter from important subject area

Move back with that exposure for correct picture



Substitute readings

Take a reading from your hand or a medium grey card

Depth of Field

Although used primarily to control the exposure (with the shutter speed) the lens aperture has an important effect on the picture. It determines just how much of the subject is sharp. The part exactly at the focus distance is absolutely sharp, provided there is no camera or subject movement. Things closer or further away are theoretically not quite sharp. In practice, there is always a zone of sharp focus from somewhere in front of the subject to somewhere behind it—this is called the depth of field. The smaller the aperture you choose, that is the larger the *f*-number, the greater the depth of field at any particular focused distance. The further away you focus, too, the greater the depth of field.

This holds good for any lens, but not between lenses of different focal length. In fact, the longer the focal length the less depth of field that you have at any given focused distance and *f*-number.

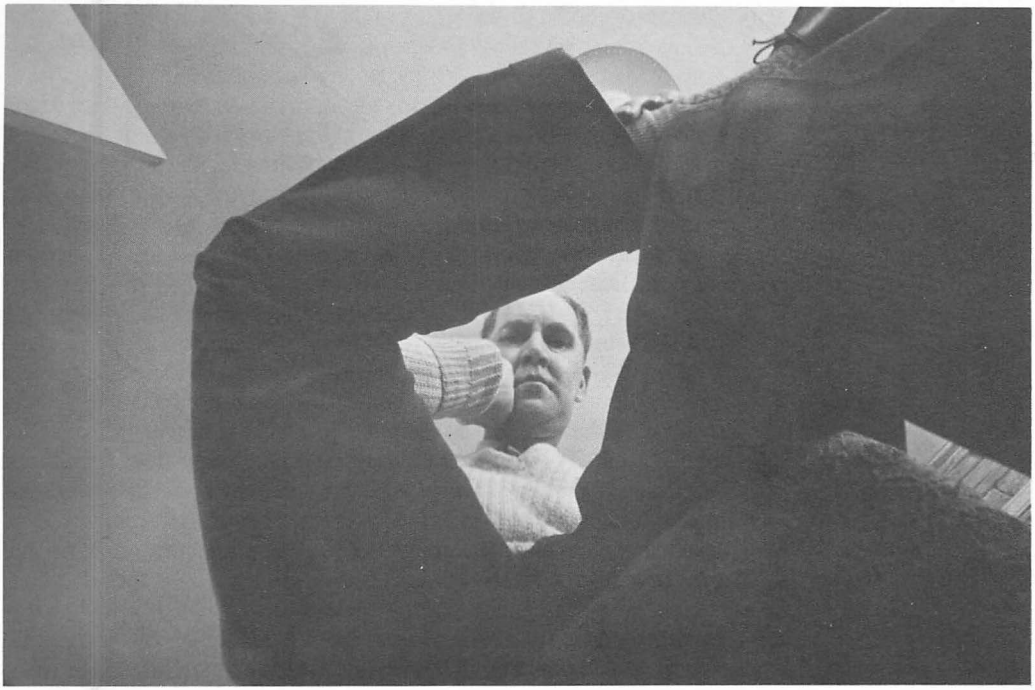
On the XD and XG-9 you can see how far the depth of field extends by stopping-down the lens—press in the button on the left-hand side of the lens mount. Of course, the viewing image darkens because you are letting less light through, but also the distant and near parts of the subject sharpen considerably.

Depth-of-field scale

You can read off the depth of field from the scale of most Minolta lenses or from depth-of-field tables. The depth-of-field scale consists of a series of pairs of lines representing different lens apertures. It lies against the focus scale and wherever the lens is focused, the figures against the marks for any particular aperture show the near and far points of sharp focus. This scale and the tables Minolta supply with each lens work on the basis that you are going to make normal size enlargements or look at your transparencies on a normal size screen. If you want to make much bigger pictures or enlarge *from* small portions of a negative, then you have to be more critical about defining your depth of field. The easiest way is just to take the limits that are given for the next larger lens aperture. For example, if you are shooting at *f*8, take the figures for *f*5.6.

Although the depth-of-field scales or tables show you how much of the picture you can be sure will be sharp, they do not really show you how much you can be sure will be unsharp. Subjects just beyond the limits will be nearly sharp, so if you want to use differential focusing—that is to have part of the subject sharp and the rest totally unsharp—you must use a very much larger lens aperture than the one which will render the whole subject sharp. Suppose for example, you are using an 85mm lens to picture a girl standing 2m (6ft) away against a distracting background. If you want the background to be really unsharp while the girl's face is sharp, you need to choose an aperture of *f*4 or larger. Even at *f*22 nothing beyond about 2m (7ft) will be really sharp.

So, when you are deciding on the aperture, you have to think about how much of the scene you want sharp, and just how unsharp you want the rest. To help you learn what to expect, try to remember



the apertures you used when you view the results; and practice using the preview button (on XD or XG-9).

Zone focusing

At the opposite end of the scale you often want to have a large amount of the picture sharp. You get the greatest usable depth of field by focusing neither on the foreground nor on the background but somewhere in between. When you want distant subjects sharp you get the greatest depth of field when you set the depth-of-field calibration of the aperture you are using against the infinity mark on the focus scale. The lens is then focused on what is called the hyper focal distance for that aperture, then the nearest point of sharp focus is exactly half that distance. In the same way when you know that the picture will be between two limits, you can then focus the camera so that the depth of field lies between those two limits. For example, with the standard lens focused on 5m (15ft) and set to *f* 11, everything from about 3m–9m (10–30ft) is sharp.

A 28mm lens offers considerable depth of field to let you compose from unusual angles.
Percy Poynter

Lighting

The word photography means 'writing with light' and it is light that makes your pictures. With modern films and cameras, there is seldom any need to worry about getting enough light on the subject, but the character of that light is as important as ever. The direction from which it falls on the subject and the harshness of the light itself, are all-important in determining the way you picture the subject. You can choose lighting to hide or reveal the features of the subject—to render it sharply in relief or let it recede almost into a flat plain.

Artificial lights, whether spots or floods, can be used to simulate daylight from the sun or overcast skies, and if they are correctly placed and of suitable size and shape, the effect they create may be difficult to tell apart from the real thing. You can arrange the artificial lighting to be completely even and shadowless. With a small subject you can do that by building a tissue paper tent around it and lighting that tent from outside. The even shadowless lighting, though, is very similar to that produced out of doors on a cloudy day. Lighting is discussed mainly in terms of artificial light; however, the principles apply to daylight. Just as you may use a white sheet to reflect some light back on to a spotlit subject, so you can place a group of people beside a whitewashed wall to reflect some light back from the sun.

Key light

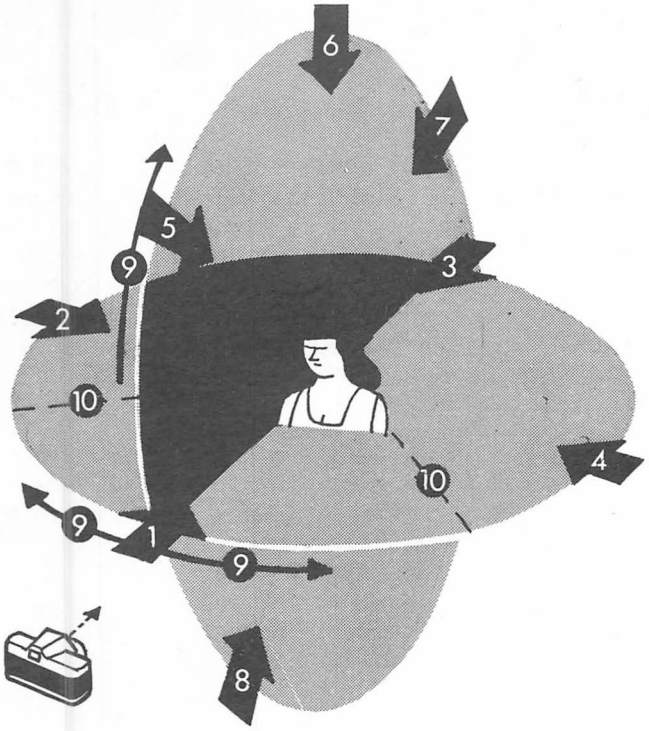
Natural light is from a single sun, so we recognize the shape and texture of subjects from the pattern of shadows that they make when the sun falls on them from above. To take natural-looking photographs you need to set up the main artificial light so that its rays fall in the same sort of direction. For most subjects, the best place for the 'key' light is to one side of the subject making an angle of between about 35° and 45° to the camera–subject axis, and slightly above the subject. Such a single light source is quite sufficient to indicate the shape of a three-dimensional subject, such as a sphere, cube, box or a face.

Fill light

As you move the light closer to the camera–subject axis, so the lighting appears flatter and the subject is not so obviously three dimensional. The ultimate in direct lighting is a ring flash. This is an electronic flash, the flash tube being fitted round the lens, so that the light comes as closely from the lens' axis as possible. This is a convenient source for certain types of close-up work, mainly scientific and medical where any extraneous shadows could obscure detail. Very seldom do you want such flat lighting for a normal photograph.

Moving the light round until it comes entirely from the side of the subject skimming the surface, gives much greater prominence to any texture. This sort of lighting is ideal for making patterns out of brick walls or for showing up the inscriptions on gravestones and monuments. It does not, though, give a particularly strong feeling of the form of three-dimensional subject.

Once you move the key light round behind the subject, it lights very little of the part that will come out in the picture, so composition now depends on the bright highlight points from where the light is



Lighting Angles

1 direct frontal—flat

2 edge light

3 back light—silhouette

4 edge light

5 front or top light

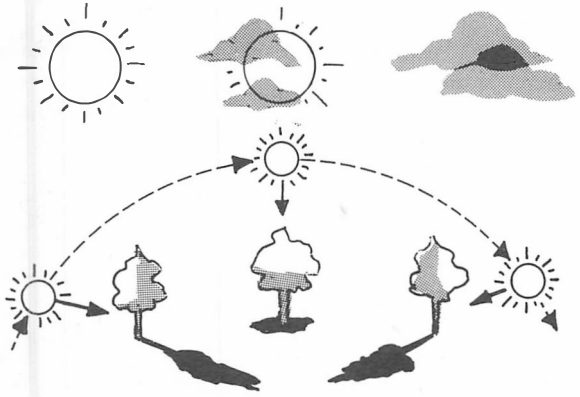
6 top light

7 rim light

8 under light

9 increased modelling

10 45°—standard light position



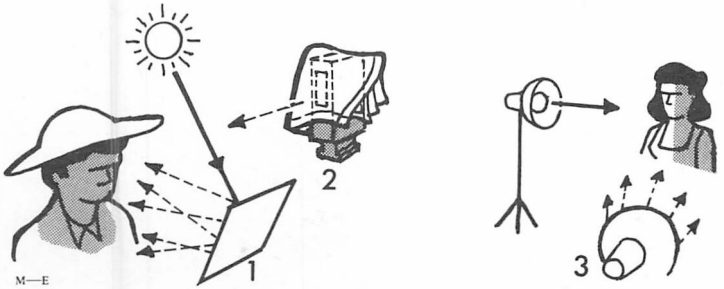
Quality of Light

strong sun—harsh shadows
overcast—soft shadow, more detail
dull—strong contrasts in tone

Time of Day

Morning and evening—long shadows, warm colour

midday—short shadows, flat lighting



To Relieve Shadows

1 white reflector

2 flash with handkerchief

3 artificial light—soft second light

either reflected from the edges of the subject or from the shiny parts of the surrounding. Backlighting like this is particularly effective with hairy subjects, such as animals or plants — each hair takes on a glow of its own, and the whole subject appears to be outlined in a halo of light.

The character of key light very largely determines the character of the picture. If you use a hard directional light such as a spotlight or the direct rays of the sun, you produce a picture in which the shadows have hard edges and each tiny flaw on the subject shows up sharply. On the other hand, if you use a large diffuse source, such as that achieved by bouncing light from a white umbrella or any other large reflector, then the picture takes on a much softer aspect. The border between the highlight and shadow areas is much less definite and such lighting is much kinder to a subject's face — the softer it is the more blemishes it hides.

Changing intensity

Whatever the light source, the shadows are generally very dark compared with the fully lighted parts. On occasions you may want totally black shadow areas, but usually you want to see some detail in them, so they must be lightened. The customary way to do this is to place what is called a fill-in light from close to the camera position. Obviously this light must not be so bright as to rival the key in intensity, otherwise the key would lose its importance in determining the modelling on the subject. Naturally, you can vary the brightness depending on the effect you want to achieve. However, an intensity of light on the subject of about quarter of that from the key light is usually about right. With this, the film is generally able to produce adequate detail in the shadows and the overall contrast of the picture is pleasant. Because the tones convey the entire picture in black and white, it is customary when using such film to use a fill-in light of lower intensity than you would use with colour.

Reflectors

Quite often you will want to use two units of equal intensity as your key and fill-in light, in which case it is quite simple to alter their relative effect on the subject by altering their respective distance. If you want one to produce one quarter of the effect on the subject, it should be twice as far away as the other light.

Effect light

Sometimes you do not need a second light source at all. Instead you can use a white or silvered reflector to throw light into the shadows of the subject. Although theoretically you should have that reflector close to the camera position, in practice that is not often possible. Obviously the reflector must be in a position so the key light falls on it. This normally implies that it has to be on the opposite side of the subject from the key. In fact, one of the simplest ways to provide a fill-in reflector is to seat the subject beside a white wall. Whether you use a reflector or a light, it is very important though that your fill-in light does not throw its own shadows. Any picture with two sets of shadows looks most unnatural.

Manipulating the key light and the fill-in can convey an effective impression of form and shape of virtually any subject. Many subjects need additional lighting to emphasize a particular feature. In formal portraits, for example, it is common practice to add a light to bring sparkle to the hair. This is generally a carefully directed spotlight, shielded so that the light does not spread over into other parts of the picture. It is placed high up and may shine from the front, back or side. Such an 'effect' light might similarly be used to add a highlight to pottery, polished wood, metal, sculpture or any similar photograph. Of course, when you use strong side- or backlighting as your main source of illumination, you are in essence using your effect light as a key. Using this light alone allows you a whole range of unusual lighting effects. The results can vary from amusing puzzle pictures to moody portraits, such as the rather hackneyed low level effect of the horror shot so beloved of movie producers.

Background light

For most subjects the background is quite separate whether it be a wall of a room or the distant hills. With distant hills, of course, there is not much you can do about the lighting except to wait for the sun to come or go. You can, though, do a lot about a nearby background.

The first use of background lighting is to make sure that the background tone differs from that of the subject. You can do this either by keeping the light to an absolute minimum to give you a dark ground, or using a strong light to make the background much lighter than the subject. At its simplest, background illumination needs to be even so that you reveal the subject's surroundings or accurately reproduce the colour you have chosen for the background. On the other hand, background lighting can be extremely elaborate using spotlights of different colours, masks or slide projectors to provide exactly the effects you want behind the subject.

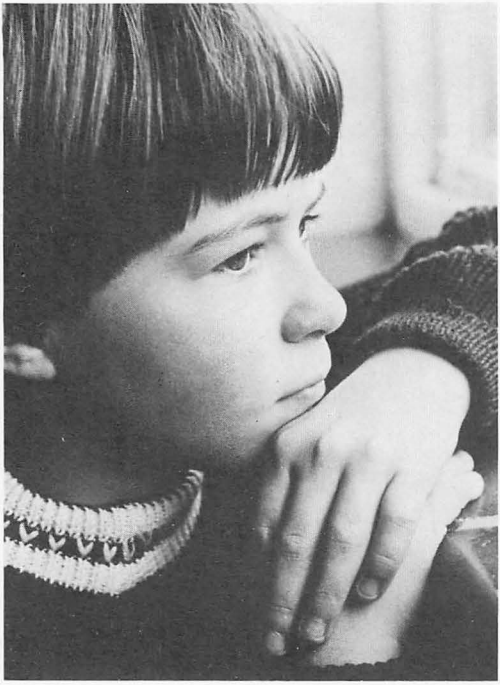
The simple approach

Undoubtedly the best way to understand lighting is to use your own lights, in a selection of reflectors. Choose continuous lighting; you cannot *see* the effect of flash until you have the film processed. If you feel that you have no permanent use for them, try to borrow or hire a few tungsten lights so that you can experiment with them. The most economical bulbs for photography are photolamps 3400K (Photofloods), but tungsten-halogen types are now being widely used.

You need one fairly narrow angle lampholder or, preferably, a spot unit with a lens to give a directional beam, and wide flat reflectors to give soft even illumination. The most convenient diffuse source is a white (or silvered) umbrella — more commonly used with flash, but also fine for continuous lighting.

Try both hard and diffuse key lights, experiment with angles, and with the degree of fill light. Once you have found out what can be done, you can use flash units instead of Photofloods, if you wish. You can also apply the same principles to outdoor pictures, but then you have to wait for the right time of day and weather conditions.

1/2



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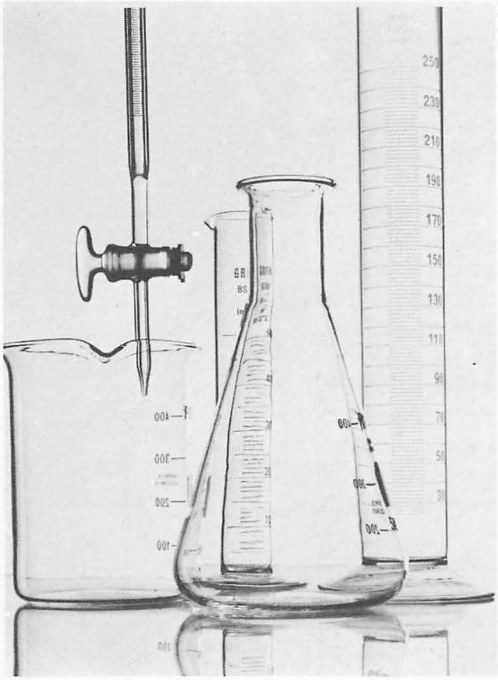
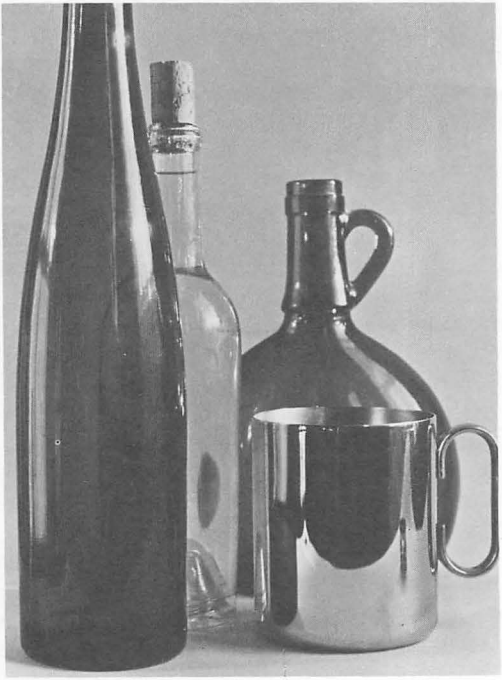
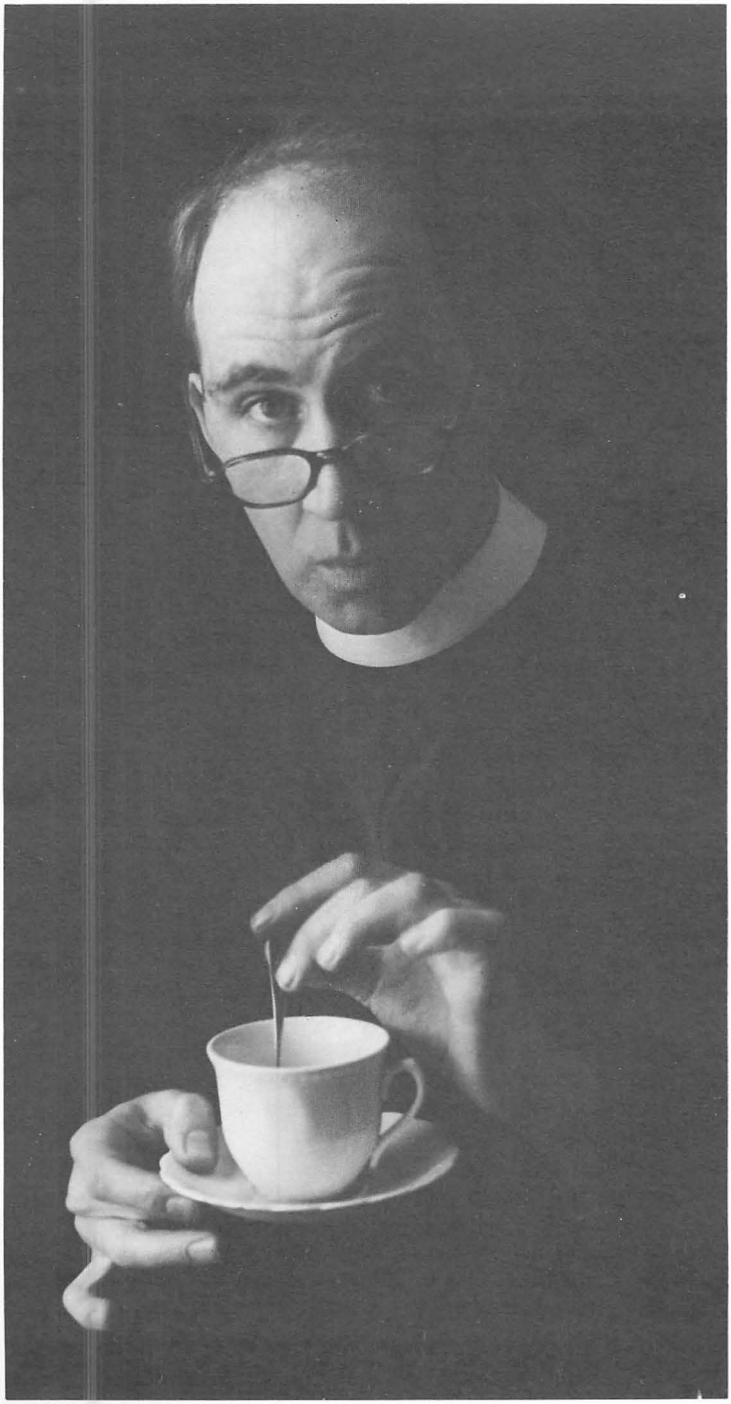






1/2 These two pictures of children show the effect of portraits taken in very different lighting conditions. 1 was taken looking into light coming from a window, 2 was taken outside on an overcast day.
Percy Poynter

3 Shadowless backlighting has been used here for glassware standing on glass so that no reflections are produced.
David Lynch

4 This shows the use of sidelighting to emphasise shapes and tones.
Percy Poynter

A carefully posed low-key shot using window-lighting. The direction and quality of the light are determined by moving the subject.
Clyde Reynolds

Flash is lighting

Flash provides a very convenient portable light source. The principles of lighting with it, though, are no different from the principles of lighting in any other form. A Minolta camera's permanent accessory shoe is fitted on the pentaprism housing and has a centre flash contact. A cableless flashgun, such as the Electroflash 200X, fits directly into the shoe and makes contact with the flash switch linked to the shutter blind movement. With the newer Minolta flashguns, you have the extra convenience that they automatically set the camera to the right shutter speed and have a flash-ready warning in the viewfinder.

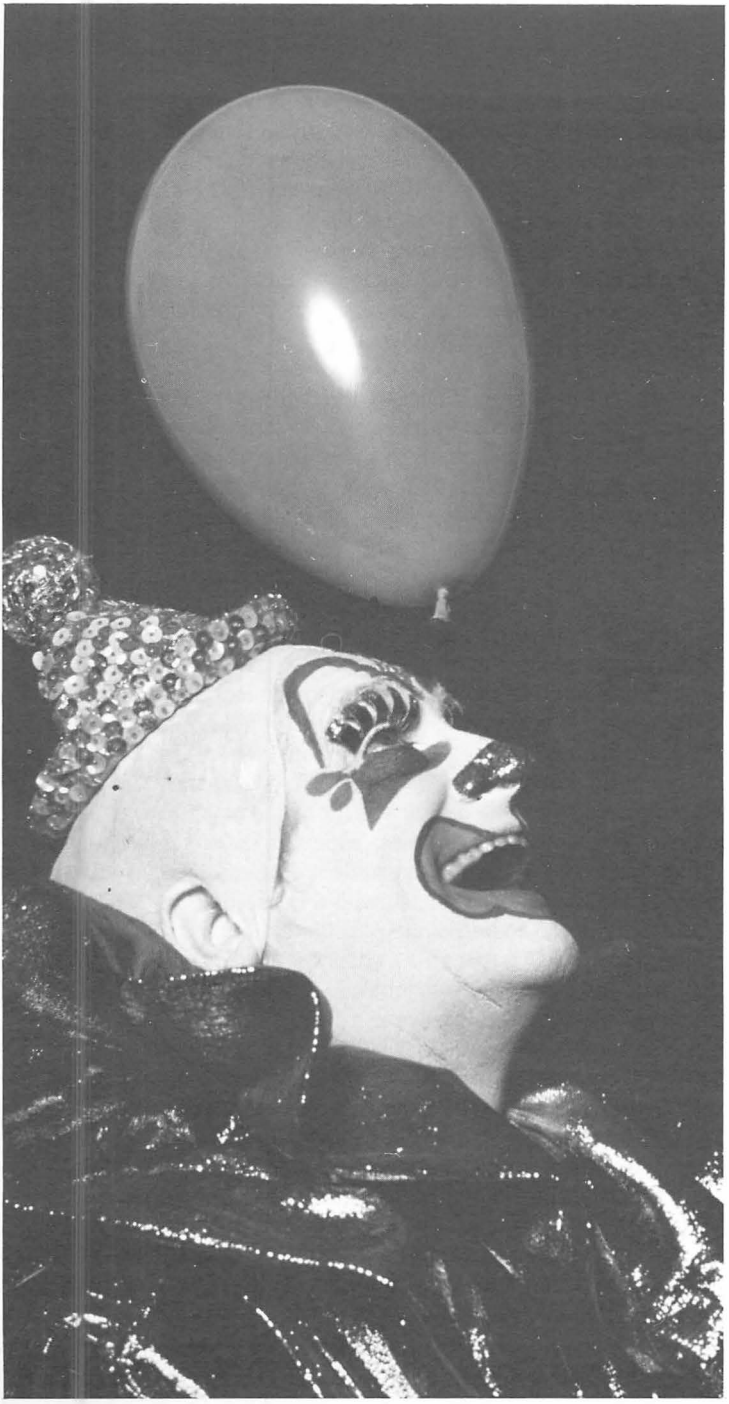
The flashgun on the camera does not, however, provide a very satisfactory lighting arrangement. It provides little or no modelling of features and it throws harsh shadows on nearby backgrounds, and possibly under the nose, chin, hairline and so on according to the camera position. It also has the irritating effect of changing lighting (a little at least) when you change from vertical to horizontal format pictures. Whenever possible it is best to remove the flash unit from the camera and put it to one side on an extension lead. You can treat it in exactly the same way as you would any other key light.

Flash exposures

With an automatic flashgun mounted on the camera, all you have to do is ensure that the lens is set to the recommended aperture to get correctly exposed pictures within the flash's range. When you take the flash off the camera, or use it on manual exposure for any other reason, you have to work out the lens aperture from the flash guide number. The guide number is simply the distance from the flash to the subject multiplied by the *f*-stop you require for correct exposure. Thus, for example, if you have a guide number of 20m, then you will get correct exposure at *f*2 with the flash 10m away, *f*4 with it 5m away, *f*8 with it 2½m away, and so on. Naturally, for any particular flash unit the guide number varies with the speed of film you are using. In practice, most flashes have a calculator on the side or the back from which you can read off the lens aperture against each flash-to-subject distance when you have set the correct film speed. When you use more than one flash at the same time, it is the key light that must determine the lens aperture. Use it on manual exposure and calculate the lens aperture by dividing the flash-to-subject distance into the guide number for the film you are using.

Using extra flashes

Like any other form of lighting a single flash unit casts very heavy shadows and gives you a very high contrast picture. You can relieve the shadows so formed with a reflector or with a second flashgun. The most convenient place for fill-in flash is on the camera accessory shoe. Once again, you have to make sure that its effect on the subject is considerably less than that of the key light. This is one place where computer flash is particularly useful. You adjust the exposure by setting aperture to suit the power and distance of the key flash. If you set the computer flashgun mounted on the camera to suit a lens



Flash used indoors provides the lighting for the subject, but leaves a black background in large areas and freezes movement.
Percy Poynter

aperture *two stops* larger, then it will cut off the light when it has filled in the shadows to just one quarter of the brightness produced by the main flash.

As with any other form of lighting, you may want to use additional flashguns for effect—to light the background and so on. Most small flashguns give roughly the same sort of lighting, with greatly varying power, of course. There is little you can do to make it harsher. However, it is very easy to diffuse it.

Perhaps the simplest way is to put a clean white handkerchief over the flash head. With a 'computer' flash, as long as you make quite sure that its sensor is not covered by the handkerchief, you can still use automatic flash exposure.

Bounced flash

The alternative way of diffusing the light is to bounce it from a suitable white reflector. Professional photographers use white umbrellas for this, you too can do this, but there are several alternatives; perhaps most convenient is a sheet of white card held either by a willing assistant or on a suitable support. A ready-made alternative in many houses is a white ceiling. To use a reflector simply point one or more of your flashguns toward it instead of toward the subject. Remember, though, that computer flashguns with a fixed sensor must be used on their manual exposure setting if you bounce the flash.

The guide number from which you calculate the exposure, or the balance for fill-in, has to be modified for bounced flash.

The reflector is bound to absorb some of the light and spread the rest out over a wider area than it normally covers. As a rough guide divide the guide number by two when you bounce the flash. Remember, too, that the distance is from the flash to the reflecting surface and then to the subject, which of course is further than a direct line from the flash to the subject. For example, in an average sized room, using a single flash with a guide number of about 100ft at one side of the room pointing up the ceiling, you probably need a lens aperture of between *f*4 and *f*5.6 for fully exposed pictures; thus such a light provides suitable fill-in when the main or key flash demands an aperture of between *f*8 and *f*11.

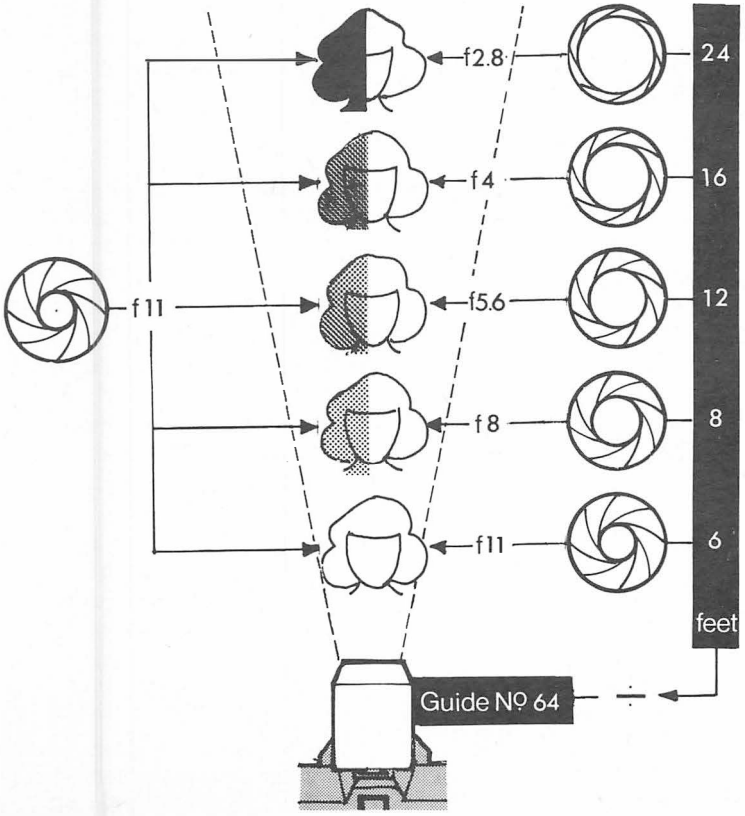
Connections

The flash contacts on the Minolta are designed to fire a single flashgun. If you use two similar flashguns, you can connect them both to the contacts either using a 'Y' connector in the lead, or by putting one flash on the accessory shoe and connecting the other through a lead to the flash terminal on the lens mount. However, if you use more than two flashes or if your two flashes are different models, it is unwise to connect more than one to the camera. The two units may interfere with one another—or worse still they may damage your camera's flash contacts.

Slaves

A far better solution is to use a slave unit for every flashgun, other than the one mounted on or near your camera. Slave units are tiny

This picture illustrates the way in which the light from flash falls off with distance.
Alison Trapmore



Flash Exposure

Intensity of the light falls off the further away the subject

To obtain correct exposure the aperture has to be adjusted. Each flash unit and bulb has a guide number. Divide this by distance of subject from camera to find correct aperture

electronic light sensors which close a switch to fire a flashgun connected to them when they sense another flash firing. They are a simple inexpensive means of doing away with the mass of cables, which tend to generate in a multiple flash set up, and of protecting your camera.

Flash equipment

Until recently flashbulbs have been the sensible choice for most amateur flash use. However, over the last few years developments in electronics have led to the introduction of a whole range of comparatively powerful and small electronic flash units. So today flash is synonymous with 'electronic flash'. Electronic flash is basically a spark discharged between two elements sealed in a glass tube filled with a suitable gas, usually xenon (hence 'X'-setting).

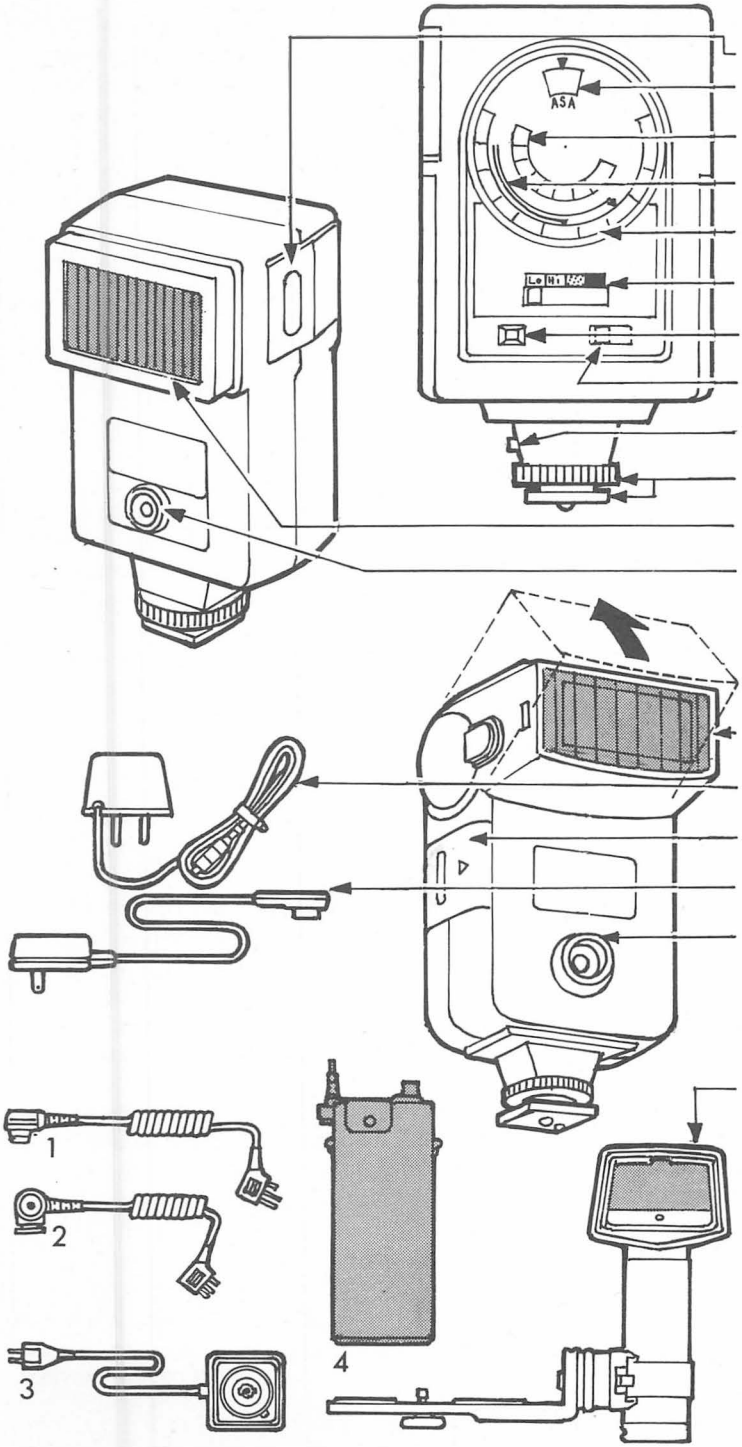
Until the early 1970s electronic flashes provided a constant light output. Some of the larger units were switchable to half or quarter power for conditions when they were considered too bright. However, you still calculated the exposure from a guide number as you would with a flash bulb. This system of flash exposure calculation calls for a certain ability with figures that many people find irksome. The calculator discs incorporated on most small guns made the necessary calculations only a little more convenient, so now practically all flashguns incorporate a sensor which switches off the light automatically as soon as the subject is fully illuminated. Typical of these is the Minolta Auto Electroflash 200X.

Auto Electroflash 200X

The Auto Electroflash 200X is one of the range of computer electronic flashes designed especially to go with the XG and XD cameras. It has two automatic exposure ranges and two manual ranges. For automatic operation, 100 ASA film, for example, you can choose to set either *f*2.8 or *f*5.6. On the red range, that is the one which needs the larger lens aperture, the flash will work from 1m to 7m (2.8ft to 23ft). On the yellow range, with the smaller aperture, the flash works from 0.7m to 3.5m (2ft to 12ft). The sensor with its allied circuitry measures the light reflected from the subject and switches off the tube when the correct amount of light has been reflected. So with any normal subject, within the flashgun's range you get perfectly exposed pictures every time.

Obviously this is an immensely convenient source of light. It is particularly useful for taking quick shots of subjects that are moving around, children playing or people at a party perhaps. However, for more organized shots it has the major disadvantage that it works only with the flashgun on the camera, which as already discussed, is not a good place for the main light. It is, however, an excellent place for the fill-in light.

The Auto Electroflash 200X and a number of others, including the Auto Electroflash 128 and Auto Electroflash 132, have a second contact on the foot. This connects with a second contact on the XD-7 or XG-2 accessory shoe. When the flash is fully charged up and ready



Auto 200X

battery compartment

film speed indicator

lo manual aperture scale

aperture/range indicator

auto/hi manual aperture scale

mode selector

monitor lamp

power switch

test button

bracket clamp and hot shoe socket

flash tube and reflector

sensor window

Auto 128 and 132X

angled flash head

niCad battery charger

battery compartment

AC adaptor 2

sensor window

Auto 450

1 sync cord

2 separate sensor

3 niCad battery charger

4 10v battery pack

to fire the overexposure warning signal in the camera's viewfinder begins to flash. At the same time, the camera selects a shutter speed suitable for electronic flash, irrespective of the automatically determined shutter speed. When you are using the flashgun as the sole light source, the flash-ready light is particularly useful. You know the instant that you are ready to fire. Of course, if you are using flash on your camera as the fill-in light in a multiple flash set up, the series thyristor electronics are likely to result in its being charged far quicker than the key flash which is on its manual setting. So you must wait until the key is ready before taking another shot.

Flash action

One of the major advantages of electronic flash is its short duration. Few units give longer than 1/500 sec, and when you use the automatic flash system close to, you can expect exposures as short as 1/50,000 sec in some cases.

So, even though your shutter is set to 1/60 or 1/100 sec, you can 'freeze' even fast-moving action. Electronic flash is ideal for nearby indoor games, such as table tennis. If you use it, though, be quite sure that you do not upset the players. Because you can use a relatively small aperture with no fear of movement blur, electronic flash is ideal for picturing childen indoors.

When you go extra close with a 'computer' flash, the duration becomes extra short. You can take beautiful close-ups, droplets suspended in mid-air, darts piercing balloons, and so on. The only difficulty is pressing the shutter release exactly at the right moment.

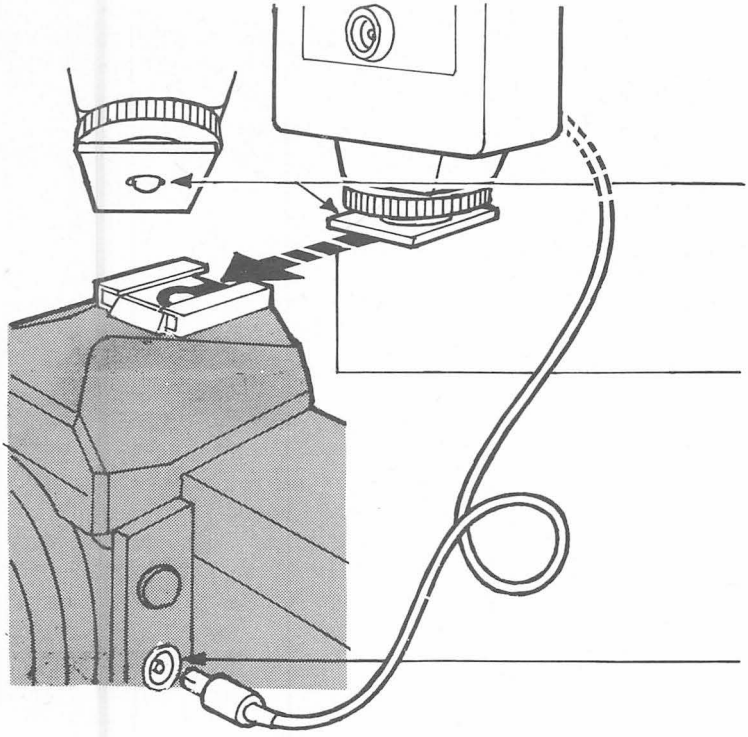
Flash in the Minolta

Minolta cameras have a 3mm (PC) flash terminal on the side of the lens mount, and a flash contact in the accessory shoe. Both are X-synchronized especially for electronic flash. The 'hot shoe' mounting allows the use of a cordless shoe mounted unit and has the second terminal for use with the Auto Electroflash 200X and similar units.

You can only use electronic flash at shutter speeds slow enough for the whole film to be exposed simultaneously. The fastest speed at which it can be used on the XD cameras is 1/100 sec. With a normal unit you can set the shutter dial in the 'M' or 'S' mode at any speed between 1 sec and 1/60 sec, but it is much more convenient to use the X setting. This gives you 1/100 sec irrespective of the mode which you have selected. To indicate that the meter is not working normally, the upper triangular LED lights. The fastest usable speed on the XG is 1/60 sec which is indicated by its yellow colour on the shutter speed dial.

The flash synchronization on these Minoltas is intended for use with electronic flash. You can, though, use bulbs. In that case, set 1/15 sec or longer. Naturally with such a long shutter speed and the relatively long flash that a bulb gives you, you must have the camera firmly mounted on a tripod or similar, and you cannot picture moving subjects.

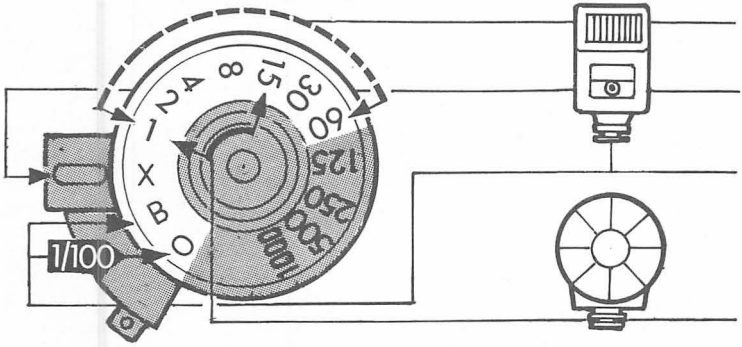
Flash Synchronization



Hot shoe connection

Inserting flash gun into hot shoe

Sync terminal for flash guns with cords

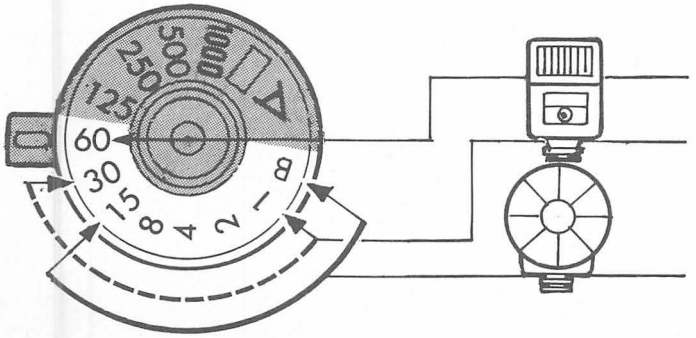


Possible speeds to use

Recommended setting

Also possible

Range of speeds with bulbs classes M, MF and FP



Recommended setting

Possible range of speeds to use

Range of speeds for bulbs classes M, MF and FP

People

More pictures are taken of people than of any other subject. At the same time, they are about the most difficult subjects that you can choose.

Lighting

When you take pictures of people, the light has to reveal just what they look like, without over-emphasizing their weak points. For the most pleasing results, whatever your light source, choose a moderate degree of side-lighting—perhaps 35° from the lens–subject axis and not too far above. Use quite a large, soft light source—either a large diffuse one, such as flash reflected from an umbrella, or the sun on a weak, hazy day. Then use quite strong fill-in light—perhaps one third or one half the power of the main light.

That is fine for most family or glamour shots. It produces pictures which people want to see. However, to restrict yourself to this technique is to lose a vital creative element in your photography. When you want to convey a strong sense of age or roughness you need much more dramatic lighting. In black-and-white, you can take the most striking shots with no fill-in light at all; just a harsh spot skimming across the subject's face, to produce strong contrasts. Light like this throws every bristle on a gypsy's chin into stark relief, or turns an old craggy face into a virtual moonscape of canyons.

Window light

One of the easiest ways to take pictures of people is indoors by a window. The sky forms a convenient diffuse light source—ideal in black-and-white. In colour, you may need a skylight filter (1A) or stronger salmon (81A) to relieve the rather blue lighting.

You can choose the modelling by moving yourself and the subject relative to the window. The closer you are to it, the softer the modelling; and the nearer the model to the window, the harsher the effect. Whatever the angle you choose, window light produces very strong contrasts. So, for most shots, you should fill in the shadows with a large reflector on the room side of the subject.

Poses and expressions

Most often, you get the most pleasing pictures when your model is relaxed. So, set the camera and lighting well in advance. When the subjects arrive, set them at ease. Play music, talk and joke until they are quite unconscious of the camera. Then you can start taking pictures. Some accomplished photographers click through twenty or thirty 'poses' with an empty camera before 'reloading' and taking the real pictures as 'a few more for luck'.

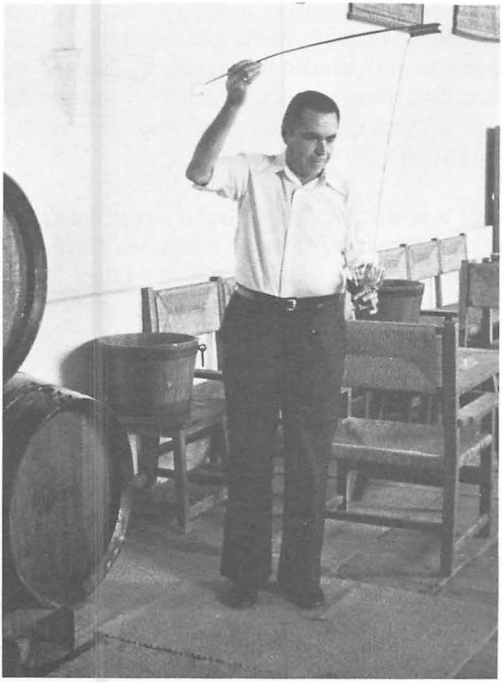
Whatever your technique, it is worthwhile taking as many shots as you can. You will capture fleeting expressions, and have pictures where most of the members of a group look reasonably natural.

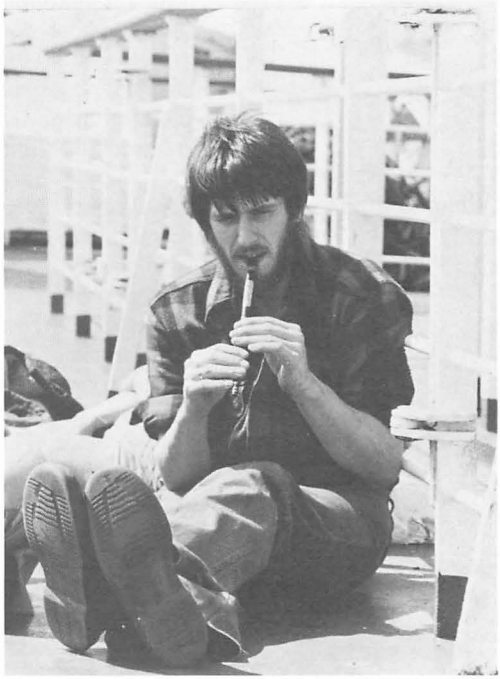
Pictures of people become more interesting if you can capture them in moments of activity or concentration.

1/3 Clyde Reynolds

2 Neville Newman

1
2/3





Power Winders

The Auto Winder D fits the XD cameras and the Auto Winder G the XG models. The winders are similar in appearance and operation but cannot be interchanged between models. They are powered by four size AA pen cells. For preference, choose manganese alkaline cells or rechargeable nickel cadmium (NiCad) cells. They are housed in a holder within the winder.

Mounting

To fix the winder on the camera: make sure that it is switched off and line up the pin with the socket on the camera base. Stand the camera on it and tighten the winder screw into the camera tripod bush.

Shooting

Turn the winder on to use the camera. To take single shots, press and release the shutter button immediately; if you hold your finger on the button, the camera fires and winds continuously at a rate of about 2 frames a second. It does not, though, start moving the film until the shutter has closed so the rate is slower at longer shutter speeds. On the mechanical 'B' or 'O' settings on the XD cameras, the winder does not wind on to the next frame until you release the shutter button. At the end of the film, the operation light stays on. Switch off the winder immediately; push up the film rewind knob and rewind the film in the normal way. The rewind knob also operates the multiple exposure mechanism on the XD-7 (XD-11).

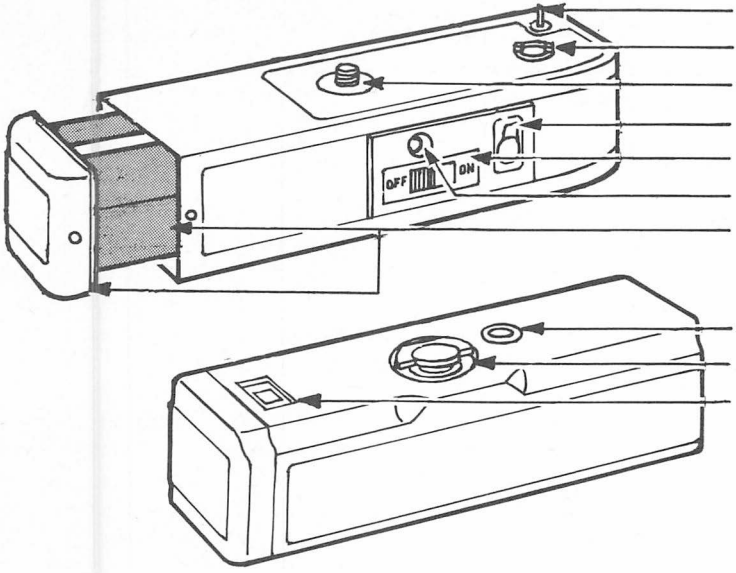
You can switch off the winder when it is still attached to the camera, and operate the camera manually in the normal way. This facility is of considerable advantage when photographing some sports. During the fast action, you can use the winder to give you the highest possible framing rate. Then you can switch it off and use the camera manually which is much quieter at times when the motor's noise might disturb the player's concentration.

When to wind?

The major advantage of a power winder is that it saves time. The camera winds on without your having to move it from your eye; and it is usually ready as soon as you are to take the next picture. There are occasions when you may want to take an evenly spaced sequence, but these are quite rare. In most fast moving actions, there are dramatic peaks and it is these you want to picture. You can decide exactly when to press the shutter button, but the winder cannot. Continuous shooting is no substitute for accurate anticipation.

The other real convenience of the winder is for tripod-mounted shots; with a remote cord you can stand well away from the camera talk to the subjects and take each picture exactly when you want to. Of course, you are not confined to even standing reasonably close to the camera: with the Remote Cord L or an even longer one, you can use the camera totally remotely; or with suitable event-triggered switches or timing mechanisms, take pictures automatically exactly when you need to.

Motor Drives



Locating pin

Film advance coupler

Power switch

Pilot light

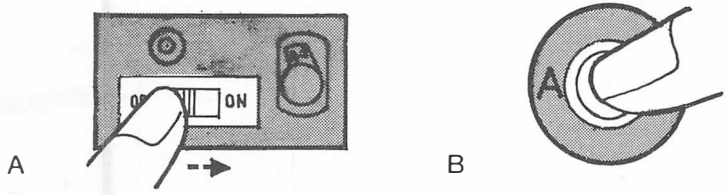
Batteries and holder

Tripod socket

Attaching screw

Battery chamber lock

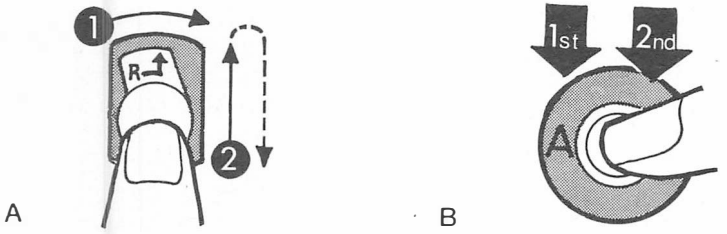
Operating Motor Drive



A Switch on

B Release

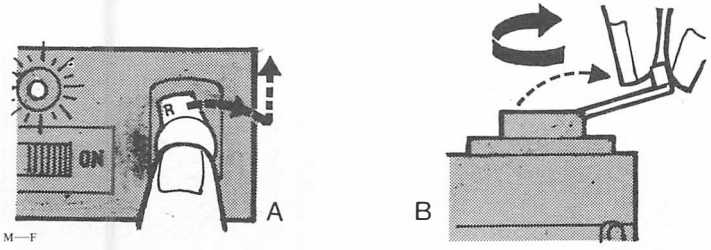
Double Exposure



A Engage film advance and release

B Rewind

Rewinding



A Pilot light is on continuously. Engage film advance

B Rewind

Keeping The Camera Still

Whenever you need to use a shutter speed of 1/30 sec or longer with a standard lens, or to use equivalent speeds with long focal length lenses, you need a firm support to avoid camera shake. A fixed camera position is also useful in formal photography—portraits and weddings, for example. You can stand away from the camera and concentrate on posing the subjects, and taking the pictures when their expressions are exactly right.

Tripod bush

The tripod bush in the baseplate takes the standard mounting screw as fitted to most tripods and other accessories. Never use any accessory with a tripod screw long enough to puncture the base of the bush, this can cause serious damage to the camera mechanism. When the lens or accessory you are using with the camera has its own tripod bush, use that to support the whole outfit.

Tripods

Three extensible legs allow the tripod to stand stably on irregular surfaces. Many also have an extensible centre pillar which allows you to adjust the height of the camera without disturbing the legs. The top of the tripod may simply consist of a flat plate with a mounting screw but most have the more complex pan-and-tilt heads which allow the camera to be rotated or tilted independently of tripod movement. Choose one which retains full adjustability with the camera set for either vertical or horizontal format pictures.

Small lightweight tripods cannot be regarded as firm supports; but they can give extra steadying in borderline situations. If you intend to often use long focal length lenses or specialize in close-ups, you are wise to obtain a good sturdy middleweight tripod.

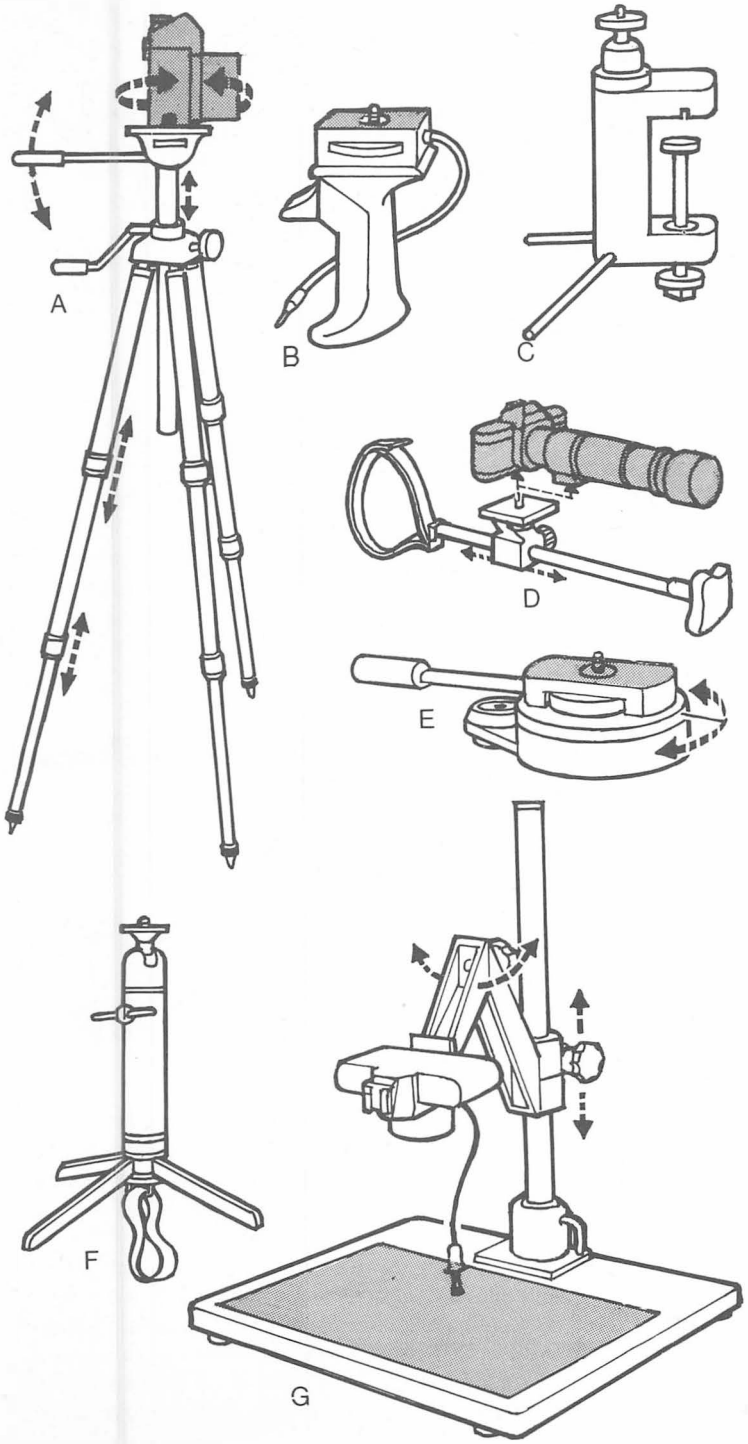
Small stands or clamps which mount the camera securely on existing objects are not the complete substitute for a sturdy tripod, but they can solve many problems.

Body supports

Hand grips or pistol grips give you a firmer hold of the camera. Most have built in triggers which connect to the shutter through a cable release. The Minolta tele-holder allows you to hold the camera like a rifle. It is fully adjustable to suit all lenses and allows you to place the camera exactly where you want it in relation to your shoulder.

The Minolta copy stand

For vertical shots of small subjects, the best choice is the copy stand. This is like an enlarger baseboard and column, fitted with an adjustable arm which carries a camera mount. To achieve this, mount the Minolta focusing rail on the copy stand and mount the camera on that.



Tripods and Grips

A an essential part of every outfit is a good steady tripod. One with a pan-and-tilt head and provision for horizontal and vertical camera mounting is easiest to use.

B some photographers find a pistol grip helps hold the camera steady.

C some small tripods double as clamps for really steady holds in awkward spots.

D the Minolta tele-holder adjusts to provide a rifle-like grip with any camera and lens.

E to make exactly-fitting panoramas, the Minolta panorama head can be used on a firm tripod.

F small table tripods give useful additional support and are quite easily portable.

G the Minolta copy stand is ideal for working from flat copy; or taking vertical shots of any objects. For fine close-focusing, mount the camera on a focusing rail.

Minor Controls

All the major features and operations have been discussed but there are still a number of small controls to be mentioned.

Self-timer

The Minolta SLRs carry a self-timer. To set the XD for delay, push the small lever on the left of the lens down in a counter-clockwise direction (looking from the front of the camera). Once you have pushed this lever down, the next time you release the shutter with the normal shutter release button, there will be delay of up to about 10 sec depending on quite how far you have pushed the lever. If the shutter has not been set the self-timer will not start moving when you press the shutter release button.

XG self-timer

The XG cameras have a completely different electronic self-timer. To operate it, turn the main switch so that the dot is opposite the words SELF-TIMER. Then, assuming the shutter is set, the next time you press the shutter release instead of immediately firing the shutter, it will start the red light on the front of the camera flashing; after about 7½ sec the light will start flashing at a higher rate for about 2½ sec, after which the shutter will operate. At any time until it fires, you can cancel the self-timer by moving the main switch to OFF.

After using the timer, move the switch back to OFF or ON as you require. If you leave it on SELF-TIMER you will get the delay every time you press the shutter release.

Self-portraits

One use for the self-timer is taking self-portraits: for this, set up the camera on a firm support, focused on your intended position; select automatic exposure, close the viewfinder eyepiece blind on the XD-7 (XD-11) or cover the eyepiece with the cap provided on the other models; set the delay and start the camera operating. Take up your position and wait for the camera to operate.

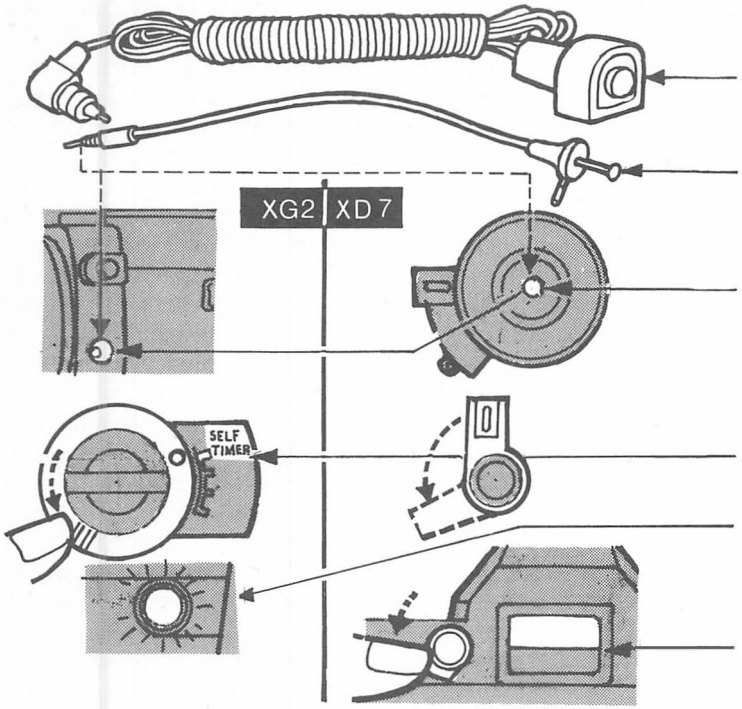
Long exposures

Another use is when taking pictures on long exposures. Without remote release, you can set the camera on a tripod or other firm support and allow the self-timer to trip the shutter. This avoids the danger of introducing camera shake as you press the shutter release button.

Infra-red focus mark

One reason for the complicated construction of modern camera lenses is so that they can focus light of all colours in the same place. However, this ability does not extend to infra-red radiation; to focus infra-red, the lens must be slightly farther from the film than it would normally be for any particular subject distance.

If you take photographs by infra-red alone, that is through a dark red or visibly opaque filter, you have to adjust the focus away from the normal visual point. Minolta lenses carry a small mark to the right of the focus index. On most lenses it is a small red 'r', but on 'one-touch' zooms, it is extended to form a line curving forward away from the main white focus line. Use this mark or line instead of the normal



Cable Release and Self Timer

Remote cord

Cable release

Release sockets

Self timer

Red light flashes during delay

Eyepiece shutter

focus mark or line. You can do this either by focusing visually and then moving the focus ring afterwards, or you can measure the distance and set the figure to the infra-red focus mark.

Film speed table

The exposure meters of the Minolta SLRs have to be programmed with the film speed on the ASA scale to give correct exposure read-out or automatic exposure. Occasionally you may use a film which is calibrated only in the German DIN system. In which case, refer to the table on the back of each camera which shows you the ASA equivalents of DIN film speeds. Surrounding this table on some models is a holder designed to take the end of a normal film box. If you use several camera bodies simultaneously, or if you are likely to put your camera away without remembering the film with which it is loaded, put the box end into the *memo holder* on the camera to remind you of the film type loaded. You can tape the end to the back of any other camera for the same purpose.

Film plane indicator

For highly critical close-up work the Minolta XD cameras carry a focal plane indicator on the top plate below the film transport lever. When calculations call for it you can measure from this mark.

Black-and-White Photography

Present day colour materials make it easy to reproduce the coloured world in all its splendour. So, why do so many enthusiasts turn to black-and-white materials? The first reason is that there is a special art in translating a coloured subject into a monochrome abstraction; but, perhaps more telling, black-and-white materials offer you a wide range of control with simple technicalities.

Films and processing

We have already discussed the range of black-and-white films. This range is greater than for colour films; allowing you to choose from speeds ranging from amazingly slow to incredibly fast. Further, though, you can adjust the processing to achieve the exact balance of contrast and grain that you want for any particular shot.

The normally recommended developers for most films are the type that was until comparatively recently known as fine grain—typified by Kodak D76 and Ilford ID11 (which are normally considered to be identical in formula). When you use the recommended time and temperature these produce excellent negatives, and allow you to rate films at the manufacturer's speed (ASA) setting. Increasing the time (or temperature) allows you to rate the film at a higher speed, but increases grain and contrast. Conversely, you can over-expose and under-develop to produce lower contrast (and sometimes finer-grain negatives).

The two most popular alternative types of developer give you either finer grain or higher speed, while maintaining the contrast at a reasonable level. You can also use soft gradation developers, or high contrast ones. Thus, the choice of film and process gives you an enormous choice in preparing the negative.

If you measure exactly the light reflected from each important part of your subject, you can decide not only the exact exposure level you want, but also the overall contrast range. By choosing the right film and development (for the whole cassette) you can match the negatives exactly to the subject. This is the basis of the zone system devised by Ansel Adams.

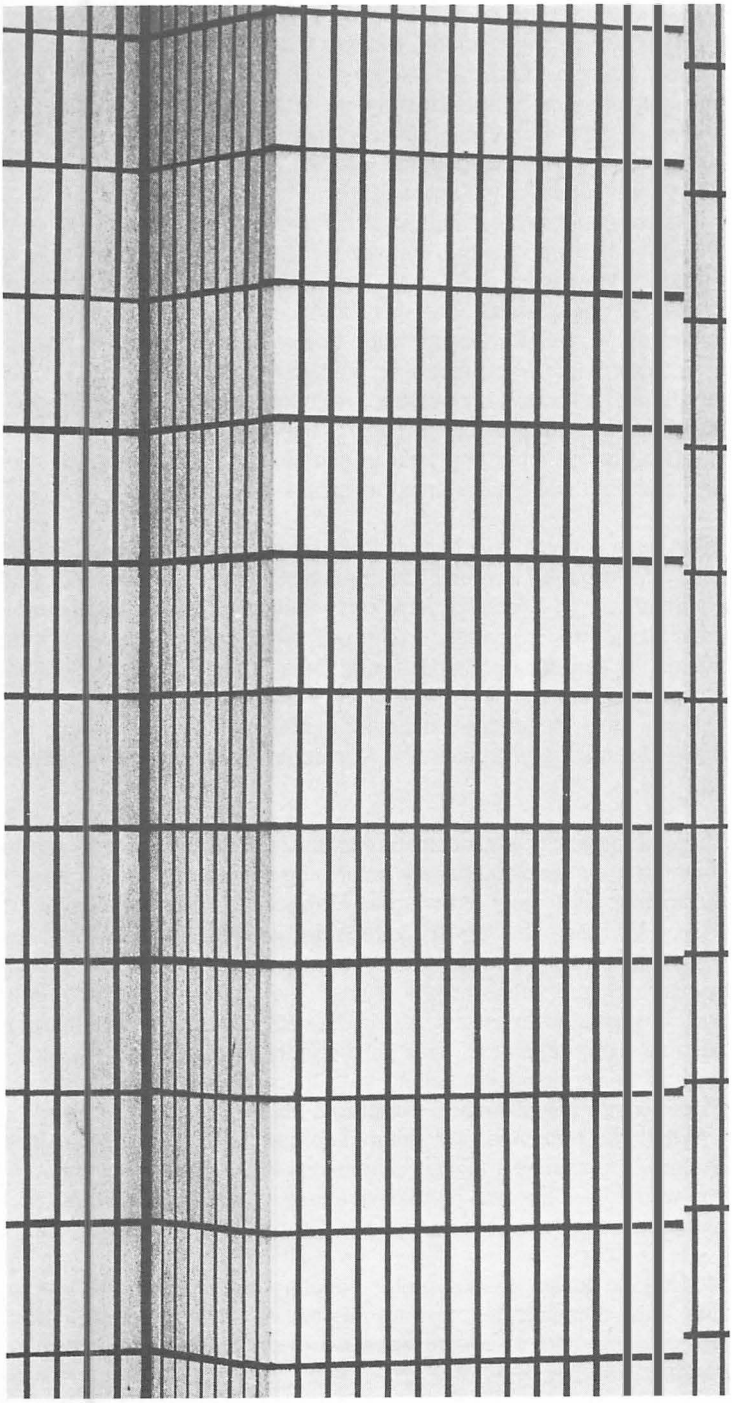
Printing

It is in printing, though, that the wonder of monochrome really rests. You can choose the paper contrast grade to complement the negative and the subject. This is possible either by buying a choice of paper grades; or, more conveniently, by using a variable contrast paper and a set of specially chosen yellow and magenta filters.

Even more important, though, you can select exactly the right section of the negative to produce the pictures you want, and enlarge it to the size you think best. To have the greatest versatility, you need meticulous technique. Choose the finest grain film and be careful with focusing and processing.

Making pictures

For successful black-and-white work, you have to see the original scene in terms of shapes and tones. To increase the impact, many choose to produce high-contrast pictures.



Black-and-white film emphasises the stark contrast and repetitive pattern of the side of this building.
Ed Buziak

Interchangeable lenses

One of the major reasons for buying a system camera, particularly a single lens reflex, is so that you can choose the lens that suits the picture. The most important feature of a lens is its angle of view. For any given format, this is directly related to the focal length. The angles of view for Minolta 35mm camera lenses vary from 1½° to 103° measured on the diagonal of the film. The longer the focal length, the narrower the angle of view.

Choosing the focal length and thus the angle of view, of a lens allows you to choose the area of the scene you include from a particular view point: wide-angle lenses allow you to include a broad sweep in one picture, whereas long focal length (narrow-angle) lenses allow you to concentrate on one small part, thus magnifying a distant object. If you can alter your viewpoint, altering the focal length allows you to vary perspective in the picture while still showing the important part of the subject the same size. You may also want to change from one lens to another in order to change the depth of field while maintaining a useful *f*-number.

Lens changing

To remove a lens from a Minolta SLR camera, press the lens release button towards the lens and turn the lens counterclockwise until you can lift it out. To fit another lens, remove its rear cap by turning that counterclockwise, then line up the red dot or bead on the lens with that on the camera; gently push in the lens and turn it clockwise until it clicks into place.

If you have the slightest difficulty in making a lens fit, go to your dealer for advice or to have the lens adjusted; do not try to force it on.

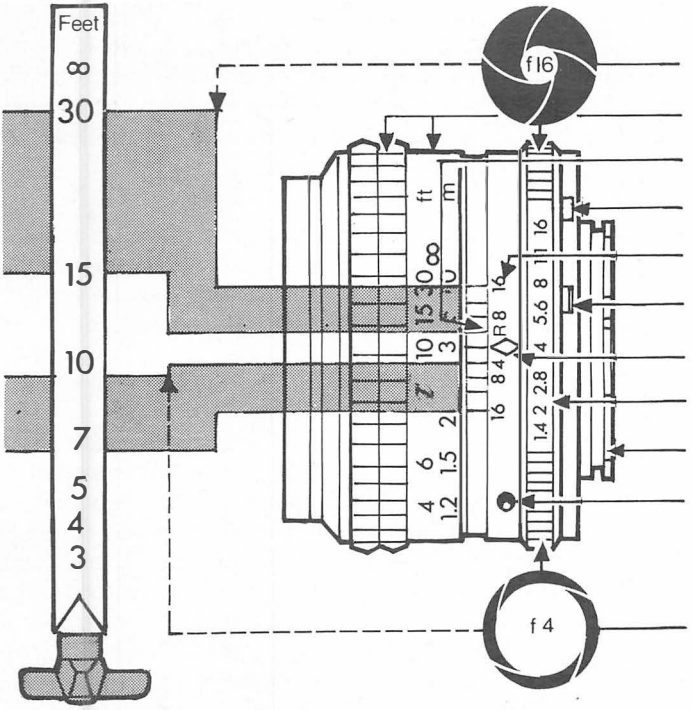
Diaphragm and lens couplings

The diaphragm on any automatic Minolta lens closes down to a preselected aperture immediately before the shutter opens, and opens up again immediately afterwards. All Minolta lenses labelled MD, MC or Auto have this facility. Some older lenses have their aperture selected manually; in which case you must set the lens to the chosen aperture before releasing the shutter and before metering if you wish to know the exposure setting. The RF Rokkors (mirror lenses) have no diaphragm at all, thus (although they are normally categorized as being manual) shooting with them is exactly the same as shooting with any automatic diaphragm lens.

When you remove an automatic diaphragm Minolta lens from the camera, it becomes a manual diaphragm lens. This is convenient if you want to use the lens on manual extension tubes or bellows. The diaphragm then closes to exactly the *f*-stop set on the aperture ring.

MC Rokkors

MC Rokkor lenses have a meter coupling lug on their diaphragm ring. This communicates aperture information to the meter in XD and XG cameras and so allows aperture priority automatic exposure control.



Depth of Field

aperture set at f 16

focusing scale and ring

infrared mark

MD coupler lug

depth-of-field scale

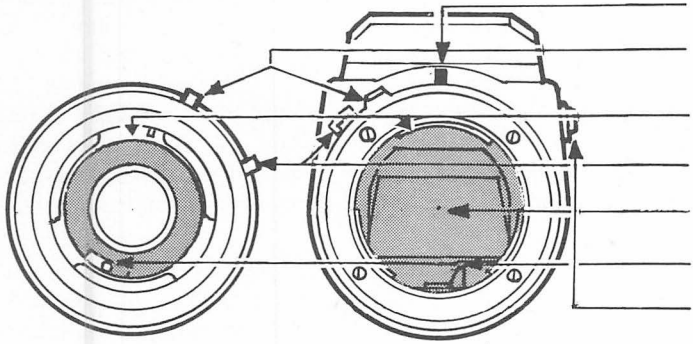
MC coupler lug
setting mark

aperture ring and scale

bayonet mount

red mounting index

aperture set at f 14



red mounting index

MC coupler lugs

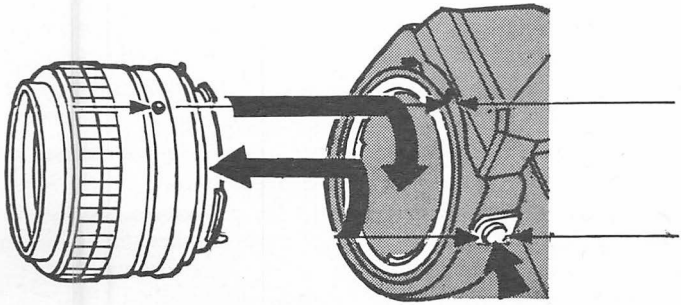
bayonet mounts

MD coupler lug

mirror

diaphragm operating lugs

lens release button



Attaching and Removing lens

Align red indices
Push in and turn right

Push in lens release button
turn lens to left and
remove

MD Rokkors

MD Rokkor lenses have this lug and a second MD lug which is necessary to use the shutter speed priority automatic exposure system of the Minolta XD cameras. When you select the lens' minimum aperture, the MD lug switches on the aperture display in the viewfinder and indicates to the meter the minimum aperture to define the range of lens apertures available for control.

Non-coupled lenses

The simplest lenses and accessories give you manual diaphragm control. With this type of equipment, the automatic exposure controls set the shutter speed automatically to suit the lens aperture you have chosen before pressing the shutter release. If you want the shutter speed to be displayed in an XD camera, you must select aperture priority automation. Of course, you can use manual shutter speed selection if you prefer.

With non-coupled automatic lenses or accessories (such as the Minolta Auto Bellows 1), the Minoltas can meter in the stop-down mode. With the XD simply press in the stop-down (depth-of-field preview) button and you can read off the chosen shutter speed (in the aperture priority or manual modes). Because the XD final check meter system measures exposure after the lens has stopped down, the camera works perfectly with aperture priority automation and uncoupled automatic diaphragm lenses. On the XG-1 or XG-2 (XG-7), however, you can only use automatic exposure with lenses having their own stop-down switch. On XG cameras uncoupled lenses or lenses on uncoupled accessories must be closed down to the picture-taking aperture before you press the shutter release button. If the lens or accessory you use has an automatic diaphragm but no means of being stopped down, then you should meter beforehand or with a separate hand-held exposure meter and set the exposure combination *manually* on the camera. To use this type of equipment on the XG-9, depress and hold in the stop-down button before you release the shutter. The meter then operates at the picture-taking aperture.

Lens designations

Each lens is marked with its maximum aperture and focal length; thus MD Rokkor 1:1.4 f = 50mm is a 50mm lens with maximum aperture of f1.4. Most Minolta lenses carry the trade name Rokkor. Many sold in North America are called Rokkor-X lenses, but are otherwise identical.

Special function Rokkor lenses have that function indicated in their name—for example, the 50mm f3.5 MD Macro Rokkor is a close focusing lens, and the 250mm f5.6 Rokkor is a reflex or mirror lens.

Rokkor and Celtic lenses

Rokkor lenses are designed for the most precise photographers who expect to be able to use them at full aperture with no detectable loss in image quality. Most photographers, however, do the vast majority of their work at comparatively moderate apertures. In some parts of the world Minolta provide a really good quality lower cost

alternative for these users. These are the Minolta Celtic lenses, available in most popular focal lengths.

Lens hoods

Most Minolta lenses are recessed in their mounts. However, light to one side of the picture area can often strike the front lens element. Sometimes, despite the multi-achromatic coating, a bright light falling on the front of the lens can produce flare in the picture. To avoid this, use a lens hood whenever it is likely to happen. The hoods provided for Minolta lenses are the longest that you can use with that focal length without some danger of vignetting—that is darkening the corners of the picture. If you use a hood from a lens of longer focal length, then you will vignette your pictures. On the other hand, if you choose a hood from a shorter focal length lens, the shading will not be so efficient.

35mm Shift CA Rokkor

When you tilt your camera up to take in the top of a building, you produce a picture with the sides sloping in. This effect, known as 'converging verticals', is quite natural; it is just the way you see a building when you look up. However, Western civilization has accepted the artists' convention that vertical lines are always parallel. So, converging verticals look rather odd.

One way of keeping the camera upright while picturing the top of

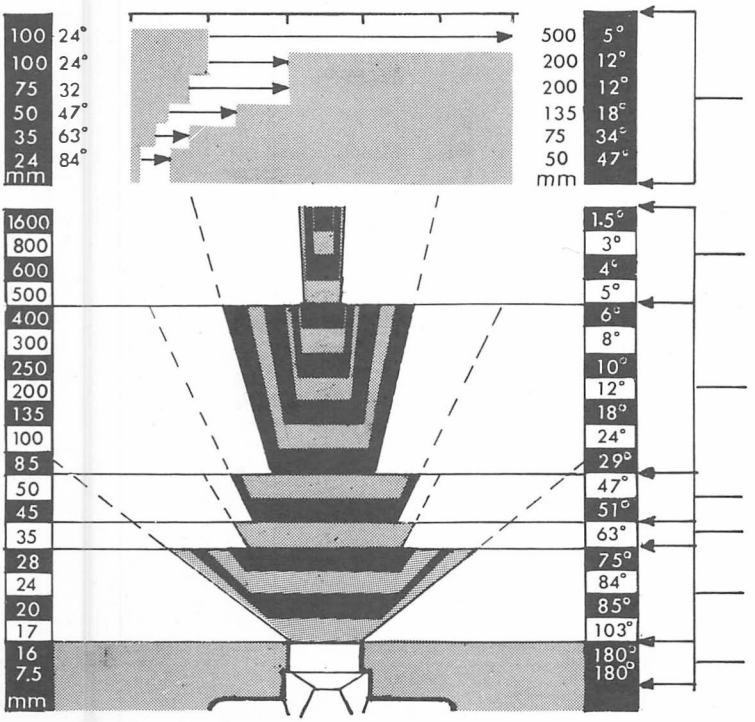
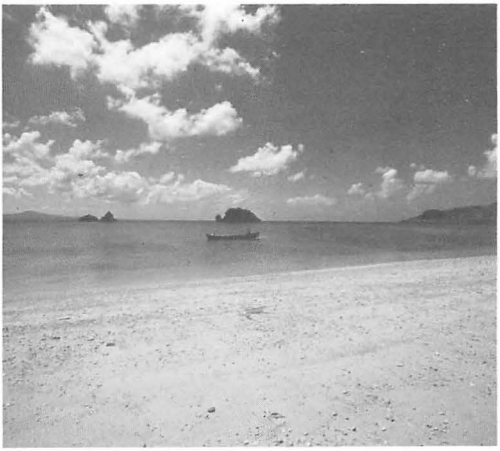


Table of Minolta Lenses

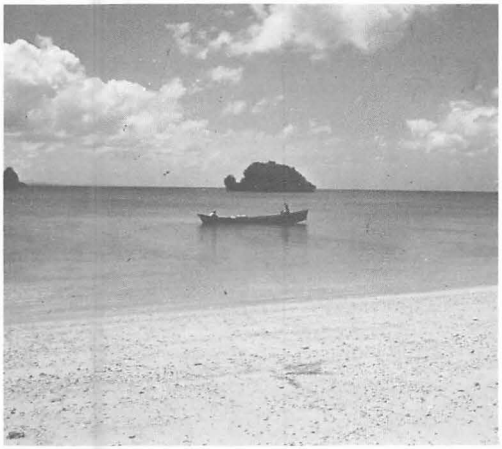
Type	Focal Length (mm)	Max. Aperture	Angle of View	Smallest Aperture	Closest Focus (m)	Elmnts	Grps	Filter Size (mm)	● MD Link	Sizes Dia x Lgth (mm)	Weight (g)
Ultra	7.5	f4	180°	f22	1.2(fxd)	12	8	Turret	●	68 x 63	345
Wide-Angle	16	f2.8	180°	f22	0.3	11	8	Turret	●	71 x 64	440
	17	f4	104°	f22	0.25	11	9	72	●	75 x 53	325
	20	f2.8	94°	f22	0.25	10	9	55	●	65 x 44	235
	24 VFC	f2.8	84°	f22	0.3	9	7	55	●	67 x 50	340▲
	24	f2.8	84°	f22	0.3	9	7	55	●	64 x 50	215
	28	f2	75°	f22	0.3	10	9	55	●	66 x 61	340
	28	f2.8	75°	f22	0.3	7	7	55	●	64 x 44	205
	28	f3.5	75°	f22	0.3	5	5	55	●	65 x 42	195
Wide-Angle	35	f1.8	63°	f22	0.3	8	6	49	●	64 x 48	235
	35	f2.8	63°	f22	0.3	5	5	55	●	65 x 42	200
	35 S-CA	f2.8	64°	f22	0.3	9	7	55	Auto	84 x 72	560■
Standard	45	f2	51°	f16	0.6	6	5	49	●	64 x 31	125
	50	f1.7	46°	f16	0.5	6	5	55	●	64 x 41	240
	50	f1.4	46°	f16	0.5	7	5	55	●	65 x 46	305
	50	f1.2	47°	f16	0.5	7	6	55	●	66 x 47	315
Telephoto	85	f1.7	29°	f22	1.0	6	5	55	●	71 x 62	455
	85	f2	29°	f22	0.85	6	5	49	–	64 x 53	300
	85 V.S	f2.8	29°	f16	0.8	6	5	55	MC	70 x 80	430★
	100	f2.5	24°	f22	1.2	6	5	55	●	63 x 68	410
	135	f2.8	18°	f22	1.5	6	5	55	●	62 x 93	425
	135	f3.5	18°	f22	1.5	4	4	52	●	63 x 88	400
	200	f4	12°	f22	2.5	5	5	55	●	65 x 131	520
	250	f5.6	10°	(f11)	2.5	Mirror	Mirror	Internal	–	66.5 x 58	245
	300	f4.5	8°	f32	3.0	7	6	72	●	78 x 178	710
	300	f5.6	8°	f32	4.5	5	5	55	●	65 x 186	695
	400 APO	f5.6	6°	f32	5.0	7	6	72	●	83 x 257	1.44 kg
	500	f8	5°	f16	4.0	Mirror	Mirror	Internal	–	83 x 99	600
	600 APO	f6.3	4°	f32	5.0	9	8	Integral	●	108 x 374	2.40 kg
	800	f8	3°	(f16)	8.0	Mirror	Mirror	Turret	–	125 x 166	1.5 kg
	1600	f11	1°30′	(f22)	20.0	Mirror	Mirror	Turret	–	178 x 322	7.5 kg
Teleconvertor	2 x TC	–	–	–	–	5	3	–	●	64 x 53	260
	300S	–	–	–	–	7	6	–	●	65.5 x 41.5	210
	300L	–	–	–	–	5	3	–	●	65.5 x 52.5	240
Zoom	24–50	f4	84–47°	f22	0.7	13	11	72	●	75 x 70	395
	35–70	f3.5	63–34°	f22	1.0	8	7	55	●	68 x 66	365
	50–135	f3.5	47–18°	f22	1.5	12	10	55	●	69 x 118	480
	75–200	f4.5	32–12°	f22	1.2	15	11	55	●	70 x 155	630
	100–200	f5.6	24–12°	f22	2.5	8	5	55	●	63 x 206	600
	100–500	f8	25–5°	f32	2.5	16	10	72	●	91 x 330	2.03 kg
Lens head for Bellows	100	f4	24°	f22	–	3	3	55	–	63 x 35	166
Macro	50	f3.5	45°	f22	**0.23	6	4	55	●	**68 x 55	**330
	100	f4	24°	f32	**0.45	5	4	55	●	**66.5 x 88.5	**380

**Without Adaptor. ▲ Variable Field Curvature (VFC) lens.
■ VFC/Shift lens. ★ Varisoft continuous soft-focus control.

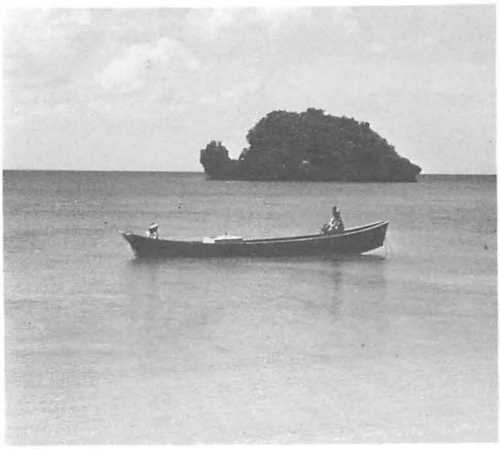
7.5mm



17mm



35mm



85mm

800mm

1600mm

From a fixed viewpoint, the focal length determines image size.

buildings is to raise the lens in relation to the camera. This is possible with the 35mm *f*2.8 Shift CA Rokkor. You can move the lens 11mm up or down for horizontal shots or 8mm up or down with the camera held vertically.

Vertical movement is the most useful, but shifting the lens horizontally also has its uses. For example, you can take a 'square-on' picture even though you are forced off-centre by something in the way; or you can take two shifted shots from one point to produce an exactly fitting panorama. All in all, the 35mm *f*2.8 Shift CA Rokkor is an excellent choice of 35mm lens. Its only disadvantage is its lack of a meter coupling lug, which could be a potential source of exposure error.

The shift and rise are coupled so that the lens can never be moved outside its circle of good resolution. The diaphragm operates automatically, but the Minolta meters cannot be relied on when the lens is shifted far from its axis. So the best way to work is to take a meter reading with the lens centred; use the stop-down button on XD cameras or the XG-9; calculate from the *f*2.8 shutter speed with an XG-1 or -2 (XG-7) and set the aperture and shutter speed manually. Then you can compose, shift and focus the lens entirely on the focusing screen; and take the picture when everything looks right.

Variable field curvature

The 35mm *f*2.8 Shift CA Rokkor, and the 24mm *f*2.8 VFC Rokkor have a special Minolta feature: by turning a ring, you can alter the 'plane' of sharp focus to make it dish-shaped. This is especially useful in close-ups; you can match the sharply focused area to the convex shape of a chrysanthemum; or the hollow of a soup bowl. Thus, many otherwise impossible shots become easy.

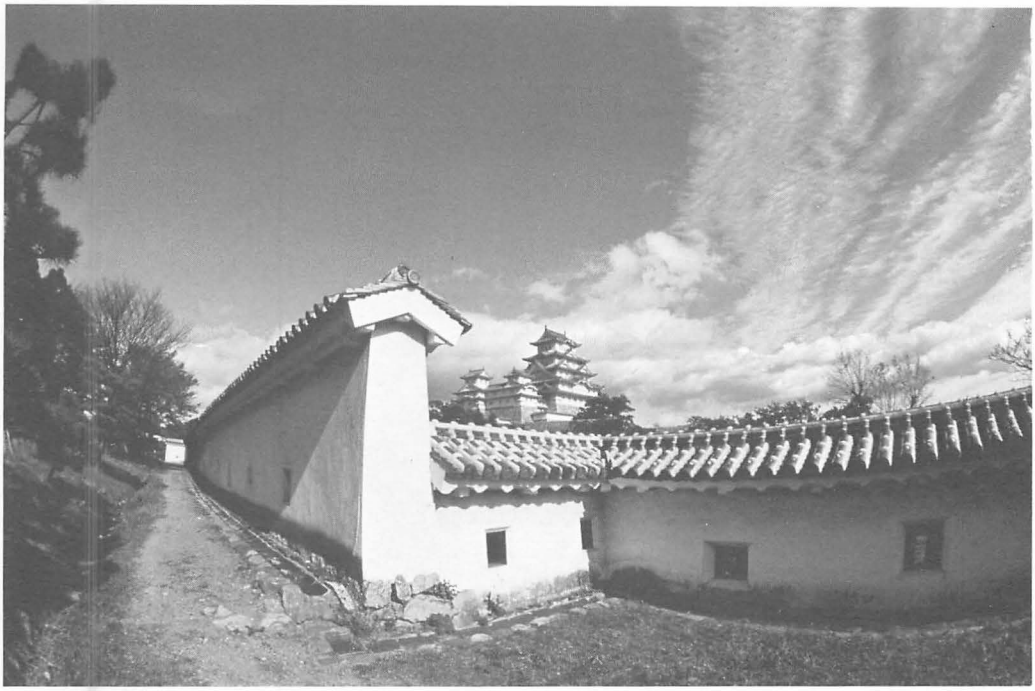
The VFC feature is especially attractive on the Shift lens. When you combine shift and curvature, you extend the depth of field in a shallow arc diagonally across the picture area; virtually mimicking the effect of tilting the lens on a view camera.

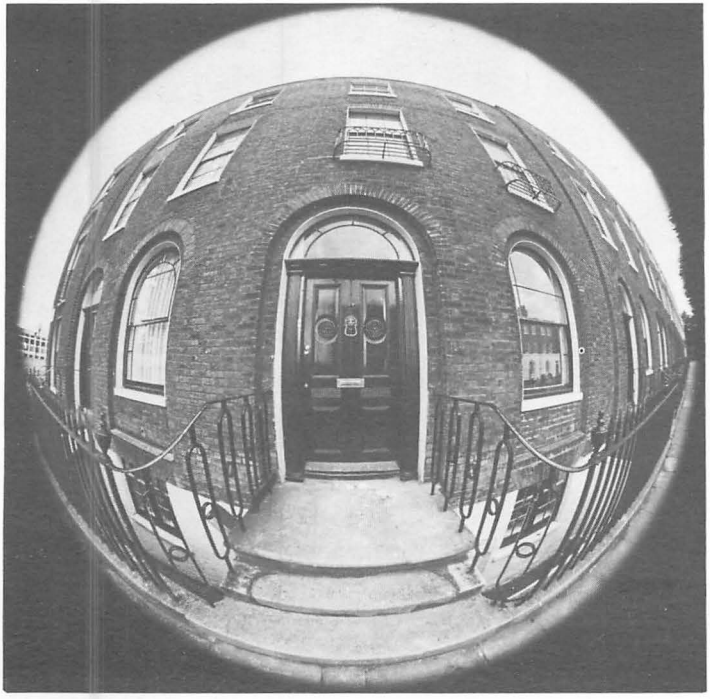
Wide-angle lenses

The MD Rokkor range of really wide-angle lenses includes four 28mm lenses offering a choice of maximum aperture, two 24mm, a 20mm, a 17mm and 16mm and 7.5mm fisheyes. They are all of 'reversed telephoto' (retrofocus) construction, to leave room for the mirror to move up and down.

28mm lenses

The 28mm lenses are regarded by many photographers as the upper limit of true wide-angles, and this focal length is increasingly being chosen as the first accessory lens. It can be used to give a broad view, although distant objects may in some cases appear so small as to be insignificant. It is also extremely useful when shooting in confined spaces, but such conditions demand care to produce natural-looking pictures. For most purposes, the *f*3.5 lens is quite adequate, but if you commonly photograph under low light conditions, the extra cost and bulk of one of the faster lenses may be justified.

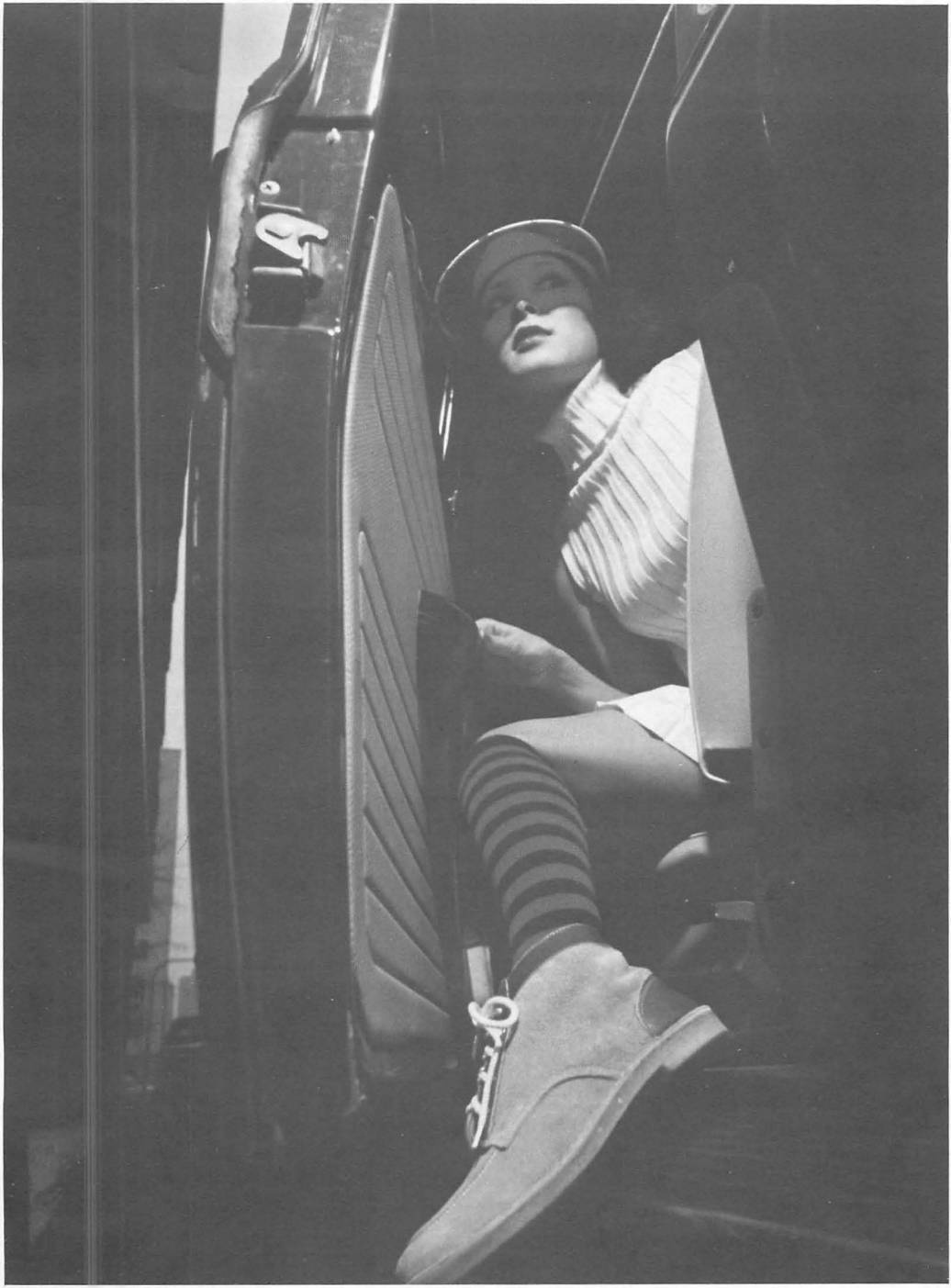




A 17mm f4 MC Rokkor can provide this interesting view of a temple. The 75mm f4 fisheye Rokkor produces the characteristic circular images. It allows you to transform a normal scene into a rotund fantasy.

Raising the shift lens allows you to hold the camera vertically and still include the top of the buildings in the picture. The vertical lines therefore remain upright, not converging as in the top picture.
Clyde Reynolds

Opposite, a 24mm Rokkor used for 'distortion' from a close viewpoint.
Clyde Reynolds



24mm lenses

The 24mm *f*2.8 MD Rokkor is an excellent choice to go with 45 or 50mm standard lenses. It is especially good for black-and-white work, where you can select an area equivalent to a 28 or 35mm lens from your 24mm negative. The 24mm *f*2.8 VFC Rokkor adds variable field curvature.

Ultra-wide angles

The extremely wide-angle 20mm *f*2.8 and 17mm *f*4 MD Rokkors are more likely to be used for special effects than just to include as much of a view as possible. Because of their extensive depth of field even at quite large apertures, they can be used to picture small close-by objects sharply and larger than life against a much reduced but still sharp background. As with all wide-angle lenses, care must be taken to keep the camera back exactly vertical, otherwise any convergence will be emphasized.

Fisheye lenses

The 7.5mm *f*4 Fisheye Rokkor produces the characteristic circular image on the film with a diameter of 23 in. The 16mm *f*2.8 Fisheye Rokkor covers a diagonal angle of 180°. Straight lines at the edges of the picture are reproduced as curves, and the lens is not suitable for normal pictorial photography. These lenses have built-in filters, selected by rotating a ring at the front of the lens.

Moderate wide-angles

The choice of a normal lens for general purpose photography is a subject of great contention. Many photographers like to use a 35mm lens as 'standard'. They prefer it to a 50mm lens for the wider view and the greater depth of field at moderate apertures. Used for general purpose photography, the viewpoints offered by a 35mm lens yield acceptable perspective, but both the MD Rokkors can focus closely enough to give 'wide-angle distortion' if required. The choice of maximum aperture depends on the use to which the lens is to be put. For most purposes the *f*2.8 lens is perfectly adequate, although it is not quite so easy to focus accurately; but as with the 28mm lenses, if you habitually take photographs under low light conditions, the extra bulk and cost of the *f*1.8 lens is well worth bearing.

Standard lenses

Other photographers prefer to regard lenses in the 75–90mm range as their 'standard', so the almost universal choice of standard lenses between 45 and 50mm for SLR cameras is a good compromise. Minolta produce four such lenses. The 50mm *f*1.2 MD Rokkor has the widest aperture, so producing the brightest viewfinder image, and the easiest focusing. Its extra light-passing ability is useful under conditions of extremely low light, although the 50mm *f*1.4 MD Rokkor is the most commonly used wide aperture lens. The 45mm *f*2 lens is quite fast enough for the majority of photographers and has a slightly wider angle of view. The *f*1.7 lens falls halfway between the *f*2 and *f*1.4.

All four lenses are highly satisfactory for a wide range of picture taking situations. An alternative to them is provided by the 50mm *f*3.5

MD Macro Rokkor (see page 112). By sacrificing two or three stops in speed, which need not worry many photographers, you gain considerable close-up ability, especially useful if you intend to use such equipment as a slide copier.

Some photographers forego a 45--50mm lens altogether, preferring to use a 35mm and an 85mm alternately.

However, this decision overlooks two important points. The first is that the angle of view of the standard lens has evolved over the years because it is the angle of view that most people find most closely matches their own eyes, so pictures taken with this lens often have a natural rightness about them. In that way, they provide a standard against which the departure in angle of view by using other lenses can be measured. If you show a succession of good normal lens shots before a breath-taking wide-angle one, the wide-angle one will inevitably have even greater impact. The second important point is that standard lenses are always in the forefront of optical development. They are often the lenses by which performance of a whole range is judged. So, while other lenses in the Rokkor range match the performance of Rokkor standard lenses, none of them are likely to better them.

Moderate telephotos

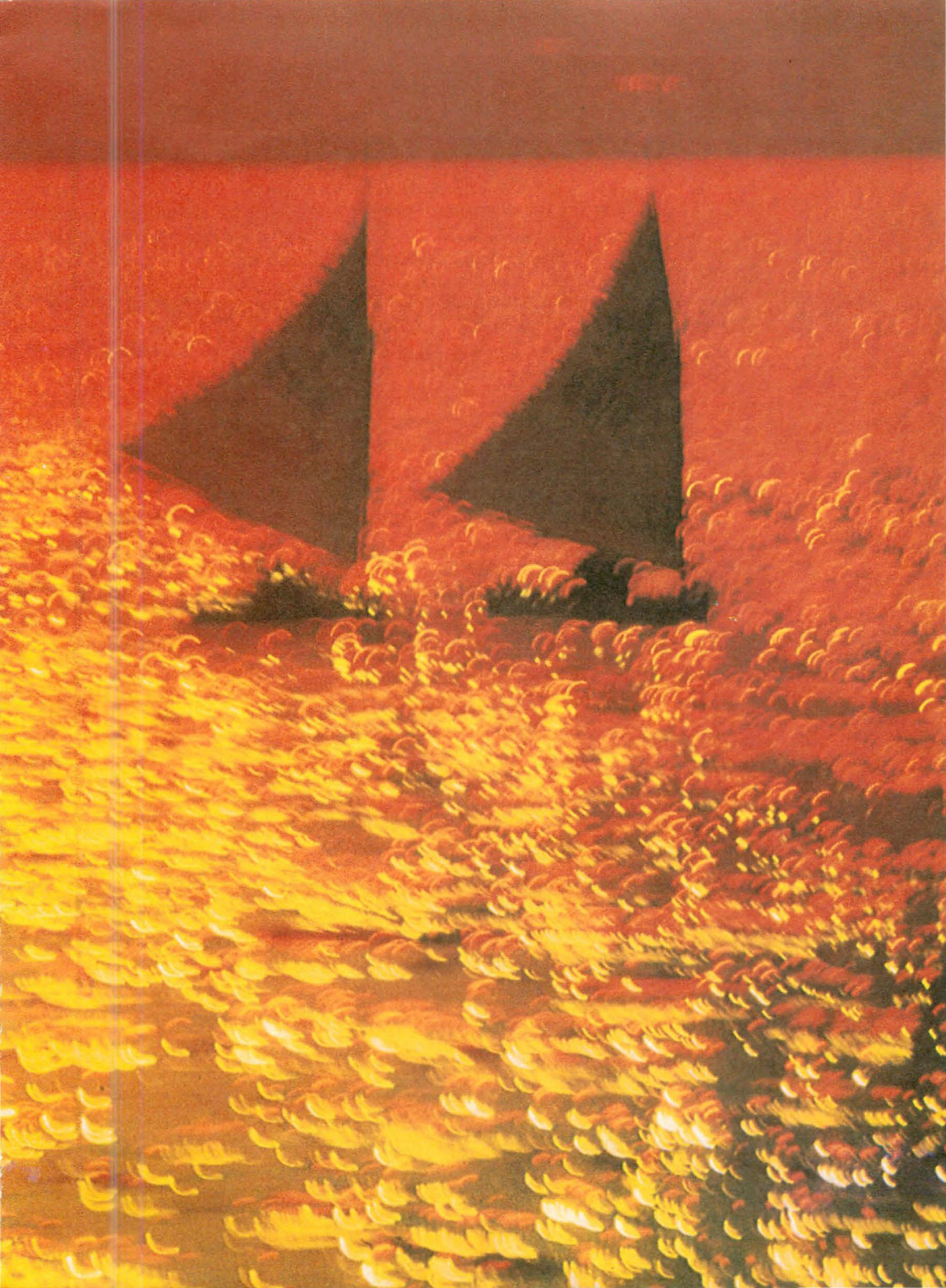
The 85mm *f*1.7 MD Rokkor has a conveniently large maximum aperture for shooting indoors and this focal length is much favoured by professional photographers for portraits as it provides pleasing perspective in head and shoulders pictures. This lens, or the much lighter 85mm *f*2 MD Rokkor, is particularly suitable as the normal lens for those who find the 45--50mm lenses include too much unwanted surroundings in their pictures.

Varisoft lens

At the same focal length, the 85mm *f*2.8 MD Varisoft Rokkor provides an exceptional portrait lens. It is so constructed that you can move some of its elements away from the ideal optical configuration without altering the focal length. The movement is controlled by a ring on the lens mount. When the index is set to '0' the lens produces Rokkor sharp pictures. Turning it to 1, 2 or 3 produces a progressively softer image; without of course changing the focus at all. The degree of softening depends not only on the soft ring setting, but also on the aperture. The wider the aperture the greater the effect of each setting on the ring. The 85mm *f*2.8 Varisoft Rokkor allows you to introduce a degree of softness into portraits, but it does need to be used with discretion.

Outdoor photographers may prefer 135mm lenses. They are long enough for most distant views, and yet can still be used for occasional portraits. The 100mm *f*2.5 MD Tele Rokkor comes between these two focal lengths and is probably the best choice if you have a standard lens and a 200mm or longer one.

With a mirror lens, rings appear from out-of-focus highlights. In this picture, the photographer used red and yellow filters over parts of a 1000mm f6.3 RF Rokkor. This has coloured the picture, and broken the rings into curves. This technique produces a picture of sparkling brilliance, without the obtrusive rings.



Longer lenses

Although moderate telephoto lenses can cover the majority of a photographer's needs, there are occasions when you find greater magnification useful. A tele-extender (see page 106) can extend the range of other lenses, but for regular use a 200 or 300mm lens is usually the best answer. For sports photography and mobile nature work it is essential to have a hand-held lens. The 200mm *f*4.5 MD Tele Rokkor offers reasonable magnification while still being conveniently light. The 200mm *f*3.5 offers a wider aperture which can be essential for moving subjects, but it is heavier.

250mm *f*5.6 RF Rokkor

If weight is a problem, then the obvious choice is the 250mm *f*5.6 RF Rokkor. This amazing lens is little larger than a 50mm *f*1.2 and weighs rather less. The mirror construction which is responsible for the tiny dimensions introduces two difficulties: firstly it is impossible to fit a normal diaphragm, so to reduce the light passing through the lens, you must use a neutral density filter which, unlike a small aperture does not increase depth of field at all. The second problem is that out-of-focus highlights are reproduced not as spots but as rings. Whether you like these, is a matter of personal choice.

The 250 RF Rokkor is an ideal travellers' lens, but probably the most versatile long telephoto lens is a 300mm which has a high enough magnification for most sports and bird photography. The 300mm *f*5.6 MD Tele Rokkor is exceptionally small and light for hand-holding so long as you take up a firm stance. The 300mm *f*4.5 lens is somewhat bulkier. It is fitted with a bush for tripod mounting.

Using long lenses

Along with the image, a long focus lens also magnifies any movement in the subject or camera. The arrest of subject movement calls for high shutter speeds even at the expense of depth of field, and camera shake can be avoided only with a really steady hold. When using a lens of 200mm or more, you should always support the lens barrel with your left hand, and if possible brace yourself or the camera against a firm object. Even then, you should regard 1/250 sec as the minimum shutter speed.

Apo Tele-Rokkors

To satisfy the most precise requirements of tele photography, Minolta offer two apochromatic lenses: a 400mm *f*5.6 and a 600mm *f*6.3. Each of these sophisticated lenses is supplied with its own matched two times convertor, so they can also be used as an 800mm *f*11 or a 1200mm *f*12.5 lens.

RF Rokkor Mirror

As a lighter, lower cost alternative to the two Apo Rokkor lenses is the 500mm *f*8 RF Rokkor which is also very small and must be a highly attractive lens to the nature photographer.

Minolta use the mirror principle for two other focal lengths---800mm *f*8 and 1600mm *f*11. All these lenses use a combination of mirror surfaces and normal glass elements. This enables the light paths to be folded, thus producing much shorter and somewhat lighter lenses. They are, however, much fatter than comparable

normally constructed units. As discussed with the 250mm lens, it is not possible to fit a conventional diaphragm and you 'stop down' with a neutral density filter which screws or slots into the rear of the lens.

Some photographers stop down by fitting an opaque cover which restricts light entry to one quarter of the front area of the lens. This gives some increase in depth of field and removes the characteristic angular highlights that mirror lenses produce in out of focus areas of the picture.

Long lenses

Lenses longer than 500mm are really for specialist use only and the 500mm lens needs considerable care in handling. Although it and, with difficulty, the 800mm RF Rokkor can be hand-held, none of these lenses show their true optical qualities unless they are firmly mounted. All but the 500mm are fitted with tripod bushes which should be used for mounting. The camera can be unsupported and may be rotated on the mount to give either vertical or horizontal format pictures. With the 500mm lens, mount the camera on the tripod in the normal way.

Apart from the problem that the minutest camera movement results in a blurred image, when photographing extremely distant subjects you are shooting through a great depth of atmosphere. On all but the clearest days the intervening dust, smoke, haze, mist and so on will seriously degrade the image. In black-and-white work you may be able to improve the contrast by using an orange or even a red filter. This, though, can lead you back into further problems with long shutter speeds. Even if you get a good strong clear image you may still not be too happy with the results. By magnifying a tiny section of the view to fill a full frame, long lenses have the effect of flattening the perspective. Coupled with their limited depth of field, this often produces the effect that you have photographed a cardboard cut-out.

Zoom lenses

Zoom lenses are constructed so that you can alter their focal length while the image remains in focus and the *f*-number remains the same. This allows you to frame the picture exactly as you want.

Zoom lenses are very useful and can take the place of two or more different fixed focal length lenses. However, they have the disadvantage that their physical characteristics are determined by the longest focal length—thus the 75–200mm MD Zoom Rokkor has a maximum aperture of *f*4.5 and weighs 600g (20oz). These figures are quite acceptable for a 200mm lens but they compare unfavourably to the 85mm MD Rokkor lenses, so the zoom is only worthwhile if you use all its range of focal lengths. When you do, however, its versaility is unrivalled, particularly for taking transparencies because their final composition must be decided in the camera viewfinder.

The 35–70mm *f*2.8 MD Zoom Rokkor is designed to replace the standard lens. It can accommodate an enormous range of photography without lens changing.

Instead of this one lens, you can cover virtually the whole popular

range of focal lengths with two MD Rokkor Zooms: the 24–50mm *f*4 lens and the 50–135mm *f*3.5. Both these lenses are small and comparatively light; they form the basis of a very small compact and versatile outfit.

At the other end of the scale comes the enormous 100–500mm *f*8 MD Zoom Rokkor with its 5:1 zoom ratio. This lens is excellent for some specialist purposes, for example, mounted on a firm tripod in a bird-watcher's hide. Its weight and bulk, however, make it impractical if you intend to walk anywhere with your camera. In that case, a much better proposition is to use the 75–200mm *f*4 MD Zoom Rokkor with a two times converter, and if necessary to carry a 500mm *f*8 RF Rokkor.

The smallest and lightest long focus Zoom Rokkor is the 100–200mm *f*5.6 lens. It is doubtful, though, whether the slight reduction in weight of this lens outweighs the disadvantage of its shorter range of focal lengths and smaller aperture than the 75–200mm lens. It is, however, considerably less costly.

Moving the zoom control during the exposure adds a new dimension to an otherwise quite ordinary transparency.

Left, the same effect can add much to action shots. Of course, that calls for a fairly long exposure of 1/8 sec., or thereabouts.

Tele-convertors

Teleconvertors (or tele-extenders) are multi-element negative lenses which fit between an ordinary lens and the camera. The effect is to multiply the focal length of that lens—usually by 2, but sometimes by 1.5, 2.5 or 3. Minolta supply a highly corrected tele-extender to double the focal lengths of the 400mm *f*5.6 and 600mm *f*6.3 Apo-Tele Rokkors. The two general-purpose convertors are designed for different ranges of lenses: TC 300S for lenses up to 300mm and TC 300L for longer focal lengths.

Uses

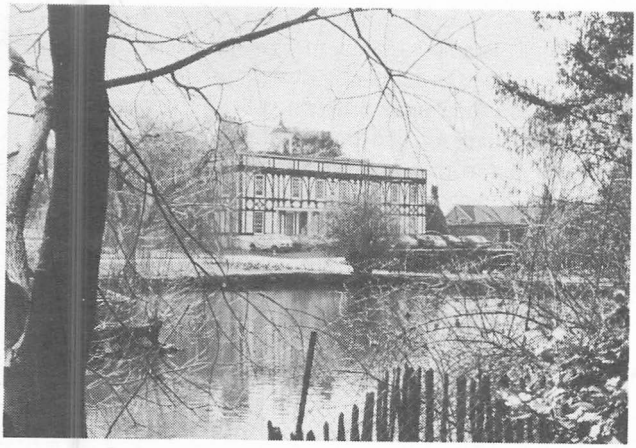
A lens/extender combination works just like an ordinary lens of the same focal length. Extenders work well with some zoom lenses, so giving, for example, 100 to 270mm with the 50–135mm *f*3.5 MD Zoom Rokkor. So, teleconvertors provide a light and relatively inexpensive means of obtaining longer focus results. They are ideal for taking an occasional photograph which needs a longer focal-length lens than you normally use and do not add much to the weight and bulk of your equipment. Shot with the standard lens on the camera, for instance, the building opposite looks unimpressive against fussy surroundings. With the convertor added, the angle of view decreases, image size increases and greater control over depth of field is available. A further bonus is that the combination of lens and extender focuses exactly as does the prime lens, and thus can normally be focused on a subject closer to the camera than could a prime lens of the same effective focal length.

Exposure

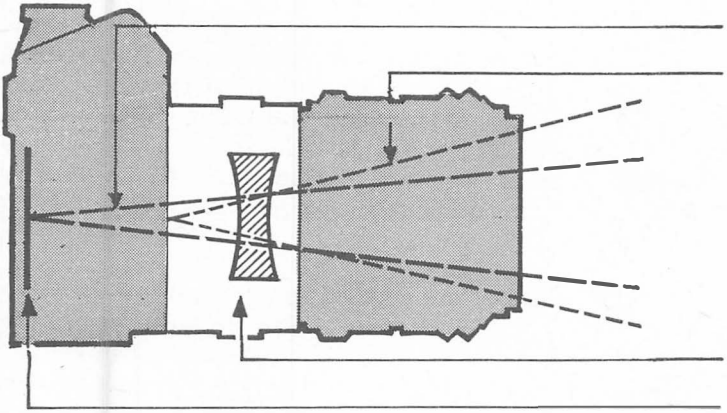
Teleconvertors increase the focal length without altering the effective aperture of the prime lens (see page 48) so the marked *f*-numbers no longer represent the relative aperture. The marked *f*-number must be multiplied by the power of the convertor to give the *f*-number of the combination. Thus a 50mm *f*1.4 lens becomes a 100mm *f*2.8 with a 2x extender or a 150mm *f*4 (4.2) with a 3x. All aperture settings are similarly affected. Through the lens exposure systems take account of this effect and indicate or set the exposure actually needed. The Minolta 300S or 300L teleconvertors are MD-coupled for shutter speed priority metering on XD cameras.

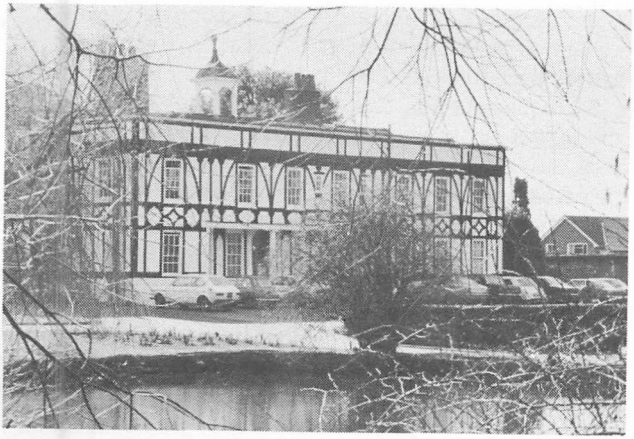
It is possible to use two or more in combination; their effect on focal length and aperture are then multiplied. For example, a 2x and a 3x extender together would turn a 58mm *f*1.2 lens into a 348mm unit with a maximum aperture of *f*8 (7.2).

Teleconvertors



Camera and standard lens





Camera and teleconvertor

Close-ups

One of the fascinations of SLR photography is in picturing tiny subjects. With a little simple equipment, the range of subjects is immense. You can picture a painted lady butterfly on the full width of a transparency and then blow it up on your projection screen until it is 1⅓m (4-5 ft) wide; you can show the minute interior details of a flower or create puzzle pictures from little sections of familiar objects.

There is nothing magical about extreme close-ups. All you have to do is arrange that the camera focuses very close; in order to do this you must increase the distance between the film and the lens. This is what you do anyway when you turn the focusing ring on most lenses—the glass components move forward in their mounting within the barrel. With ordinary lenses, the amount of travel thus provided is restricted. For example, the standard lenses focus down to a distance of about ½m (1¾ ft). There are two ways that you can arrange closer focus: you can add an extra lens to the one on the camera to shorten its focal length so that the existing travel has greater effect; or you can move the lens further away from the camera by interposing extension tubes or extension bellows.

Close-up lenses

Close-up lenses are relatively inexpensive—usually single glass constructions in filter type mounts. They attach to the front of the camera lens, just like a filter. Unlike normal lenses it is customary to rate close-up lenses in dioptres rather than focal lengths. In fact, dioptres are simply the focal length divided into 1m, so a 1 dioptre lens has a focal length of 1m, and a 3 dioptre lens, 33cm. The greater the power or dioptre number, the closer you can focus and so the greater magnification in the picture.

Minolta close-up lenses

Minolta close-up lenses are supplied as number 0 (0.95 dioptres) number 1 (2.0 dioptres) and number 2 (3.8 dioptres). You can use them singly or in pairs to provide a range of strengths between just under 1 and nearly 6 dioptres. When you use two together, always put the more powerful one on to the camera lens first.

Most accessory manufacturers supply close-up lenses as well—usually in strengths from about 1 to 3 or 4 dioptres. However, not all of these are as carefully made as the Minolta lenses and you may find that you have to close down to *f*8 or *f*11 to obtain a really sharp image. Zoom close-up lenses are also available. These allow you to vary the power up to about 10 dioptres. Used at relatively small apertures, they can be a convenient way to take some close-ups.

As noted earlier, the effect of a close-up lens is to reduce the total focal length of the combination and thus make more use of the existing extension. However, it is much simpler to remember that with the camera lens set on infinity the combination focuses at the focal length of the close-up lens. For example, when you mount the number 1 close-up lens on any camera lens set to infinity, you form a sharp image of subjects exactly 50 cm from the lens. The normal focusing travel allows a restricted range of closer focusing. The major

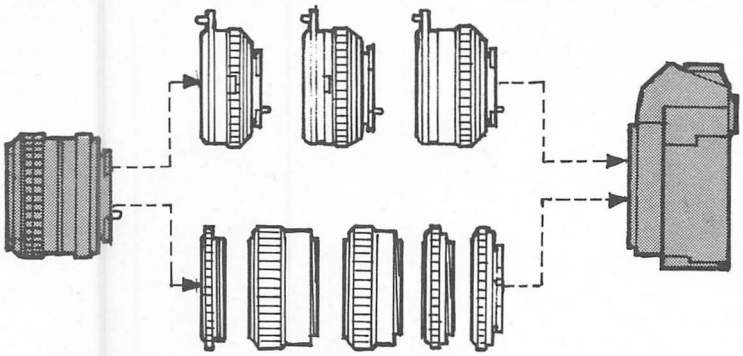
advantage of close-up lenses is their convenience. They do not affect exposure calculations nor do they interrupt any lens-camera linkages.

Extension tubes

Extension tubes are—exactly as their name implies—metal rings or tubes to provide fixed amounts of additional distance between the lens and the film. This, of course, allows you to focus closer and thus produce a larger image on the film. Minolta supply two sets of tubes: the Extension Tube Set II consists of three tubes of 7, 14 and 28mm ($^1/_3$, $^2/_3$ and 1in), which screw into one another; and two bayonet adaptor rings, EB and EL. Ring EB is fitted to the camera body by aligning the red dots and turning it in the usual way. EL is fitted to the lens. You can now screw the two rings together giving 7mm ($^1/_3$in) extension. Alternatively, you can interpose one or more of the other three tubes to give the magnification you need. With a 50mm standard lens, the Extension Tube Set II allows you a range of magnifications between 0.14 and 1.21 times.

Manual diaphragm operation

The Extension Tube Set II has no lens-to-camera coupling mechanism, so Rokkor or Celtic lenses mounted on the tubes operate manually. Adjusting the aperture ring sets the aperture directly on the diaphragm; so whenever you have a fixed camera position, focus on

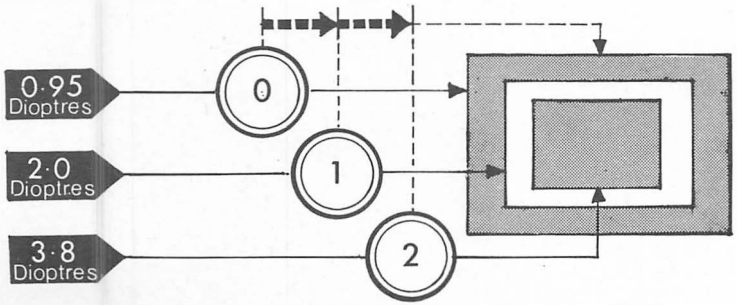


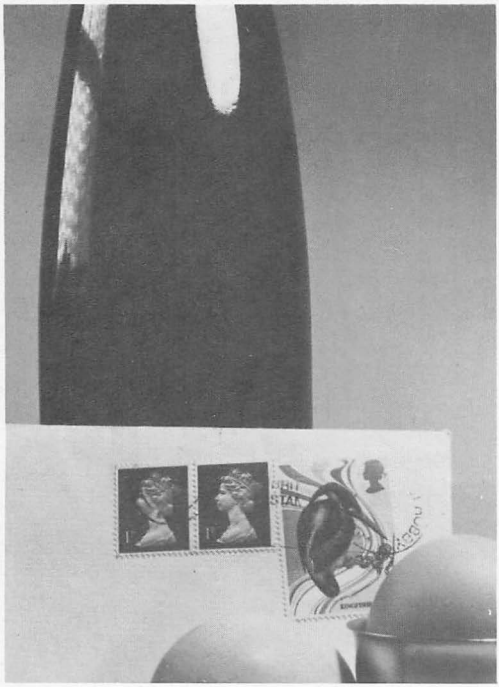
Auto Extension Tubes

Manual Extension Tubes

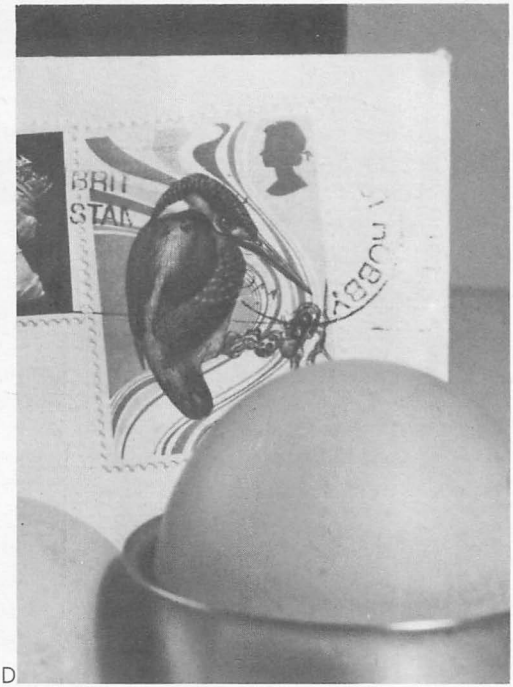
Close-up Lenses

Areas of nearest focusing distance compared

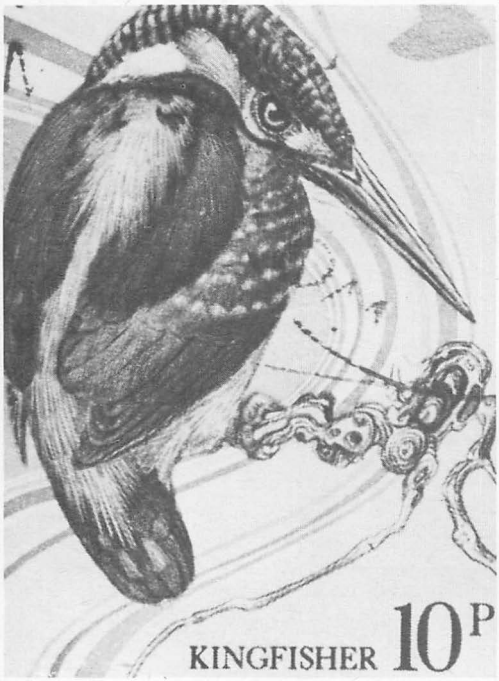


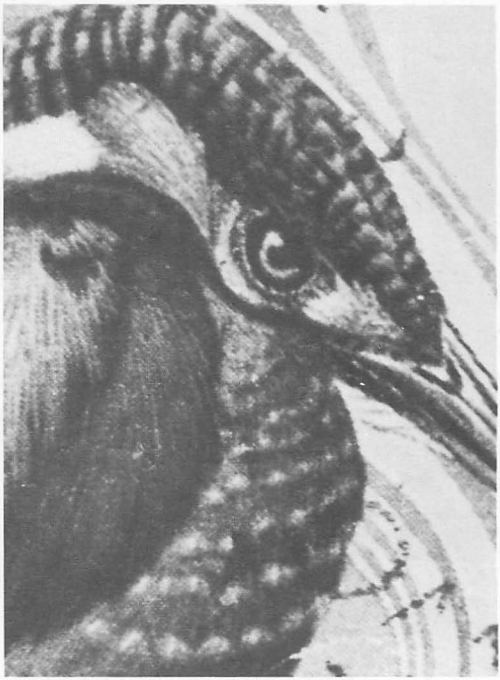


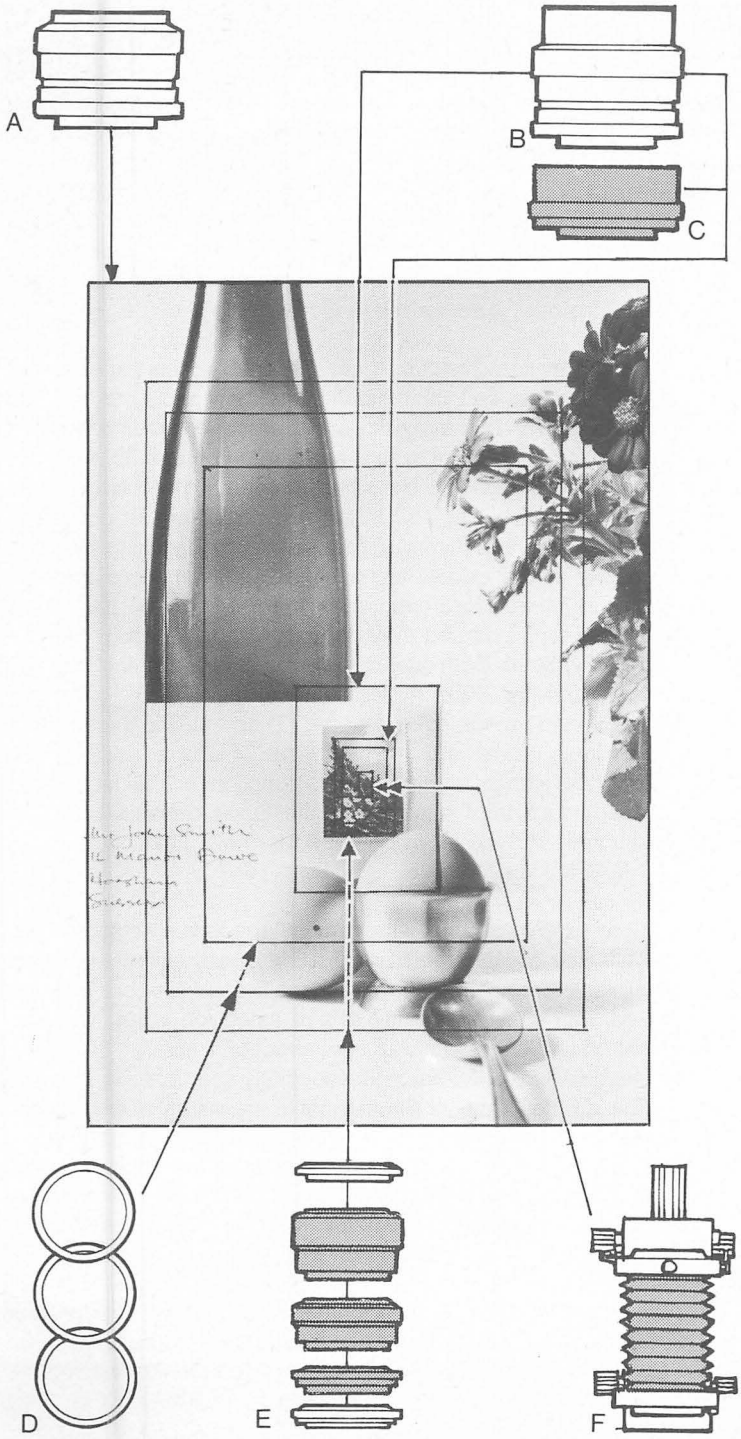
B D



E F







The Scope of Close-ups

A 50mm lens closest focusing distance

B 55mm macro lens, alone

C 55mm macro lens plus extension tube

D Close-up lenses range with 50mm lens

E Extension tubes range

F Range of bellows

your subject before you stop down the lens. Because extension tubes move the lens further away from the camera, they reduce the amount of light that reaches the film at any particular diaphragm setting. This is important for flash exposures (see page 120), but is compensated for fully by the normal through-the-lens metering system on the Minolta SLRs. In fact much the simplest way to use the camera with manual extension tubes is in the automatic-exposure mode. Both types of camera select the correct shutter speed automatically through the stopped-down lens aperture. In fact, the final check system on the XD ensures that you get aperture priority automation whether the camera is set for the A mode or the S mode.

Automatic diaphragm operation

The reduction in light resulting from the extra extension dims the viewfinder image as well, so it is difficult to view and focus with the lens stopped down. This makes manual extension tubes difficult to use with moving subjects or with a hand-held camera. So, for more than the occasional close-up shot, you are well advised to get automatic extension tubes. The MC Auto Extension Tube Set consists of three tubes (14, 21 and 28mm). They extend the focusing range in the same way as the manual tubes but allow automatic diaphragm operation and full aperture exposure control. Each tube has a bayonet mount at each end and they do not use adaptor rings like the Extension Tube Set II. With one or more rings, between the lens and the camera body, the XG operates in its normal aperture of priority automatic exposure mode. Likewise, the XD operates in the aperture priority mode as it does with any MC lens. Of course, the MC auto extension tubes cannot add any extra function to the lens—so a manual diaphragm lens mounted on the tubes remains a manual diaphragm lens, and the tubes do not add an MC function to an old non-MC Auto Rokkor.

Which lens?

You can use extension tubes with virtually any lens. The shorter the focal length, the greater the magnification at any given extension. For example, a 35mm lens will give a magnification of about 1.5 times when used with either of the full sets of extension tubes, while an 85mm lens will give a magnification of about 0.75 times.

The 24mm *f*2.8 VFC Rokkor is an especially good choice; because you can mould the 'plane' of sharp focus to the shape of the subject. The focused distance is not necessarily the distance from the front of the lens. It is the distance from an optical point within the lens. (Distance figures given in tables supplied with close-up lenses are measured from the subject to the film plane, but the reflex viewfinder of your Minolta saves these being referred to.)

Reversing the lens

Most Minolta lenses are designed to give their optimum performance on distant subjects. To make the best use of their optical design for close-up work, they may be fitted in reverse on the extension tube, when the subject is smaller than the image on the film—that is, when

the magnification is greater than one-times. When that is the case, it is advisable to reverse moderately long and standard focal length lenses. Wide-angle lenses should rarely be used in reverse with the exception of the 24mm VFC which can be recommended for use with bellows. However, if you need high magnification and have no alternative but to mount a wide-angle lens on tubes or bellows, you have to reverse it to form an image at all because the retrofocus construction means that the subject would need to be inside the lens, used the normal way round.

Macro lenses

Out and about with the camera, you quite often want to change quickly from picturing a distant subject to taking a photograph of something quite close. If you are using a normal lens, that means you have to take it off the camera, put a tube on and replace the lens. The MD Macro Rokkor lenses provide a very convenient alternative to this. These lenses are available in 50mm and 100mm focal lengths. Both have a maximum aperture of *f*3.5. They are housed in focusing mounts with extended travel. The 50mm *f*3.5 MD Rokkor focuses to just under 25cm (approx 6½in) and reproduces subjects exactly half life-size on film. The 100mm lens focuses down to a distance of half a metre; that is, as close as a normal 50mm standard lens. At that distance, it again reproduces subjects just half life-size on the film. These lenses are both computed to be particularly suitable for close-up photography. However, they still produce good images of more distant subjects.

If, as most people do, you already have a 50mm standard lens, the 100mm *f*3.5 MD Macro Rokkor is a particularly useful first accessory lens. Not only is it good for close-ups, but it is also ideal for portraits and much outdoor photography. Note too, that in close-up photography depth of field and the effect of camera or subject movement is determined entirely by the magnification of the subject. So, choosing the 100mm lens, rather than the 50mm lens produces no disadvantages.

Life-size adaptors

Both the Macro lenses come with their own MC-coupled extension tube. This tube extends the magnification to allow you to reproduce things between half life-size and life-size on the film, depending on the setting of the lens' focusing ring.

Naturally, these MD-coupled lenses give you full automatic exposure facilities on the Minolta SLRs, and full aperture priority automatic exposure with their MC-coupled extension tubes. But, as with any other extension device, you need to know the effects of the extra extension when you use flash. The MD Macro Rokkors therefore have magnification and exposure factor scales engraved on them. The white scales are for the lens by itself, and the orange ones for the lens with its life-size adaptor.

Extension bellows

Extension bellows perform the same function as extension tubes, but allow you to vary the extension between the limits of the bellows

length. The Minolta Bellows IV consists of two panels mounted on a geared rail. The back panel carries the camera on a rotatable mount (so that you can choose between horizontal and vertical format pictures). The front panel carries the lens. You can rack either panel back or forward along the geared rail by turing the knob on its left-hand side. To lock the panel in any position, twist the knob on its right-hand side. When the camera panel is in its fully rearward position, the actual extension range in millimetres is indicated by the scale on the geared rail. The tripod bush below the rail allows you to mount the bellows unit on a tripod or on the Minolta Focusing Rail. The front panel can be removed entirely from the rail, reversed, and remounted. In this way you reverse the lens. However, this reduces the total extension possible, so a reversing ring is still a useful accessory with the Bellows IV.

Auto Bellows III

The Auto Bellows III is a similar unit. However, the lens panel is much more sophisticated. Firstly, it incorporates an automatic stop-down mechanism. When you mount a lens on this panel it remains at full aperture just as it does on the camera. To stop it down, you can either press the release button on the front panel or the plunger of a double cable release connected to the socket on the front panel.

This gives you the choice of two automatic diaphragm operation mechanisms. With a double cable release correctly adjusted and fitted into the socket on the lens panel of the bellows and the remote release socket of the camera, pressing the end of the cable release stops down the lens and then fires the shutter. Alternatively, you can use the special coupling cable available for the Auto Bellows III. This connects the cable release socket on the bellows to the remote release socket on the camera. Now, when you press the release button the lens panel of the bellows, the lens stops down and the cable then fires the camera.

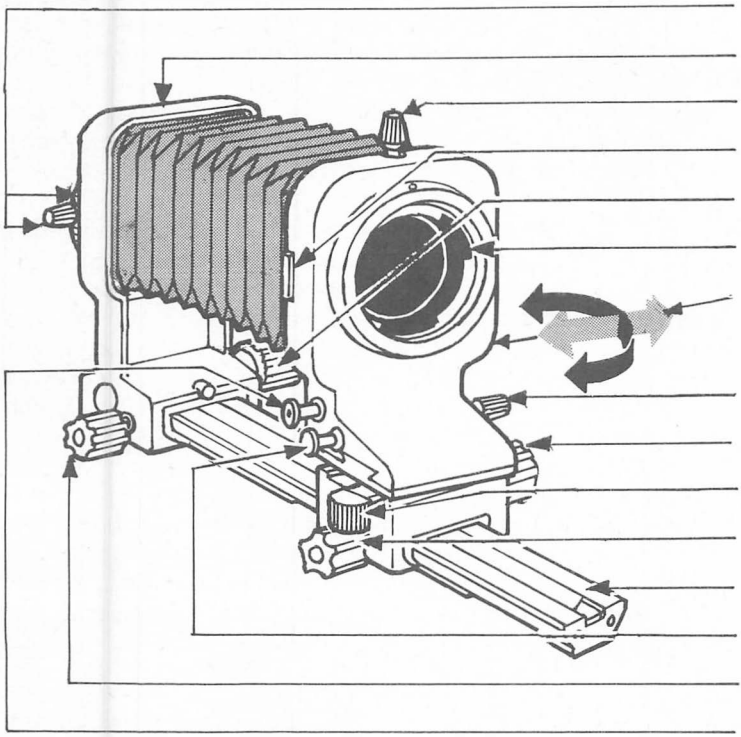
Reversing the lens

When you reverse a lens in the normal way with a reversing ring, you remove all its connections with the camera body and thus lose the automatic diaphragm mechanism. The Minolta Auto Bellows III solves this problem by having a removable front standard like the Bellows IV. Loosen the small screw at the top just behind the lens panel to remove the bellows. Then take the front standard off its mounting rail, turn it round and put it back on the other way round. Couple the bellows to the filter ring of the lens; directly if it takes 55mm filters or with the adaptor ring provided if it takes 52mm or 49mm filters. With the same cable connections, the lens now has the same diaphragm operation as it has facing forward.

Shift and swing

As a further refinement, the front panel of the Auto Bellows III allows you to move the lens sideways or to swivel it on its axis. This gives you a degree of perspective control and the swivel allows you to manipulate the extremely shallow depth of field to its best advantage.

Minolta Autobellows III



camera mount and lock

rear panel

bellows release

lens release

rear panel movement

lens mount

front panel can be shifted or swung

swing lock

front panel movement

shift lock

front panel lock

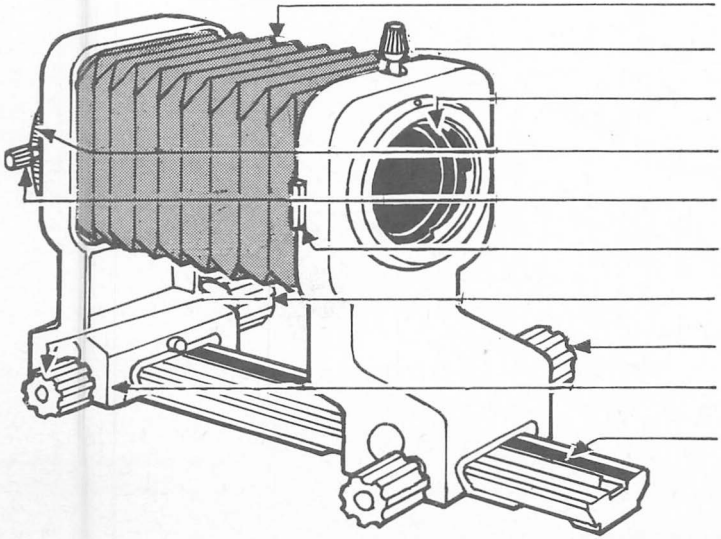
track

stop down release/shutter release

rear panel lock

cable connector

Minolta Bellows IV



bellows

bellows release

lens mount

camera mount

camera mount lock

lens release

rear panel movement and lock

front panel movement

rear panel

track

Older bellows

Two earlier Minolta bellows units are still in wide use—the Bellows III quite closely resembles the Bellows IV with the control knobs reversed. However, the rear standard is fixed and cannot be moved along the rail and the camera mount does not allow you to swivel the camera for vertical or horizontal shots. The Auto Bellows 1 is a twin-rail bellows, which couples directly with its own focus rail which is necessary for accessories such as the Slide-Copier or Macro Stand. Like the Bellows III the back standard is fixed and the camera cannot be rotated.

Automatic diaphragm operation, though, is controlled internally within the bellows unit, thus, you do not need any cable connection between the bellows unit and the camera. However, if you want to reverse the lens, you must use the normal reversing ring and lose the automatic diaphragm facility. Furthermore, it is not possible to use automatic exposure with these bellows on the XG-1 or XG-2 (XG-7) except when the lens is reversed and the automatic diaphragm mechanism out of operation.

Older accessories

You can use the Slide Copier and Macro Stand designed specially for the Auto Bellows I on the Bellows III with a connector. None of the accessories for these bellows are interchangeable with the new Auto Bellows III and Bellows IV; neither can you use the Auto Bellows III and Bellows IV accessories on the older units.

Focusing rails

Most close-up photography is done with a camera mounted on a firm support. This is essential for two reasons. Firstly, the reduced light reaching the film because of the extension necessitates the use of relatively long shutter speeds in most conditions. Secondly, magnifying the subject magnifies its movement and at the same time any camera movement.

Often the simplest way to work is to set up the camera with the right number of extension tubes or the correct bellows extension to give you the required magnification. Then move the whole unit backward and forward to focus on the subject. When you are hand-holding the equipment, it is quite possible to do this with a rocking motion. It is, though, particularly inconvenient to move a tripod or other firm support backwards and forwards until the focus is exactly right.

The answer to the problem is to use a focusing rail. The focusing rail couples directly below the bellows and provides a second rack which moves the bellows, and therefore the camera and lens, backward or forward as you rotate the knob. Like the bellows panels, the focusing movement on the rail is lockable.

This close-up shot shows how the impact of an image can be increased by isolating it from its surroundings.

The focusing rail for the Auto Bellows III and Bellows IV is quite different from that for the Auto Bellows 1. However, they both function in a similar manner. The front of the bellows unit engages in the front

of the rail. The back of the rail carries a tripod type screw which engages with the bellows tripod bush fixing the two together. There is no focusing rail for the Bellows III. However, if you use that or extension tubes or even a macro lens, you can mount the camera or the bellows unit on either focusing rail just using the screw on the rail. The new focusing rail has another and totally separate function. It carries a hot shoe flash contact so it can double as a flash bar. To use it this way, fix it to the tripod mounting bush in the camera so that it sticks out sideways. Connect the focusing rail with its cord to the 3mm (PC) flash terminal on your camera. Now you can mount any cordless hot shoe electronic flash on the accessory shoe of the focusing rail.

Shooting at close range

Once you have selected your equipment and decided just how large you want to record the subject; that is where the full advantage of the SLR comes in. You can compose and focus the picture exactly as you want it through the viewfinder. With a suitable camera support you can move your whole equipment backward and forward to get it in focus, changing the extension as you need to get the required magnification.

If you move the lens in relation to the camera in order to focus the picture you change the size at the same time. If you move the whole outfit, which is the best way with tubes or with the older bellows units, the image size changes but not so drastically. With the newer bellows unit you can move the back panel with the camera on it for focusing. In that way, as you focus the image stays exactly the same size.

Composing and focusing the picture is only part of the story. Just as with full-size subjects, the lighting makes or mars close-up pictures. Whenever possible, use daylight or a continuous artificial light source. Follow normal lighting principles using small pieces of paper to reflect light where you need to.

Flash close-up

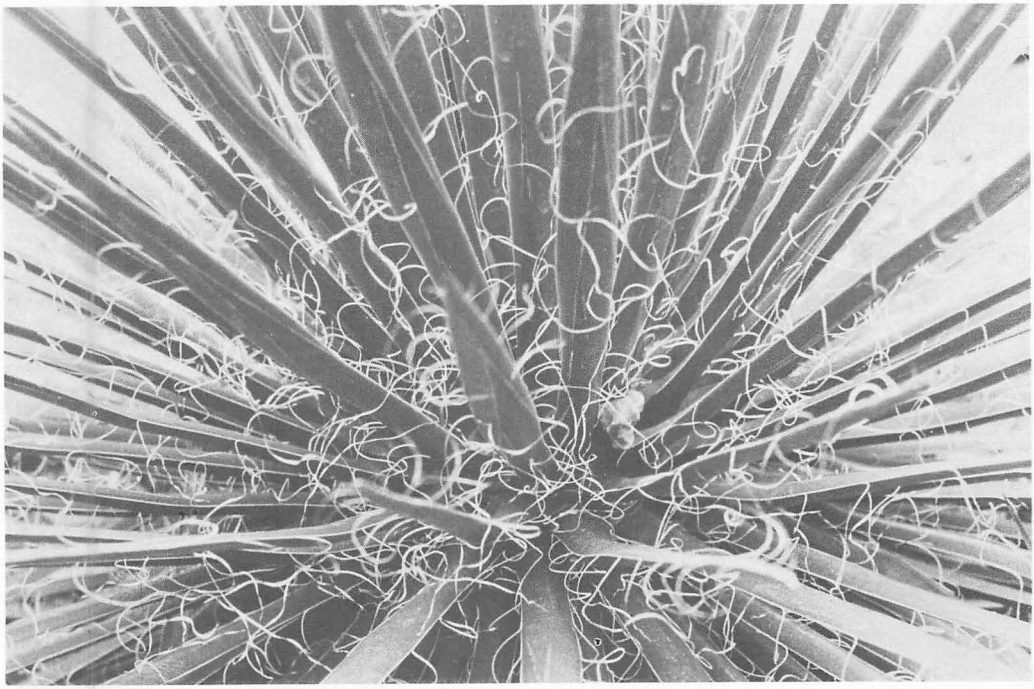
1 A 100mm bellows lens transforms this plant into a surreal monster.
Clyde Reynolds

2 A close-up of a snowdrop taken in available light.

3 Using flash to illuminate this close-up separates the snowdrops from the background, which is darker because of the smaller aperture.
2/3 Sidney Ray

There is one problem with using flash for close-ups: you cannot see what the lighting is until you have processed the film, and with tiny subjects, small movements of the light units can make an enormous difference to the final picture. However, flash has a major practical advantage for small subjects. It allows you very short exposure times coupled with the fact that it does not 'fry' tiny living specimens the way that any artificial light is likely to do. This makes it highly desirable to persevere with flash techniques if you picture moving subjects of any sort.

The easiest flash source is a ring flash. This uses a circular flash tube surrounding the lens and provides virtually even shadowless lighting which is particularly favoured for medical and scientific work. Flat lighting though, gives you very little three-dimensional effect and thus is not suitable for subjects whose shape is important. Perhaps the simplest way to use directional lighting is to mount one or



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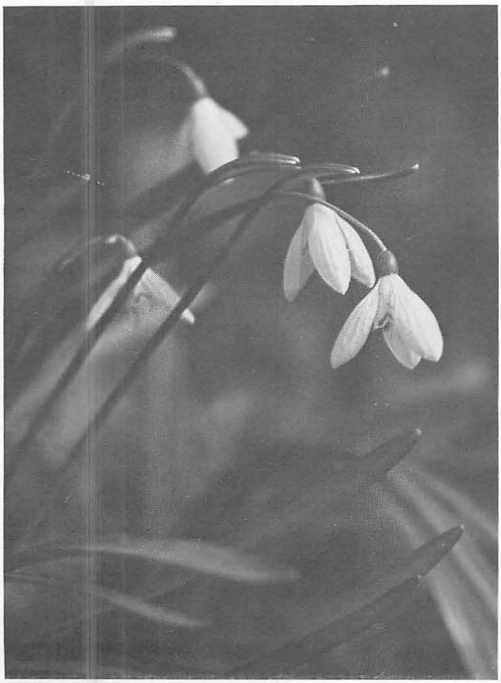

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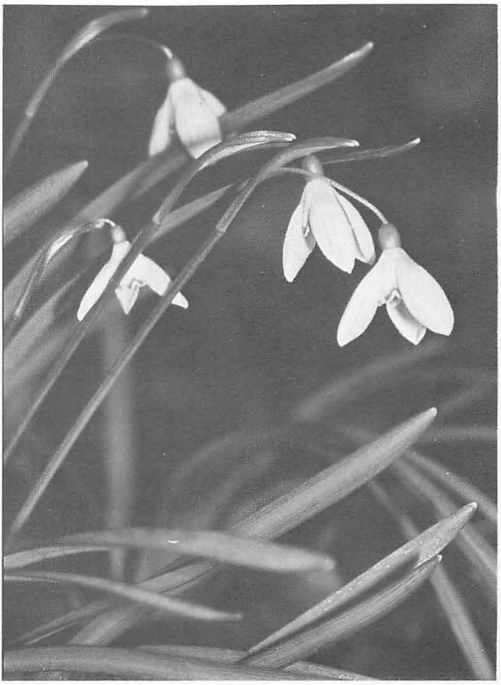


more small flashguns close to the front of the lens. If you use an adjustable bracket, you can set the units to give just the modelling you want.

Flash exposures

Flash exposure control, manual or automatic, requires that you set the lens to a particular aperture for the flashgun setting or for the flash distance. Once you move the lens significantly further than its normal distance from the camera, the *f*-numbers you set on the aperture ring no longer relate in the same way to light reaching the film.

To calculate the effective *f*-number you must multiply the setting on the ring by the total lens extension and then divide by the focal length. To obtain the total extension add the extra extension, i.e. the tube or bellows length to the focal length. For example, the 100mm Macro lens on its life-size adaptor and fully extended, is 100mm further than normal from the film plane, so the total extension is 200mm. Thus, with the aperture ring at *f*8, the effective *f*-number is 8 × 200/100 or *f*16. In fact, for life-size reproduction the effective *f*-number is always exactly double the setting on the aperture ring.

With Auto Electroflash 200X as the main light source, ⅔m (2ft) away from the subject, on 100 ASA film and the LO setting, the calculator suggests you need an aperture of *f*11. With life-size reproduction you therefore must set your camera lens to *f*5.6. If you want to use automatic flash exposure, which has the advantage of producing even shorter duration, and therefore freezing movements such as the beating of a bird's wing or even the fluttering of a butterfly, on this gun you must use the yellow setting if the flash is closer to the subject than 1m (3ft); in which case again with 100 ASA film you need an aperture of *f*5.6. So again, for the correct exposure you must halve that figure and set *f*2.8 (which, of course, is not available on the macro lenses). To use auto flash really close with these lenses you need a more powerful unit, such as the Auto Electroflash 132 or 450.

Of course, this modification to the effective *f*-number applies whenever you determine the exposure other than through the lens. So, if you use a separate meter for close-ups, do remember to modify the aperture setting.

Copying slides

The easiest way to make duplicates of transparencies is with a slide copier mounted on the bellows. The latest Minolta slide copier fits directly to the Auto Bellows III or Bellows IV. A different copier mounts on the focusing rail of the Auto Bellows I or the connector of the Bellows III. In principle, though, the two units work very similarly.

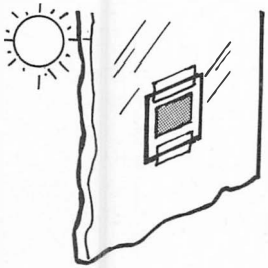
Mount the camera lens on the bellows; choose a 50mm lens if you want to duplicate the slide to the same size, or a shorter focal length if you want to magnify them more. As with any other close-ups, for magnifications much greater than 1 to 1, reverse the lens. Mount the slide copier on the front of the bellows, release the clips either side

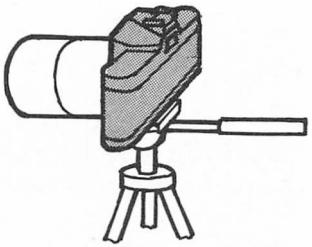
and pull the copier bellows back to engage with the filter mount of the lens. The lens connector fits directly on 55mm mount lenses. For 40 or 52mm mount lenses, use the adaptor provided with the bellows. The 49mm adaptor is the right size to grip reasonably snugly the mount on the back of a reversed lens. Note that the copier bellows is purely acting as a lens hood and so the connection with the lens does not have to be completely light tight.

Holding transparencies

Slides go behind the hinged diffuser on the front of the slide copier. You can move the slides from side to side or up and down so that when you are reproducing a magnified copy you can select exactly the area of original transparency you wish to magnify. Just in front of the slide holder is a narrow slit into which you can put film strips. When copying from strips fix the two film strip holders to the slide copier to hold the coils of film on either side.

When you have set the magnification on the bellows, then focus the image by moving the slide copier back and forward. The new unit has its own focusing knob which operates on the bellows rack. The older unit on the Auto Bellows 1 uses the focusing rail to provide its focusing movement. On the Bellows III you simply loosen the lock knob and slide the connector back and forward. Once you have focused exactly on the area that you wish to reproduce, tighten all the locking screws.

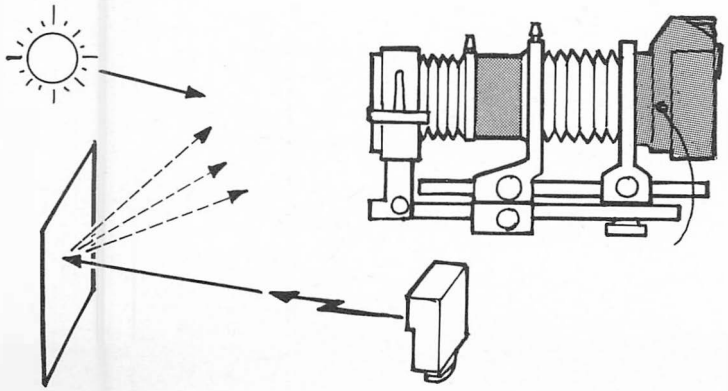




Slide Copying

daylight

tape slide to window and use micro lens or standard lens and extension tubes



slide copier and bellows use daylight or flash bounced off white card

Films

You can copy colour slides and colour negatives on colour transparency film. You can make black-and-white transparencies from negatives on ordinary black-and-white negative film, or colour or black-and-white negatives from transparencies on the appropriate film.

You *can* make transparencies from colour negatives if you load your camera with print film. However, this is a process closely related to ordinary colour printing, and you have to make the same series of tests to determine both the exposure time and the filters you need to get the required colour. You really have to do your own colour film processing if you want to try this.

You can use daylight or artificial light to make your slide copies; but if you are working on transparency film, it must of course be balanced for the light that you are using. The white diffusing panel allows you to shine a light directly at the slide copier, but be quite sure that the slide is evenly illuminated. It is much better to reflect the light from a large white reflector.

Exposure

With a continuous light source the automatic exposure systems give the correct exposure; but there is more of a problem with flash. However, a good starting point is to work out the aperture in the usual way using the flash to white card film distance correct for magnification, i.e. open up by two stops for 1 to 1, and then open up one more stop for the light absorbed by the card. Of course automatic flash units must be set to manual for this operation.

Macro stands

The macro stands fit just like the slide copiers to the focusing rails. They provide a small vertical stage on which you can photograph small objects such as postage stamps, coins or insects. The metal stage is coloured mid-grey to ensure accurate meter readings. It can be removed if you want to shoot through the stand. In which case, set your exposure level manually.

Viewing accessories

While the normal viewing system is fine for most pictures, there are times when you may want to modify the view. The accessories slide onto the eyepiece, their ridges registering in the grooves either side of the lens.

Focusing magnifier

For critical focusing, especially useful in close-up work, the Magnifier V can be fitted into the grooves surrounding the eyepiece. It has dioptric adjustment for eyesight correction. Focus the camera on a static subject, then focus the magnifier on the camera's focusing screen by rotating its eyepiece. You can then see the centre of the screen magnified 2.5×, and thus focus your subject with great accuracy.

Angle finder

The Angle Finder V also fits into the accessory fitting grooves and has dioptric adjustment by rotating its eyepiece. It allows the screen to be viewed at right angles from above or below the camera, from either side or from any position in between. This may be convenient, or even essential, when shooting in confined spaces, from low angles, or with the camera fitted to ancillary equipment such as a microscope. The finder shows a laterally reversed image of the camera screen and the meter needle thus appears on the left-hand side.

Eyesight correction

The Eyepiece Corrector Lenses V are designed to correct the eyepiece for near- or far-sighted persons who do not like viewing through their glasses. The lenses, made in nine dioptre strengths from −4 to +3 are mounted in rectangular holders which slip into the slots in the camera eyepiece. This range is fine for many spectacle wearers, but by no means all. Some need stronger dioptric correction, and often cylindrical (astigmatic) correction as well. If you wear glasses of this type and want to dispense with them for photography; arrange for an optical company to make up and eyepiece, lens to your spectacle prescription.

An inability to focus close by can occur with increasing age. This results in the need for reading glasses or bifocal lenses. If you use special glasses for close viewing you may find that a slight positive correction to the eyepiece will allow you to focus the screen clearly with distance glasses.

Caring for and Travelling with your Equipment

With just a little care, your Minolta equipment will last for many years. In fact, you are very unlikely to wear it out; lack of use is a much greater risk.

Ideally, no camera should be stored. The camera is designed to be used. If it is not, its mechanism can become sluggish and unreliable. If possible, operate the mechanism a few times each month even if you do not actually take any pictures. If storage is inevitable, when you take the camera out, check it over thoroughly, operating all shutter speeds several times with the lens removed or back open so that you can observe the shutter action. If you use flash, plug a flashgun in and make a few test shots, again watching for synchronization through front or back with the lens in place.

The batteries in electronic cameras are an especial source of danger. No battery is totally leakproof, and leaking contents can damage your camera or winder—perhaps even beyond repair. Whenever you put your Minolta equipment away for more than a week or two, remove the batteries, and store them separately. When you use the camera again, clean the batteries and their housing and replace them. If you have any doubt about them, use new ones.

Cases

Cases fall into two categories: ever-ready camera cases, lens cases etc. which come with the equipment; and gadget bags or equipment cases.

Ever-ready cases are a matter of taste—many photographers find them a nuisance, and often the best compromise is to remove the front flap and leave it at home, thus retaining some protection without inconvenience. They are, however, good for protecting the camera in storage, as are the round lens cases supplied with Minolta lenses. When carrying the camera, keep it close to the body on a tight strap so that it does not swing out into brick walls or tree trunks.

If you want to carry several items with you, the simplest way is to put them all into one case. If you carry the camera separately, a small gadget bag is very handy. The sort that are supposed to hold a camera and two accessory lenses will hold about three lenses, a small flashgun and several cassettes of film, together with filters, extension leads and other small items. For real strength, however, there is no substitute for foam-lined aluminium cases. These can be bought in a number of sizes, and have foam inserts which are cut out to provide tight-fitting compartments for all your pieces of equipment. They are not, though, highly portable. So, you really need a gadget bag as well, to allow you to carry exactly what you need for a particular assignment; leaving the rest in the foam-lined case securely locked away.

Cleaning operations

In normal use, the camera needs little attention. The best treatment, in fact, to keep it in good condition is constant use. Avoid any cleaning operation unless it is absolutely essential. A few specks of dust on the lens will do no harm at all. Frequent careless cleaning with a

handkerchief can cause considerable damage that is progressive and insidious. If dust or sand does get into the camera in significant quantities, you would be better advised to take it to a competent mechanic for a complete overhaul. The same applies if you drop the camera into water, particularly sea-water. The chances are, in both cases, that at least partial dismantling will be necessary to get the water, sand, etc. out of inaccessible parts and to effect thorough cleaning and regreasing.

Never, under any circumstances, attempt to repair a camera that is malfunctioning unless you are absolutely certain that you know what you are doing. Camera repairs are expensive but they can become a great deal more expensive if inexpert repairs are attempted first. However, it is worth while to carry some watchmaker's screwdrivers to tighten any screws that come loose, but do that with care as well.

Travel and your camera

For most of us any journey involves a flurry of photographic activity. Pictures of far-away places have more interest and charm than your local district. Do not forget, though, that your local shopping precinct is someone else's exotic adventure. Take your own neighbourhood seriously.

Problems

When you travel, though, you have to be especially selective about your equipment. Of course, you can carry your whole outfit in your car, but not walking about a city all day. So, plan ahead; if you carry a lot of equipment in your car, think just what you intend to do with it; and consider the danger of leaving it even in a locked car.

If you have a secure base, then you can transport your outfit in a fitted case, secure in the knowledge that you can leave it behind you when you want to. In that event, take a small gadget bag as well. Then you can walk around with just the selection of equipment you need on any particular day. Try not to leave the rest, though, in your car on hot sunny days. The temperature can rise far too high to do your films any good.

Selecting an outfit

If you are going to a zoo, or an air display, for example, you are likely to need long focal length lenses. Take the longest one you can carry—the 500mm *f*8 and 250mm *f*5.6 RF Rokkors are especially convenient. Take a standard lens, or a 35mm if you use one a lot. Then fill in the gaps. If you expect good light, choose relatively small aperture lenses, the 75–200mm *f*4.5 MD Rokkor Zoom is ideal. Put a 2x converter in your pocket to cover the gaps and you have more than you need.

On the other hand, should you be picturing a town, you are likely to want the widest angles you can get. You could, for example, take a 17mm *f*4 MD Rokkor, 35mm *f*2.8 Shift CA Rokkor, and the 50–135mm *f*3.5 MD Zoom Rokkor.

For evening or indoor shots, maximum aperture is all important, so you want the widest apertures you can get, say, the 35mm *f*1.8 and 85mm *f*1.7 MD Rokkors. You may also want a flash or two.

Analyze each individual photographic outing the same way, and take the minimum that you need.

Widening the options

When you propose a multi-purpose trip, then you have to combine your lists to select an ideal outfit. Whenever you can, make compromises. For example, you may find a 50mm *f*1.4 MD Rokkor and a 2x convertor more useful than a 100mm *f*2.5 lens; or that the 28–50mm *f*4 MD Zoom Rokkor is the only wide-angle lens you ever use, and that with an 85mm *f*1.7 and a 2x convertor can cover all needs.

Of course, you soon have favourite lenses. Mine is the 75–200mm *f*4.5 MD Zoom Rokkor. Along with that, I take either a 24mm *f*2.8 MD Rokkor, or the 17mm *f*4 MD Rokkor and the 35mm *f*2.8 Shift CA Rokkor. When I expect to need longer focus lenses, I like the 500mm RF Rokkor, and take a 2x convertor. The standard 50mm *f*1.4 MD Rokkor goes with me when I travel, and gets used a lot for available-light work, which is where the 85mm *f*1.7 lens comes in, too.

Select your pictures

It is not just your equipment which calls for planning—it is your pictures as well. It is fine to make abstract patterns of swirling traffic or backlit thistles; but if you can do them just as well at home, you might as well leave your camera behind and enjoy the new places. If you want to record your experiences, you must concentrate on the places and people you meet. Decide just what is new, what is different. Think how best you can emphasize the difference.

Picture the ordinary dwellings as well as the public places; show the people at their work as well as the ceremonial; and emphasize the lush pastures or arid deserts as you wish; the opportunities are boundless.

The arts of documentary photography greet us every day in newspapers and magazines. Look at the pictures with care. Decide which you admire, which do their jobs best, and why. You can use the techniques of a war photographer to great effect at the Calgary stampede, or bull-running in Pamplona. Look at the pictures of refugee children; you can follow their pattern with settled children playing; or examine landscapes or town pictures to see how the photographer distilled the essence of each scene.

Take enough shots

Each time you take a picture, compose the scene on the focusing screen. Convince yourself that you cannot improve it, then press the button. Each one should be a masterpiece in its own right; but there is always another view. So, keep on looking to see if you can find a better angle.

Often when you examine your pictures, you find that a forgotton second glance gave you the best one. So, if the picture you compose

The vertical format used here emphasizes the narrowness of the canal and focuses attention on the gondolier.
Beatrice Reynolds

has possibilities, take it. It is better to use a bit more film than to miss the best picture. That is not to say, of course, that success comes in any way in proportion to the amount of film you use—it comes from the amount of application you give to the images on the viewing screen.

Minolta XD XG
Clyde Reynolds

This book covers the Minolta XD and XG series of cameras, the latest in Minolta's increasingly successful range of 35mm single lens reflexes.
The book includes sections on the essential basics of photography including composition, viewpoint, choice and use of films, exposure, lighting, close-ups and care of equipment. Clear and detailed operating instructions are given to a level far beyond that reached by the manufacturer's handbook, with the emphasis on using this equipment to take photographs of the highest quality.

For further reference:
The Minolta Way Clyde Reynolds
Minolta XE1 SRT Book Clyde Reynolds
Minolta SLR Guide W. D. Emanuel

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