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FILMS AND FILTERS

There are two kinds of films available for the Praktica camera: black-and-white and colour.

Black-and-White Film

This produces a negative on which the colours and brightness range of the subject are translated into black and white. From it, prints or enlargements on paper or black-and-white transparencies can be made.

The black-and-white film used normally is panchromatic, that means that it is sensitive to all colours. There is a choice of several types differing mainly in sensitivity as well as certain other characteristics.

SLOW FILMS are of low sensitivity requiring comparatively great exposure. Their main advantage is the extremely fine grain, permitting a high degree of enlargement without its granular structure becoming unpleasantly visible. Such films also yield images of the greatest sharpness. On the other hand, these slow films are not very suitable for coping with fast movement in other than exceptionally good lighting, nor for general work in poor light. Such films are rated at 40–80 ASA or 17–20 DIN.

MEDIUM SPEED FILMS still yield a reasonably fine grain with good gradation. They are the most suitable material for all-round photography, other than in poor light. These films are rated at 80–160 ASA or 20–23 DIN.

FAST FILMS with somewhat coarser grain (still acceptable for reasonable degrees of enlargement) will cope with most light conditions including poor light and interiors in favourable conditions. This is the right film for the photographer who wants to be prepared for the unusual, to arrest fast movement with high shutter speeds, as well as shots in poor light. The ratings are 200–400 ASA or 24–27 DIN.

ULTRA FAST FILMS are primarily intended for high-speed sports shots in dull weather, interior snapshots in poor light, night photography and ill-lit stage pictures. These films are specialist types for conditions where normal

materials are totally inadequate. They should not be used for general photography.

The high speed is achieved at some cost in definition and graininess. Speed ratings range from 500–1600 ASA or 28–33 DIN.

The ASA and DIN figures mean nothing in themselves. They are simply a convenient expression of the relative sensitivities of various films. They do not give an absolute value of sensitivity and are usually described by the film manufacturers as "recommended meter settings". If you use your meter in the normal way and process the film according to the manufacturer's instructions, you will obtain correctly exposed results from a normal subject by using his film speed figure.

It naturally follows that you can use a different figure for subjects that are strongly backlit or contain an uneven tonal distribution. Or you may prefer a denser or less dense negative, which you can obtain by adjusting either the development time, or the film speed rating. Yet again, you may use a different developer or processing technique, which may also affect the recommended meter setting.

The manufacturer's figure is simply a guide. You do not have to follow it slavishly.

There is a wide range of different makes of films in all speeds on the market. Their characteristics, apart from speed, vary slightly from make to make. It is safe to say that all well-known brands are reliable and good. The best film is the one you are used to.

Professional photographers and advanced amateurs may find one or the other characteristics of a particular make, i.e. its gradation, granular structure, acutance, etc., of particular value for specific jobs.

Colour Film

These films produce an image in colour after appropriate processing, corresponding directly or indirectly to the natural colours of the subject.

Colour film is as easy to use as black-and-white film, but needs a little more care in exposure.

Processing is more complex and is often carried out by the film maker or specially appointed processing laboratories.

There are two basic types of colour film: reversal and negative.

Colour Reversal Film

This produces a colour transparency on the actual film exposed in the camera. This transparency, when held up to the light, shows a positive image with all parts of the subject in their original colours. It can be viewed in a suitable transparency viewer with a magnifier, or it can be projected in a slide projector to give a large and brilliant picture on a screen. The film is also known as colour slide film.

Although the colour transparency is an end product, it can still be used to make:

(*a*) duplicate positive colour transparencies;
(*b*) a black-and-white negative which can then be used to produce black-and-white prints or enlargements;
(*c*) a colour negative for making colour prints and enlargements, as from colour negative film (described below);
(*d*) direct colour enlargements on colour reversal paper.

For correct colour rendering, colour reversal films have to be carefully matched to the light by which they are to be exposed. Accordingly, some makes are available in the following types:

(*a*) daylight colour film, which will give correct colour reproduction in daylight, with blue-tinted flash bulbs and with electronic flash.
(*b*) artificial light type colour film, which will give correct rendering by photoflood illumination, or high-power tungsten light.

Colour films made for one kind of light may be used under different light conditions with the aid of a conversion filter as recommended by the manufacturer.

Different makes of colour film may yield transparencies of a slightly different characteristic colour quality, colour

saturation and colour contrast. Which you prefer is very much a matter of personal taste, and you can only be recommended to try various makes to find the one which suits you best.

Colour Negative Film

On processing, this produces a colour negative which shows a negative image of the subject in its complementary colours, e.g. blue appears yellow, red appears blue-green and so on. These colours may sometimes be hidden under an overall orange or reddish tint.

The film is also known as colour print film.

The main purpose of the colour negative is the production of colour prints on paper. The quality is generally somewhat higher than that obtained from a positive transparency.

From the colour negatives you can make:

(*a*) any number of colour prints in varying sizes,
(*b*) direct black-and-white prints or enlargements, in the same way as from a black-and white negative,
(*c*) positive colour transparencies for viewing or projection.

Most colour negative films are suitable for exposure by any type of light, e.g. daylight, flash or photofloods. The necessary adjustment of the colour rendering is carried out during the printing stage. Manufacturers sometimes recommend conversion filters even with colour negative films. These mainly serve to simplify the subsequent correction needed in printing.

Colour Film Speeds

The majority of colour films, reversal and negative, are rated between 25 and 80 ASA or 15 and 20 DIN, corresponding to a slow to medium speed for black-and-white material. A few films go up to 500 ASA or more for poor light conditions.

As with black-and-white films, the slower types tend to yield improved image detail, especially with negative colour film, while the fastest emulsions may show slightly reduced colour saturation and image sharpness.

The Choice of Colour Film

Making your choice between colour reversal or negative film (in spite of the various uses that can be made of either type of material) remains an individual question.

First, there is the way you want to see the result, as a colour print or as a colour transparency. The print has no doubt much to commend itself. It is easily shown, stored and carried about. The transparency calls for the aid of a viewer or projector.

Next, the all-in cost of a colour print is about three times that of the transparency. This may at times be mitigated by the fact that from unsuitable negatives no colour prints need or can be made. The transparency user, however, has additional outlay in the form of a viewer or projector with screen (in most cases both).

A final point to consider is the quality. The transparency will record each colour and its brilliance in full. Held to the light or projected on a screen, the brightness range, which may be 100 : 1, is fully or almost fully retained. It shows colours brilliant with great depth and realism. The colour print can at its best only reflect four-fifths of the light falling on it and even the darkest tones reflect about one-twentieth to one-tenth, so that the full range is no more than 16 : 1. While the colour print is, by necessity, duller than the transparency, it is only fair to say that the eye soon adjusts itself to the reduced brightness range, and subjects without great contrasts will be very satisfying.

From the point of view of convenience, reversal film has the advantage that it directly gives finished colour pictures of high quality and is still capable of producing colour prints as well. For the maximum versatility and control in print making, however, negative film is superior.

Filters for Black-and-White Film

By its nature, a black-and-white film can only translate colour values of the subject into tones of lighter or darker grey. Mostly these correspond fairly closely to the *brightness*

of the colours, but do not of course differentiate between them. In certain cases the difference between the brightness of two colours may be so slight, that both record in almost the same tone of grey.

There a filter helps by modifying the depth of one or the other colour, and so making it show up lighter or darker than it would normally.

The commonest example is the blue sky with white clouds in a landscape. The blue is so brilliant (and the film is often excessively sensitive to it), that the clouds do not show up against it. By putting a yellow filter in front of the camera lens we can subdue or "hold back" the blue, and so making it record darker in the final print.

We can even go further and over-emphasize the effect progressively with an orange or red filter; these darken the blue so much that the sky looks almost black for a really dramatic effect.

The same considerations hold for other filter effects. For instance, the film renders a red rose in the same tone of grey as the leaves of the rose bush. With the colour contrast gone, the rose disappears in its surroundings. A green filter makes the rose darker and the leaves lighter; conversely a red filter will show up the rose as light against dark foliage. Scientifically, both filters falsify the tone rendering, but produce a more acceptable pictorial result.

In all these cases a filter *lightens objects of its own colour, and darkens objects of its complementary colour.* Apart from isolated instances in pictorial photography, such contrast control is very valuable in copying and scientific work (e.g. photomicrography).

All filters cut out some part of the light and thus, as a compensation, an increase in exposure time is necessary when using them. This is stated on most filters in the form of a filter factor indicating by how much (e.g. 2 times, 3 times) the exposure must be increased with that filter. The factors are approximate for they depend not only on the nature of the filter but also on the exact colour sensitivity of the film and on the colour of the prevailing light. The

Praktica models with built-in TTL meter allow automatically for the factor of any filter placed over the lens.

Filters for Colour Film

The normal yellow, orange and other filters for black-and-white film must never be used with colour films, as they would give the colour picture a strong over-all colour tint.

In daylight and with daylight type film, only two filters are ever required. One is a haze filter, almost colourless but for a slight straw tinge. It is usefully employed on hazy days and in high altitudes to avoid excessive bluishness of the colour picture, especially with distant landscapes, seascapes and near water. This filter does not call for any change in exposure. On dull days, a skylight filter compensates for the excessive coldness of the colour rendering.

Either filter is also useful for colour photography with electronic flash, as it produces somewhat warmer tones.

CONVERSION FILTERS are used if a colour film balanced for one type of light should be used in another type of light. The film manufacturers give specific recommendations, generally in the instructions with the film.

The Polarizing Screen

There are times when the judicious use of reflections will enhance the pictorial effect of the picture, but they are also frequently obtrusive and undesirable. Thus highly-polished subjects are difficult to illuminate successfully so as to obtain a true photographic rendering, since they will reflect too much light and so spoil the reproduction with a glare which obscures the detail. This difficulty can be overcome by the use of the polarizing screen.

It has the special property of suppressing so-called "polarized" light. Light reflections from glass, china, enamel, polished wooden surfaces, water, are to a large extent polarized and can, therefore, be almost extinguished by placing the polarizing filter in the proper position over the lens. This screen will prove particularly useful when taking shop-windows, furniture, photography of wet objects, etc.,

when the shot can be taken at an angle of about 35 deg. to the plane of the subject containing the reflection. At other angles, reflections can be only partially reduced.

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

The polarizing screen is in addition particularly useful in colour photography where it acts similarly to the yellow filter in black-and-white photography, i.e. it darkens a "milky" blue sky. The bluish colour cast obtained with diffused sky light is removed or at least appreciably reduced with the polarizing filter. The reduction or elimination of reflections through this filter is of course just as useful in colour pictures as it is in black-and-white.

EXPOSURE

Exposure means—to expose the film in your camera to light. The dose of light any film needs to produce the right sort of image depends on how sensitive that film is to light. A fast film is more sensitive than a slow film.

Once your choice of film is settled, the basic condition of exposure is settled with it. You are now left with the problem of scaling the light you find in front of your camera to the amount your film needs.

Your job is to judge the light reflected from the subject you are about to photograph. Your grandfather, as an amateur photographer, used to take into account his geographical position, the time of the year, the hour of the day, the state of the sky as well as the tone of the subject itself, and by so adding one thing to another size up the light reflected from the subject. The experienced professional, of course, hardly ever worked that way. He just had a look and he knew.

Today a light meter or exposure meter does the same for any photographer. It takes a look, it measures the light and it lets you know.

In fact, it does more than that. It translates the light measured straight into terms of photographic exposure. It does so by presenting you with the choice of aperture numbers and shutter speeds, sorting them out in pairs.

Aperture and Speed

The aperture number or *f*-stop controls the *amount of light* allowed to enter through the lens. These numbers run in a series: 1.4–2–2.8–4–5.6–8–11–16–22; each higher stop number lets through half the light of the next lower number (next larger stop).

The shutter speed controls the *length of time* for which the lens is kept open to light. Shutter speed figures represent fractions of a second: 2=$\frac{1}{2}$ second, 4=$\frac{1}{4}$ second . . . 500=1/500 second.

The actual exposure is a product of these two: "how

much" and "how long". A large amount of light striking the film for a short time may produce an image similar to that produced by a small amount of light striking the film for a long time. Hence the free choice from a series of balanced aperture-shutter combinations offered by your exposure meter: more or less open apertures paired with more or less quick shutter speeds and more or less stopped down apertures paired with more or less slow shutter speeds.

Choosing the Combination

Even though the built-in meter measures for you the correct exposure you still have one decision to face: which aperture-shutter combination to choose for any given shot. Paradoxically enough they all are right and yet one is better than the other.

Why should it be so?

Because both the aperture and the shutter also have secondary functions and effects.

The aperture not only controls the amount of light that is allowed to pass the lens—it also has a bearing on how much of the image will be sharp.

The shutter in controlling the length of time for which the light strikes the film, will inevitably record any movement during that time as a slight or greater blur.

So you are left with three things to think of:

How fast is the action you want to catch?

How much of the scene in front of the lens has to be sharp?

Is the light good enough for either?

If there is fast action you have to choose and pre-set an appropriately fast shutter speed (p. 54) and then pair it with the stop which is right by your meter.

If the scene is to be sharp from a point close to the lens to some other point well away from it, you should choose the stop that will yield the necessary depth of field (p. 56) and then pair it with the shutter speed agreed by your meter for correct exposure.

If the light is very poor, the chances are that you may not

be able to cope with either extremely fast or particularly deep subjects.

Yet your choice in putting shutter speed or depth of field first should still be governed by what you value most about the picture you propose to take.

Exposure nowadays is no problem at all. But to hit it off in such a way that it will produce the picture *you* want is still a matter of intelligent judgment.

Time Exposures

When the light is very weak, especially when you have to use a small stop, even the slowest shutter speed of 1 sec. may be too short. In that case, you need time exposures. Set the shutter to B and press the release button. The shutter now remains open for any length of time until you let go of the release button.

For such time exposures, the camera must be mounted on firm support such as a tripod. It is safest to release the shutter with the help of a cable release to avoid shaking the camera. This release screws into the centre of the release button on the camera.

For long time exposures, where the shutter is to remain open for longer than you can conveniently keep the release depressed, use a cable release with a lock. To make the exposure set the shutter to B, press the cable release plunger with the locking plate lifted. The shutter will now remain open until the locking plate is depressed. On cable releases with locking screws, tighten the screw on pressing the plunger and undo the screw to close the shutter.

Using an Exposure Meter

To get the best results the exposure meter has to be used intelligently. This may look like a contradiction, since we have already said that it is an accurate light measuring instrument. But light from all parts of the subject—highlights, shadows and middle tones—falls on the meter, so the reading it gives us is an average one for the whole subject area.

Meters are scaled to suit typically average subjects—i.e., subjects with average areas of light, dark and middle tones. So if you point the meter at a subject of this kind, the exposure reading will be correct.

But if the subject is not average—if there are large highlight areas and little shadow, or large shadow areas with few highlights—then you have to modify the exposure reading to obtain the best results.

So there is more to using a meter than just pointing it at the subject and accepting without question the reading indicated.

Even with the models with built in meter which measures only the field actually reproduced on the film one might want to make an individual allowance in cases where the main subject is very much darker than all its surroundings.

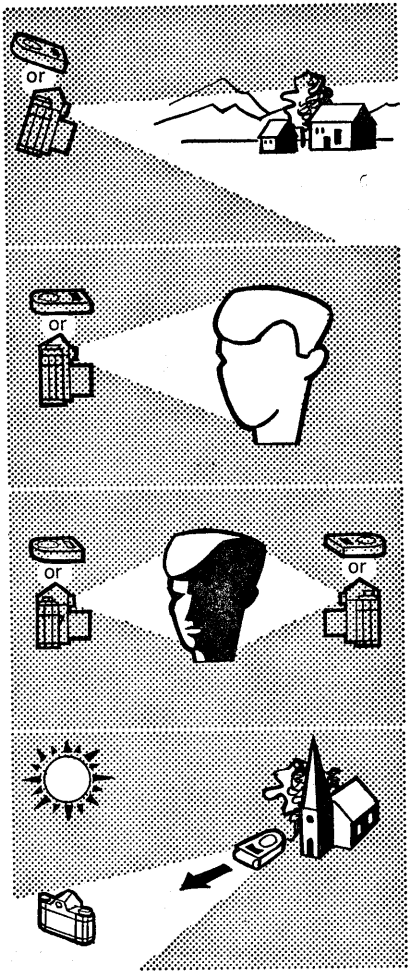
The usual method of using a meter is to point it directly at the subject. This gives the correct exposure reading provided the subject has an average mixture of highlights, shadows and middle tones. But if there is a large bright area, or a large dark area, the best method is to go near to the main subject and take a close-up reading. For example, if the subject is a figure against a white or dark background, by going closer you will reduce the amount of background affecting the meter and therefore get a reading in terms of a more average subject, which is what you want.

For some subjects you can take a reading from really close up, aiming the meter at the part of the subject that you want to make sure has optimum exposure. For instance, many photographers take a close-up reading of the sitter's face in portraiture; out-of-doors you can take the reading from the back of your hand instead of going up to the subject.

If you cannot go close up to a subject that needs a close-up reading, then try to find something near at hand that is similar in tone to the subject, and on which the light falls from the same direction and take a reading from that.

When taking readings of general scenes including a good deal of sky, you have to tilt the meter down slightly to

USING AN EXPOSURE METER



For normal readings point the exposure meter cell (or the camera if it has a built-in meter) towards the subject. Where the sky is included point the meter cell slightly downwards.

For more accurate readings of principal subjects, especially where backgrounds are excessively light or dark, approach the subject closely to take direct readings from the most important parts.

With contrast subjects containing both bright highlights and deep shadows, take separate close-up readings of each. The correct exposure is a mean between the two readings.

If the meter has an incident-light attachment, point it towards the camera from the subject position. If the subject is excessively light or dark, adjust the reading accordingly.

reduce the area of sky "seen" by the meter. The sky is a bright highlight, and by tipping the meter down to exclude some of it, the subject becomes "average" in tone range.

Open views, such as distant landscapes, usually have very light shadows, so you can give a shorter exposure than the meter indicates. It is usual to give half the exposure—i.e., use double the shutter speed, or use one stop smaller.

AGAINST THE LIGHT subjects are extreme cases of non-average tone range. The main lighting becomes a very bright highlight in the field of view, so if you point the meter straight at the subject it will indicate too short an exposure and give you a silhouette effect in the final picture.

This is all right if you want a silhouette. But if you want correct exposure for the subject, you should either take a close-up reading, or take a reading from the camera position and give four to eight times the exposure indicated.

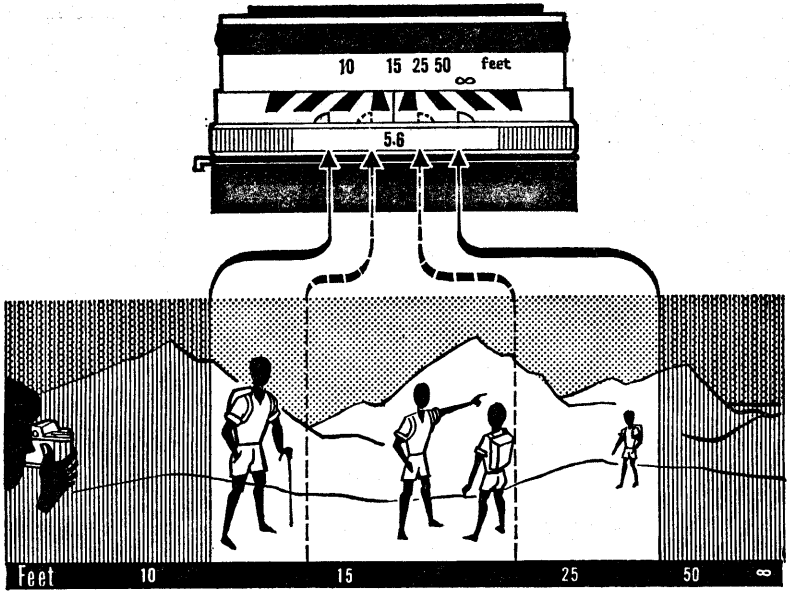
COLOUR FILMS have little exposure latitude, so particularly careful reading is advisable. The meter is used in the same way as for black-and-white films.

Because of the importance of the highlights, if you are using a meter from the camera position for an against-the-light shot, it is best to only double the reading, and not multiply it four to eight times as recommended for black-and-white negative films.

Shutter Speeds and Movement

The actual shutter speed you need within a series of available aperture-speed combinations is governed by considerations of camera steadiness as well as of subject movement.

An unsteady camera hold results in camera shake, to which a small and light instrument such as the Praktica is particularly liable. Even the slightest shake will result in inferior definition of the image. Practical experience goes to show that 1/125 sec. is safe, while you have to hold the camera particularly steady when using 1/60 or 1/30 sec. Where lighting conditions make even longer exposure times essential and there is no subject movement, either support



The Praktica carries a depth of field indicator on the lens mount. Markers move together or apart according to aperture set and focused distance. Thus, at 15 ft. and *f* 5.6 the markers indicate a depth of field from about 10 ft. to 50 ft. At larger apertures the markers move together, as shown by the dotted lines, to indicate a reduced depth of field.

the camera on a tripod, or look round for extra support for your elbows and hands—e.g. a wall, railing, etc.

The shutter speed required to arrest movement depends of course primarily on the speed with which the subject moves. Remember, however, that parts of the subject (e.g. the legs of a runner) may move faster than the subjects as a whole; you may sometimes have to compromise and show such parts slightly unsharp. Often that is not a serious fault, as slight blurring—provided the main part of the subject is sharp—helps to emphasize the impression of movement. Other factors to consider are the distance of the subject—the farther away, the less noticeable the movement blur; the focal length of the lens—a long-focus lens in effect brings the subject nearer; and the direction of the movement. Objects moving across your field of view blur more than if they are approaching or receding.

Aperture and Depth of Field

When you focus the Praktica on a given object, the image of that object will be really sharp on the film. Things nearer or farther away will be gradually less and less sharp, until they are noticeably blurred. The range of distances over which objects are still acceptably sharp, before you do notice the loss of definition, is known as the depth of field.

You can control the extent of this sharp zone by the lens aperture. As you stop down the lens, the zone of sharpness grows in both directions; as you open up the lens, its depth decreases.

You can obtain the actual zone of sharpness at various apertures and distances from tables, but in practice, the most convenient way is to use the depth of field indicator on each lens.

This is a special scale of aperture numbers marked opposite the distance scale. There are two sets of such numbers from the largest stop (*f*1.8, *f*2, or *f*2.8) to the smallest (*f*22) on each side of the focusing index (the mark that indicates the distance to which you have set the lens).

At any distance setting, the distance figures opposite each pair of aperture numbers on the depth of field scale give the near and far limits of sharpness. For example, at 10 ft. you may find the two stop values 8 on the scale (*f* 8) opposite about 7 and 17 ft.—so you have a sharp zone from 7 to 17 ft. At *f* 4, the distances opposite the stop values 4 may be 8 and 13 ft. respectively; at *f* 16 you might get a sharp zone from 6 ft. to 40 ft. You will also notice that the depth of field is greater at far distances than near ones.

Two more points on depth of field:

Firstly, the depth obtained depends also on the focal length of the lens. Short focus lenses yield more depth and tele lenses less depth.

Secondly, the sharp zones obtained by the indicator are based on a somewhat arbitrary assumption of how much blurring is acceptable. So depth of field data for different cameras with the same lens may not always agree, and you are also quite safe in rounding off figures obtained from such data. To make really big enlargements from your negatives, you can use stricter standards of sharpness by stopping down further. (For previewing of depth of field on cameras with automatic diaphragm see page 16).

Zone Focusing

With action subjects and similar occasions where you want to shoot quickly, determining sharp zones even with the depth of field indicator wastes too much time. There you need prepared settings covering given near and medium distance ranges that you can easily memorize and set on the camera. The focusing zone table (p. 72) gives such settings; then you only have to worry about keeping the subject within that zone while you shoot.

With landscapes and views, you sometimes need depth from infinity to the nearest possible point. Thus, by stopping down to *f* 8 and focusing on 25 ft. you get a really extended zone from infinity down to about 13 ft. But don't use this "hyperfocal distance" setting for maximum sharpness in the far distance; in that case focus on infinity (∞).

FLASH WITH THE PRAKTICA

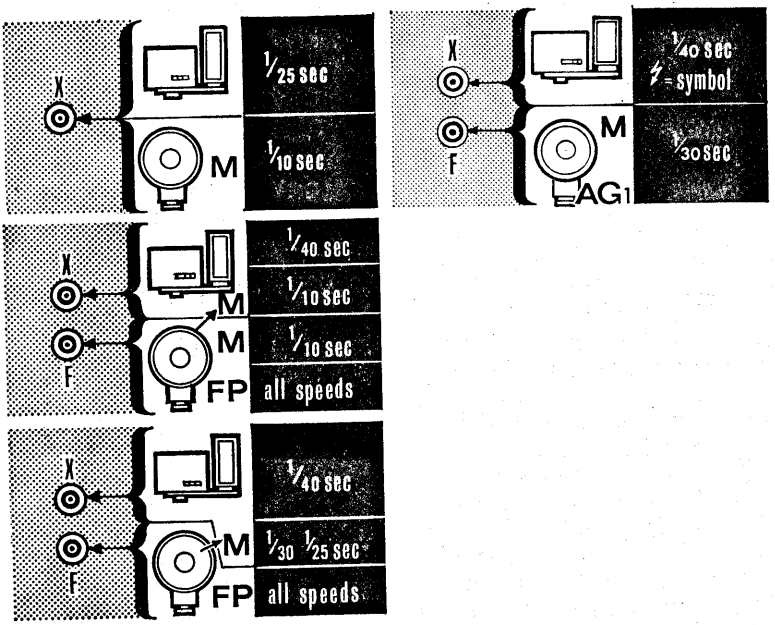
Flash is an efficient light source where no or insufficient daylight is available such as at night, indoors, etc., and also to fill in deep shadows in daylight. In the flashlight you carry your own private "sun" with which you can illuminate your subject or scene at any time and place.

THE FLASH BULB is similar to a minute electric bulb. However, when current passes through it, it lights up in an intense flash lasting usually about 1/40 to 1/60 sec. Each bulb will flash only once and has to be discarded afterwards.

The flash bulb is inserted in a flash gun and the current of the battery fires the bulb, while a reflector fixed behind the bulb makes sure that all the light is directed towards the subject. Most flash guns incorporate a capacitor unit which increases the reliability of firing, even when the battery is nearly exhausted. The shutter speed, provided it is slower than 1/25 sec., has no effect on exposure since the flash is shorter than the exposure time. Where the focal plane shutter travels across the film and does not expose it all simultaneously except at certain speeds, the special instructions on page 60 have to be followed.

Popular-size flash bulbs are now being made only in the blue-tinted variety. These can be used for black-and-white or colour (negative or reversal) photography, either as the sole light source or as fill-in lighting by daylight. Clear glass bulbs used to be recommended for negative colour films but this is no longer the case.

ELECTRONIC FLASH UNITS utilize the discharge of a high-tension capacitor through a flash tube. The power is derived from an accumulator or battery (there are also models working from the mains electricity supply). The electronic flash outfit is somewhat bigger and heavier than the flash bulb outfit, its comparative light output equals an average flash bulb and its initial cost is higher. On the other hand, anything from 10,000 to 25,000 flashes are obtained from one tube. The flash duration is extremely short



Top left: **The standard co-axial socket was first used on the fourth series Praktica FX, giving synchronization for electronic flash and bulbs. Earlier models had non-standard sockets.**

Middle left: **The Praktica FX2 and FX3 introduced the now standard F synchronization for focal plane bulbs together with normal X synchronization.**

Bottom, left: **On the Praktica FX2, Praktica IV and later models, the two standard sockets give X and FP synchronization as before but make slightly faster shutter speeds possible with bulbs.**

Top, right: **On the Praktica NOVA I and IB the X synchro contact is for electronic flash, the F socket for ordinary M type and AG 1 type flash bulbs.**

(1/700 to 1/2000 sec.) and will arrest the fastest movements. The cost of an individual exposure is negligible.

Electronic flash is universally suitable for black-and-white, negative colour and also for daylight type reversal colour films. It can be used for fill-in lighting by daylight.

How to use Flash with the Praktica

The Prakticas from model FX on are synchronized for flash. The early versions of this model have a non-standard contact while the last versions of the Praktica FX were fitted with the standard co-axial plug which is X synchronized. Later models carry two standard flash plugs, one marked X and the other F.

F setting works so that electrical contact is made before the first shutter blind begins to uncover the film. This setting is used for flash bulbs only. For the ordinary M class bulbs the shutter speed should be set to 1/30 or 1/25 sec. With the special FP bulbs, faster speeds depending on type of FP bulbs can be used on models prior to Nova only.

X setting works so that electrical contact is delayed until the first shutter blind has completely uncovered the film. It is used with electronic flash. The shutter should be set to 1/40 sec. (⚡=flash sign on shutter). 'L' series see below.

No faster shutter speed must be used, otherwise only part of the negative would be exposed, because the second blind would already be moving across the film. At the same time, the illumination time with electronic flash is so extremely short (1/700 to 1/2000 sec.) that even with 1/40 sec. fast-moving objects will be "arrested".

The electrical contacts of the Praktica up to and including model V are closed while the shutter is untensioned. Thus, an electronic flash unit can only be plugged into the flash socket or a bulb inserted into the connected battery capacitor gun *after* the shutter has been wound on. This breaks the contact, which is made again when the shutter is released and remains made until the shutter is again wound on.

It is advisable to make practical tests with focal plane

bulbs to establish correct working, as variations are possible, particularly on earlier Praktica models.

Exposure Guide Numbers

There is a convenient way of working out exposures with flash, and this is by means of a guide number. When you buy flash bulbs you will always find the guide number for any speed of film printed on the packet.

To find the correct aperture to use, divide the guide number by the distance between the flash and the subject. For instance, suppose you find that the guide number of the bulb with the film in use is 160. If you then want to take a photograph at a distance of 10 ft. from the subject, divide 160 by 10=16. Therefore, the correct aperture to use is *f* 16. Alternatively, if you want to use an aperture of *f* 8 for any reason, then the correct flash distance is 160÷8 = 20. So the flash must be 20 ft. from the subject.

Synchro-Sunlight

If you want to use flash in conjunction with daylight, e.g. to lighten deep shadows, the exposure time is taken for the sunlit side of the subject and the aperture used according to this reading. Now take the flash guide number for the shutter speed pre-selected, double it and divide it by the aperture to be used. The result is the flash-to-subject distance for a normal fill-in light. With daylight colour film, use only blue flash bulbs or electronic flash.

Example: Exposure meter reading at 1/30 sec.—*f* 16.
Guide number for the flash at 1/30 sec.—120.
The guide number doubled is 240. Divide 240 by 16—15.

That means that the flashgun should be 15 ft. from the subject. It is advisable to use an extension cable between camera and flashgun. This enables you to place the flash farther away from or closer to the subject than the camera.

USING ALTERNATIVE LENSES

The field of view covered by the standard lens is ideal for the majority of subjects. Occasionally, however, a greater or reduced field of view has distinct advantages. The Praktica camera has an interchangeable lens mount permitting use of alternative focal length lenses for such occasions.

Wide-Angle Lens

A wide-angle lens is a lens of shorter focal length. It sees and reproduces more of the subject in front of the camera than does the standard lens.

Such a wide-angle lens has definite advantages in cases where the practicable distance between camera and subject is limited and the standard lens cannot record the whole of the subject. The wide-angle lens is, therefore, primarily used for architectural photography and interiors.

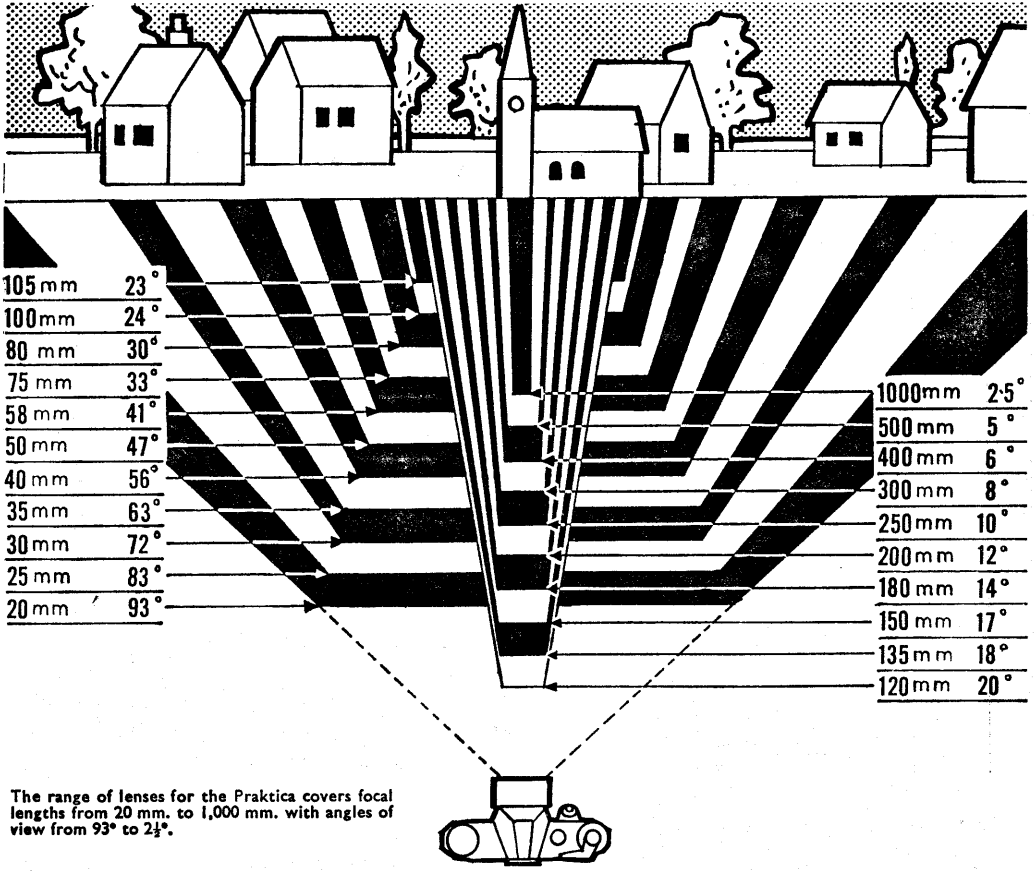
In view of its short focal length, the depth of field covers a particularly wide zone, even at full aperture. It can, therefore, be employed with advantage as a quick-shooting lens for general purposes where accurate focusing or distance-setting would be inconvenient (e.g. through insufficient time).

To get a large image, even of a near subject, you have to go really close to it. Near objects then tend to dwarf more distant ones, and the resulting picture shows pronounced perspective effects. In this way, the wide-angle lens can be used to emphasize perspective.

Wide-angle lenses made for the Praktica camera are listed in the lens table on page 64. Wide-angle lenses made for the Asahi Pentax, Edixa Reflex and any other single lens reflex camera with the standard 42×1 mm. thread will fit the Praktica, too.

Telephotography

A tele lens on the other hand has a smaller angle of view than the standard lens. It is of longer focal length, and reproduces less of the subject in front of the camera than the standard lens does, but on a larger scale.



The range of lenses for the Praktica covers focal lengths from 20 mm. to 1,000 mm. with angles of view from 93° to 2½°.

SOME PRAKTICA LENSES

Name	Focal Length	Aperture	No. of Elements	Angle of View	Closest Focusing Distance	Diaphragm Type
Flektogon	20 mm.	f4	10	93°	6½ in.	FA**
Prakticar	24 mm.	f2.8	10	84°	15 in.	FA
●**Flektogon**	25 mm.	f4	7	82°	8 in.	FA
Prakticar	28 mm.	f2.8	7	74°	15 in.	FA
Pentacon	29 mm.	f2.8	7	73°	10 in.	FA*
●Lydith	30 mm.	f3.5	5	72°	13 in.	PS
Pentacon	30 mm.	f3.5	5	71°	13 in.	PS**
●**Primagon**	35 mm.	f4.5	4	63°	16 in.	PS
Flektogon	35 mm.	f2.8	6	62°	7 in.	FA**
Prakticar	35 mm.	f2.8	6	63°	19½ in.	FA
●Helioplan	40 mm.	f4.5	4	56°	—	N, PS
●Primotar E	50 mm.	f3.5	4	47°	20 in.	FA
●**Primotar**	50 mm.	f2.8	4	47°	24 in.	PS
●**Trioplan**	50 mm.	f2.9	3	47°	24 in.	C
Domiplan	50 mm.	f2.8	3	47°	30 in.	FA
Oreston	50 mm.	f1.8	6	47°	13 in.	FA
Tessar	50 mm.	f2.8	4	45°	14 in.	N, PS, FA
Pentacon	50 mm.	f1.8	6	47°	13 in.	FA*
Pancolar	50 mm	f1.8	6	46°	14 in.	FA*
Pancolar	55 mm.	f1.4	7	42.5°	15.5 in.	FA*
●**Primoplan**	58 mm.	f1.9	5	41°	24 in.	N, PS
●**Primoplan**	75 mm.	f1.9	5	32°	—	N, PS
Pancolar	75 mm.	f1.4	7	33°	25.5 in.	FA
●**Trioplan**	100 mm.	f2.8	3	24°	43 in.	N, PS
Pentacon	100 mm.	f2.8	5	24°	3 ft. 6 in.	FA*
●**Primotar**	135 mm.	f3.5	4	18°	63 in.	N, PS
Pentacon	135 mm.	f2.8	5	18°	4 ft. 11 in.	PS**
Pentacon	135 mm.	f2.8	5	18°	4 ft. 11 in.	FA
Zeiss-S	135 mm.	f2.8	4	18°	4 ft. 11 in.	FA
Zeiss-S	135 mm.	f3.5	4	18°	3 ft. 0 in.	FA**
●**Telemegor**	150 mm.	f5.5	4	17°	—	N, PS
●**Primotar**	180 mm.	f3.5	4	14°	7 ft. 3 in.	N, PS
●**Telemegor**	180 mm.	f5.5	4	14°	6 ft. 7 in.	N, PS
Zeiss-S	180 mm.	f2.8	5	14°	7 ft. 0 in.	FA†**
Pentacon	200 mm.	f4	5	12°	10 ft. 0 in.	PS**
Prakticar	200 mm.	f3.5	6	10°	10 ft. 0 in.	FA
Prakticar	200 mm.	f2.8	6	10°	11 ft. 9 in.	FA
●**Telemegor**	250 mm.	f5.5	4	10°	10 ft. 9 in.	N, PS
Pentacon	300 mm.	f4	5	8°	12 ft. 0 in.	PS**
●**Telemegor**	300 mm.	f4.5	4	8°	10 ft. 9 in.	N, PS
Prakticar	300 mm.	f4	6	8°	13 ft. 8 in.	FA
Zeiss Jena S	300 mm.	f4	6	8°	13 ft. 0 in.	FA†**
●**Telemegor**	400 mm.	f5.5	4	6°	19 ft. 8½ in.	N, PS
Zeiss Mirror lens	1000 mm.	f5.6	4	2.5°	50 ft. 0 in.	—**

Diaphragm type: Fully automatic=FA; Preselect=PS; Normal=N; Clickstop=C.
* Lenses suitable for Praktica LLC and VLC Electric for full aperture measurement.
** For LLC and VLC with working aperture light measurement, non electric.
†With automatic aperture correction for close-up photography.
● Discontinued.

Such a lens is particularly suitable for subjects that are difficult to approach closely, such as animals, children, architectural detail, sports events, etc. In photographing distant views without near foreground, it brings the subject nearer. It also permits a greater camera-to-subject distance in portraiture, producing a more pleasing and subdued perspective.

At the same time, its lesser depth of field concentrates definition on the portrait, avoiding a sharp background which would detract from the main object.

Long focus lenses made for the Praktica camera are listed in the lens table below. Tele lenses made for the Asahi Pentax, Edixa Reflex and any other single lens reflex camera with the standard 42×1 mm. thread will fit the Praktica, too.

Lens Changing

To remove a lens, simply unscrew it from the body. To insert a lens, screw it into the lens aperture of the camera body until it comes to a definite stop without using force.

Lenses which automatically couple internally with the pre-selector mechanism *must* have the protruding coupling pin protected from damage by use of a rear lens cover.

Focusing and Depth of Field

Focusing with a wide angle or telephoto lens is the same as when using a standard lens. The reflex screen enables the image to be focused accurately. At the same time, the reflex screen shows the exact field of view of the particular lens used. There is no parallax error, nor are supplementary finders required.

The alternative lenses have their own depth of field indicator. This works in the same way as with the standard lens.

Aperture Control Systems

Most lenses for the Praktica camera are either fitted with the automatic pre-set aperture or a pre-set aperture which has to be actuated by hand.

Automatic pre-set aperture. You pre-set the required aperture on the rear ring of the lens mount by turning the aperture selected to the index mark. The aperture remains fully open for focusing and viewing so as to obtain minimum depth of field and maximum brightness. When you release the shutter, the aperture stops down to the pre-set figure and re-opens automatically to full aperture immediately after the exposure. See also pre-view of depth of field on page 16.

Semi automatic pre-set aperture, on earlier lenses, works similarly to the automatic pre-set aperture described above except that the aperture has to be opened up again by hand after exposure, by means of a cocking ring or lever.

The pre-set aperture system consists of two control rings. The front ring pre-sets the required aperture, but does not stop down the lens. You therefore focus and view the image at full aperture. Immediately before the exposure you turn the rear ring as far as it will go to stop down the lens to its pre-set aperture. This you can do by touch alone without taking the eye from the finder. After the exposure, simply turn the rear ring back again to open the lens to full aperture.

Aperture selection without any speed up or simplifying mechanism is found on the earlier lenses and some inexpensively mounted later ones. Here one focuses best with full aperture and afterwards one stops down the lens normally to the diaphragm opening required.

PRAKTICA ACCESSORIES

Close-ups

The single lens reflex camera is particularly suited for close up photography. When working with supplementary lenses or extension tubes, the actual image covered, as well as the exact definition, can be controlled on the reflex screen.

Supplementary Lenses

The Praktica camera lenses can be focused down to at least 3 ft. The closest focusing distance varies according to the lens employed. Some permit focusing down to 12 inches, for these latter, supplementary lenses are not normally required.

The field covered at 3 ft. with a 2 in. (5 cm.) lens is $25\frac{1}{2} \times 17$ in. To photograph at closer range for table top, copying and similar work, supplementary lenses can be used. A range of three lenses, giving a scope which can reasonably be described as covering all practical needs, are a+1 diopter, a+2 diopter and a+3 diopter. It is convenient to get these lenses of suitable diameter to fit into an interchangeable filter mount, so that one mount only is required and a lens can be inserted in accordance with the distance at which one has to work.

The distances covered by these supplementary lenses are:

Supplementary lens	*Distance covered*
+1 dioptre	from $39\frac{3}{8}$ to 19 in. (100 to 50 cm.)
+2 dioptre	from $19\frac{3}{4}$ to 13 in. (50 to 33 cm.)
+3 dioptre	from $13\frac{1}{8}$ to $9\frac{1}{2}$ in. (33 to 25 cm.)

The field covered, the distance at which the lens has to be set, as well as definition can be observed on the reflex ground glass. The table on page 68 giving these figures is intended mainly for general information.

No change in exposure time is required when working with these close up lenses. To obtain perfect definition it is advisable to use a medium aperture.

Extension Tubes

For very close-range work extension tubes can be used. These tubes can be screwed between lens and camera, giving an approximate ratio of reproduction from 1/10 natural size to natural size. A set consists of three rings, one of 7 mm., one of 14 mm., and one of 28 mm. lengths. They can be used individually or combined (See table on page 73).

The simple extension tube set is intended for use in connection with lenses with manual diaphragm control.

The extension tube set with plunger has on each ring a plunger transmission to connect to and actuate the automatic diaphragm mechanism of the lenses so equipped.

Extension ring with double cable will act on the shutter release and lens diaphragm simultaneously. This is useful when carrying out close-up work with the reversing ring (see below) or with extension bellows.

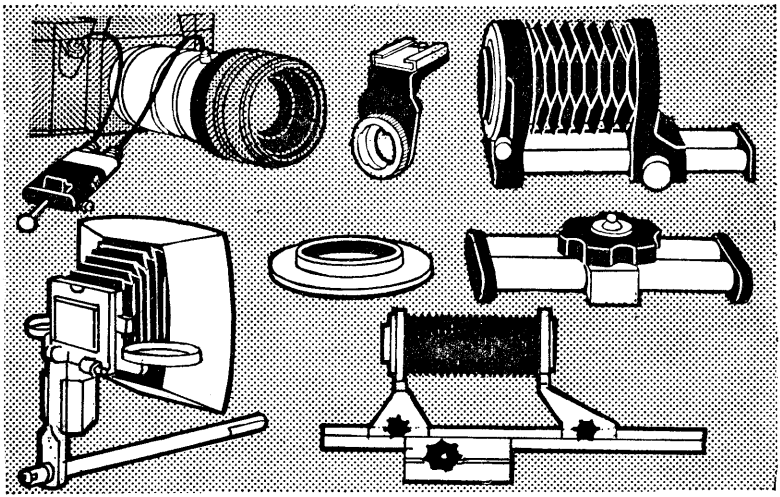
Reversing Ring

To obtain critical definition when magnifying the subject directly 1.5 times or more on the film, the Praktica lens should be used reversed (front to back). The lenses have been specially designed and corrected for use in reversed position for ultra close-up work. To use the lens with its front pointing to the film a reversing ring is available which screws into the filter thread of the lens for connection to the extension rings or bellows attachment. The extension ring with double cable should be used at the same time to permit use of the automatic lens diaphragm control.

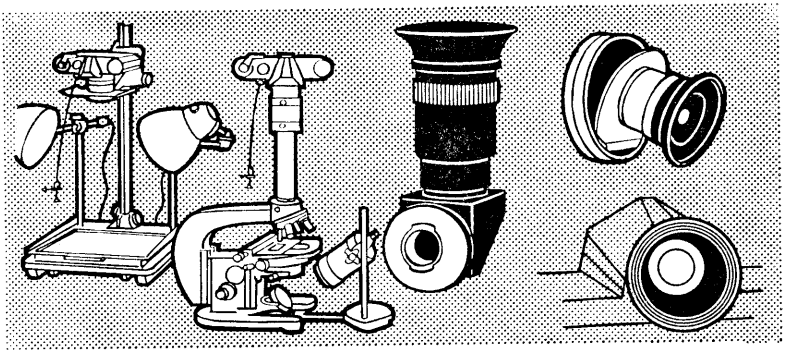
Bellows Attachment

The bellows attachment offers a continuously variable extension from 35 mm. to 125 mm. It is connected between Praktica body and lens. The extension ring with double cable should be attached to the lens to permit use of the automatic lens diaphragm control.

A larger close-up bellows attachment gives extensions from 35 mm. to 220 mm. and is particularly designed for close up and macro photography.



Top, left: Extension tubes and extension ring used with double cable release. *Top, centre:* Accessory shoe. *Top, right:* Extension bellows attachment. *Centre:* Lens reversing ring. *Centre, right:* Focusing slide. *Bottom. left:* Slide copying attachment for large bellows. *Bottom, right,* Large bellows attachment.



Left: Copying stand. *Middle, left:* Photomicrography attachment. *Middle, right:* Angular finder attachment. *Top, right:* Focusing magnifier. *Bottom, right:* Rubber eye cup.

A Transparency Copying attachment is available for connection to the larger close-up bellows for copying negatives and transparencies.

Focusing Slide

The focusing slide allows critical control by continuous adjustment of the camera-to-subject distance mainly in conjunction with the bellows unit. It greatly facilitates the extremely fine focusing necessary with ultra close-up work and the retaining of the precise picture ratio.

Photomicrography

An intermediate piece for photomicrography has been designed connecting to the Praktica body on one end and to the microscope eyepiece at the other. The taking lens is removed. The image of the microscope lens is visible on the camera reflex screen for focusing and exposure.

Praktica Copying Stand

This baseboard with column and holding arm for the camera is equipped with two adjustable light reflectors and frame to accept flat or three dimensional objects up to approximately 12 in. × 8 in. for easy and quick copying.

Accessory Clip

The accessory clip is attached to the eyepiece of the viewfinder and is intended to accept a flash gun. Suitable for all Prakticas from model IV on.

Angular Viewfinder

This attachment, fitting to the Praktica eyepiece permits viewing at low level such as photographing children, general low angle shots, close-ups and photomicrography. It can be rotated so that it is equally useful in horizontal and vertical positions of the camera.

It can also be helpful in obtaining unobserved shots by holding the camera at right angles to one's own standing

position. The angular viewfinder is suitable for all Prakticas from model IV on.

Focusing Telescope

This 2.7X magnifying telescope is fitted to the camera eyepiece and permits extremely critical focusing of any section of the finder image. Suitable for all Prakticas from the model IV on.

Rubber Eye Cup

To exclude unwanted side light and facilitate viewfinding a rubber eyecup can be fitted to the eyepiece of the pentaprism of the Praktica, on all models from Praktica IV on.

Correction Lens Mount

A mount accepting a correction lens to compensate for a users' faulty eyesight can be fitted to the viewing eyepiece. Suitable for all Prakticas from model IV on.

Pentaprism

For the Praktica camera models FX2 and FX3 with chest level reflex finder a pentaprism has been made which clips into the reflex hood and permits viewing of eye level and upright and laterally correct image. A similar attachment has also been provided for the earlier Praktica model, here the pentaprism is fixed above the reflex hood.

Lens Hood

A lens hood is recommended to prevent stray light from outside the picture area entering the lens. This could produce glare and reflections and thus reduce the brilliancy of the image. A lens hood is supplied with some telephoto lenses, while for the wide angle and standard lenses of the Praktica, lens hoods are available in screw-in or push-on mount.

FACTS AND FIGURES

This section gives the more important exposure, close-up, zone focusing, film, etc., data for the Praktica camera in handy tabular form for easy reference.

CONVERSION OF FEET AND INCHES INTO METRIC UNITS

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

British to Metric		Metric to British	
$\frac{1}{8}$ in.	0.32 cm.	0.5 cm.	$\frac{3}{16}$ in.
$\frac{1}{4}$ in.	0.64 cm.	1 cm.	$\frac{3}{8}$ in.
$\frac{1}{2}$ in.	1.27 cm.	2 cm.	$\frac{3}{4}$ in.
1 in.	2.54 cm.	3 cm.	$1\frac{3}{16}$ in.
2 in.	5.08 cm.	4 cm.	$1\frac{9}{16}$ in.
3 in.	7.62 cm.	5 cm.	$1\frac{15}{16}$ in.
4 in.	10.2 cm.	6 cm.	$2\frac{3}{8}$ in.
5 in.	12.7 cm.	7 cm.	$2\frac{3}{4}$ in.
6 in.	15.2 cm.	8 cm.	$3\frac{1}{4}$ in.
7 in.	17.8 cm.	9 cm.	$3\frac{1}{2}$ in.
8 in.	20.3 cm.	10 cm.	$3\frac{13}{16}$ in.
9 in.	22.9 cm.	12 cm.	$4\frac{3}{4}$ in.
10 in.	25.4 cm.	15 cm.	$5\frac{7}{8}$ in.
11 in.	27.9 cm.	20 cm.	$7\frac{7}{8}$ in.
1 ft.	30.5 cm.	25 cm.	$9\frac{13}{16}$ in.
2 ft.	61.0 cm.	30 cm.	$11\frac{3}{4}$ in.
3 ft.	91.4 cm.	40 cm.	$15\frac{3}{4}$ in.
4 ft.	1.22 m.	50 cm.	$19\frac{3}{4}$ in.
5 ft.	1.52 m.	60 cm.	$23\frac{5}{8}$ in.
6 ft.	1.83 m.	80 cm.	$31\frac{1}{2}$ in.
7 ft.	2.13 m.	100 cm.	$39\frac{1}{2}$ in.
8 ft.	2.44 m.	1.5 m.	4 ft. 11 in.
9 ft.	2.74 m.	2 m.	6 ft. 7 in.
10 ft.	3.05 m.	2.5 m.	8 ft. 3 in.
15 ft.	4.57 m.	3 m.	9 ft. 10 in.
20 ft.	6.10 m.	4 m.	13 ft. 2 in.
30 ft.	9.14 m.	5 m.	16 ft. 5 in.
40 ft.	12.20 m.	10 m.	33 ft. 0 in.
50 ft.	15.24 m.	15 m.	49 ft. 2 in.
100 ft.	30.48 m.	20 m.	66 ft. 0 in.

QUICK FOCUSING ZONES WITH THE STANDARD 50 mm. LENS

Zone	*Focus on*	*Aperture*	*Extent of Zone*
Near	7.5 ft.	*f* 8	6–10 ft.
Medium	10 ft.	*f* 11	7–20 ft.
Far	25 ft.	*f* 8	13–infinity

CLOSE-UPS WITH EXTENSION TUBES ON 50 mm. LENS

Extension tube No.	Length (in mm.)	Ratio of reproduction	Subject area (mm.)	Lens-to-subject distance (mm.)	Exposure factor
1	7	0.13 to 0.27	179×270 to 90×134	403 to 206	1.45
2	14	0.27 to 0.4	90×134 to 60×90	206 to 142	1.75
1+2	21	0.4 to 0.53	60× 90 to 45×67	142 to 110	2.15
3	28	0.53 to 0.67	45× 67 to 36×54	110 to 90	2.55
1+3	35	0.67 to 0.8	36× 54 to 30×45	90 to 77	3
2+3	42	0.8 to 0.94	30× 45 to 26×38	77 to 68	3.5
1+2+3	49	0.94 to 1.07	26× 38 to 22×34	68 to 61	4.0

FOCUSING WITH CLOSE-UP LENSES

Set distance on focusing mount to ft.	The distance from front of lens to subject is With+1 lens in.	With+2 lens in.	Approx. field size With+1 lens in.	With+2 lens in.
∞	39½	19¾	21 ×32	10½×15½
20	33½	18	18 ×27	10 ×15
10	29½	17	16 ×24	9 ×14
6	25½	15½	13 ×20	8 ×12
4	21	13½	11½×17	7½×11
3	18½	12¾	9½×14	7 ×10½

SUBJECT SIZE AND DEPTH OF FIELD WITH CLOSE-UP LENSES

Subject Distance in.	Scale approx.	Total Depth of Field (in.) at * f5.6	f8	f11	f16
38	1 : 20	6	9	12	17
30	1 : 15	3¼	4¾	6½	10
24	1 : 12	2¼	3¼	4	6
20	1 : 10	1½	2½	3¼	4
16	1 : 8	1¼	1½	2¼	3¼
12	1 : 6	⅝	¾	1¼	1½

*This is the total depth in front of and behind the plane of maximum sharpness. Where this range is less than about 4 in., it is safe to assume it to be equally distributed in front of and behind the focused distance. When the depth range is greater, it covers somewhat more behind the subject than in front (for instance, at 38 in. and f 16, the depth might be 7 in. in front and some 10 in. behind the sharpest point).

DAYLIGHT EXPOSURE VALUES

For Praktica models without exposure meter add up the respective figures in tables 1, 2 and 3. The result is the exposure value to be set. On models without exposure value scale use table 4 to get aperture-speed combinations (set the shutter to nearest marked speeds if necessary—e.g. 1/25 sec. for 1/30 sec.).

1. *Subject and weather*

	Clear sun	*Cloudy light*	*Cloudy med.*	*Cloudy dull*
Distant land or seascape without foreground	13	12	11	10
—with light foreground	12	11	10	9
Open streets, squares, light buildings	11	10	9	8
Figures, groups in open, near objects without heavy shade	10	9	8	7
—in shade	9	8	7	6
Average interiors, diffused light ...	3	2	1	0

2. *Month and time*

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

3. *Film Speed*

BS ... 21°	23–24°	25–26°	28–29°	31–32°	34–35°
ASA ... 10	16–20	25–32	50–64	100–125	200–250
—2½	—1½	—1	0	+1	+2

4. *Exposure Values and Aperture-Speed Combinations*

Exp. Value	*f* 2.8	*f* 4	*f* 5.6	*f* 8	*f* 11	16	*f* 22
3 ...	1	2s	4s	8s	15s	30s	60s
4 ...	1/2	1	2s	4s	8s	15s	30s
5 ...	1/4	1/2	1	2s	4s	8s	15s
6 ...	1/8	1/4	1/2	1	2s	4s	8s
7 ...	1/15	1/8	1/4	1/2	1	2s	4s
8 ...	1/30	1/15	1/8	1/4	1/2	1	2s
9 ...	1/60	1/30	1/15	1/8	1/4	1/2	1
10 ...	1/125	1/60	1/30	1/15	1/8	1/4	1/2
11 ...	1/250	1/125	1/60	1/30	1/15	1/8	1/4
12 ...	1/500	1/250	1/125	1/60	1/30	1/15	1/8
13 ...	—	1/500	1/250	1/125	1/60	1/30	1/15
14 ...	—	—	1/500	1/250	1/125	1/60	1/30
15 ...	—	—	—	1/500	1/250	1/125	1/60
16 ...	—	—	—	—	1/500	1/250	1/125

CONVERSION OF SPEED SYSTEMS

ASA & BS Arith. (New) *	ASA Log (New)	DIN	BS Log
3		6	16°
6	1°	9	19°
12	2°	12	22°
25	3°	15	25°
50	4°	18	28°
100	5°	21	31°
200	6°	24	34°
400	7°	27	37°
800	8°	30	40°
1600	9°	33	43°

*Also Weston Master III, IV and V meters.

SHUTTER SPEEDS TO ARREST MOVEMENT

Subject	Distance between Camera and Object					
	10 ft. 3 m.	17 ft. 5 m.	25 ft. 7.5 m.	42 ft. 12.5 m.	83 ft. 25 m.	165 ft. 50 m.
Swimmer	1/60	1/30	1/25	1/15	1/10	1/5
Walker	1/100	1/60	1/40	1/25	1/10	1/5
Runner	1/300	1/200	1/155	1/75	1/60	1/30
Cyclist	1/500	1/300	1/200	1/100	1/75	1/40
Skater	1/1000	1/500	1/400	1/250	1/125	1/60
Horse galloping	1/500	1/300	1/200	1/100	1/75	1/40
,, trotting	1/300	1/200	1/125	1/75	1/60	1/30
,, walking	1/125	1/75	1/50	1/30	1/15	1/10
Racehorse	1/1000	1/500	1/400	1/250	1/125	1/60
Waves	1/500	1/300	1/200	1/100	1/75	1/40
Heavy waves	—	1/1000	1/500	1/300	1/150	1/75
Boats making 10 knots ...	1/300	1/200	1/125	1/75	1/60	1/30
,, ,, 20 knots ...	1/500	1/300	1/200	1/100	1/75	1/40
Tramcar	1/300	1/200	1/125	1/75	1/60	1/30
Motor car on road ...	—	1/1000	1/500	1/300	1/500	1/75
Slow train	1/500	1/300	1/200	1/100	1/75	1/40
Fast train	—	—	1/1000	1/500	1/250	1/100
Aeroplane	—	—	—	1/1000	1/400	1/200

The shutter speeds as listed above are applicable to motion which cuts right across the direction in which the lens is pointing, and are correct for the standard lens.

If the motion photographed is at an acute angle with the direction in which the lens points the exposure time can be longer, say 1/30 sec. instead of 1/60.

If the subject moves directly towards the lens (or for that matter away from it) the exposure time can be three or four times longer, say 1/8 sec. instead of 1/30.

Where the above table shows speeds not marked on the shutter use the next faster speed.

DEPTH OF FIELD WITH THE STANDARD 50 mm. LENSES

Unit: foot

Aperture	Focus setting							
	2	3	4	6	8	12	30	∞
1.4	1.98 ~2.02	2.96 ∞3.04	3.93 ~4.08	5.83 ~6.18	7.69 ~8.33	11.31 ~12.78	25.97 ~35.51	187.12 ~∞
1.8	1.98 ~2.02	2.95 ~3.05	3.91 ~4.10	5.78 ~6.23	7.61 ~8.43	11.13 ~13.01	25.02 ~37.47	146.31 ~∞
2	1.98 ~2.02	2.94 ~3.06	3.90 ~4.11	5.76 ~6.26	7.57 ~8.48	11.05 ~13.14	24.57 ~38.54	131.88 ~∞
2.8	1.97 ~2.03	3.86 ~3.08	3.86 ~4.15	5.67 ~6.37	7.41 ~8.69	10.71 ~13.66	22.91 ~43.50	94.60 ~∞
4	1.96 ~2.05	2.89 ~3.12	3.80 ~4.22	5.54 ~6.54	7.19 ~9.02	10.23 ~14.51	20.81 ~53.91	66.45 ~∞
5.6	1.94 ~2.07	2.85 ~3.17	3.72 ~4.32	5.38 ~6.79	6.91 ~9.51	9.67 ~15.85	18.54 ~79.26	47.60 ~∞
8	1.91 ~2.10	2.79 ~3.25	3.62 ~4.48	5.15 ~7.20	6.53 ~10.35	8.93 ~18.38	15.95 ~270.28	33.41 ~∞
11	1.88 ~2.13	2.72 ~2.35	3.49 ~4.69	4.89 ~7.79	5.11 ~11.64	8.15 ~23.00	13.58 ~∞	23.36 ~∞
16	1.83 ~2.20	2.61 ~3.51	3.31 ~5.09	4.52 ~9.02	5.53 ~14.70	7.12 ~39.68	10.98 ~∞	16.80 ~∞

DEPTH OF FIELD WITH THE STANDARD 50 mm. LENSES

Unit: metre

Aperture	Focus setting									
	0.45	0.5	0.7	1	1.5	2	3	5	10	∞
1.4	0.45 ~0.45	0.50 ~0.50	0.69 ~0.71	0.99 ~1.02	1.47 ~1.54	1.94 ~2.07	2.86 ~3.16	4.51 ~5.46	8.55 ~12.05	57.78 ~∞
1.8	0.45 ~0 45	0.50 ~0 50	0.69 ~0.71	0.98 ~1.02	1.46 ~1.55	1.92 ~2.09	2.82 ~3.20	4.52 ~5.60	8.21 ~12.79	45.05 ~∞
2	0.45 ~0.45	0.50 ~0.50	0.69 ~0.71	0.98 ~1.02	1.45 ~1.55	1.91 ~2.10	2.80 ~3.23	4.47 ~5.68	8.05 ~13.20	40.57 ~∞
2.8	0.45 ~0.45	0.49 ~0.51	0.69 ~0.71	0.97 ~1.03	1.43 ~1.57	1.88 ~2.14	2.73 ~3.33	4.28 ~6.01	7.47 ~15.15	29.02 ~∞
4	0.44 ~0.46	0.49 ~0.51	0.69 ~0.72	0.96 ~1.04	1.41 ~1.61	1.83 ~2.20	2.63 ~3.49	4.04 ~6.57	6.74 ~19.44	20.35 ~∞
5.6	0.44 ~0.46	0.49 ~0.51	0.67 ~0.73	0.94 ~1.06	1.37 ~1.66	1.77 ~2.29	2.51 ~3.74	3.75 ~7.52	5.96 ~31.31	14.5~∞ ~∞
8	0.44 ~0.46	0.48 ~0.52	0.66 ~0.74	0.92 ~1.09	1.32 ~1.73	1.69 ~2.45	2.34 ~4.18	3.39 ~9.61	5.09~ 378.10	10.21 ~∞
11	0.43 ~0.47	0.48 ~0.53	0.65 ~0.73	0.90 ~1.13	1.27 ~1.84	1.60 ~2.68	2.17 ~4.91	3.02 14.74~	4.30 ~∞	7.44 ~∞
16	0.43 ~0.48	0.47 ~0.54	0.63 ~0.79	0.86 ~1.20	1.19 ~2.05	1.47 ~3.17	1.93 ~6.93	2.57~ 138.43	3.42 ~∞	5.13 ~∞