

BROWNIE MOVIE GUIDE



BROWNIE
MOVIE f2.7

BROWNIE MOVIE
MODEL II f2.7

BROWNIE MOVIE
MODEL II f1.9

BROWNIE
MOVIE TURRET f1.9

BROWNIE 8
MOVIE f2.7

BROWNIE MOVIE GUIDE

*How to Get the Best
from your Kodak*

Brownie f 2.7 Movie Camera, Model II

Brownie f 1.9 Movie Camera, Model II

Brownie Movie Camera Turret, f 1.9

and Brownie 8 Movie Camera, f 2.7

By G. R. SHARP

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THE BROWNIE MOVIE CAMERA RANGE

Brownie 8 mm. cine cameras are designed to provide home movies at a modest outlay with a minimum of technicalities.

Simplicity the Keynote

Brownie movie cameras use the most economical cine film available—the 8 mm. gauge—and their main feature is simplicity of operation. The clockwork mechanism runs at a governed speed of 16 frames per second. The shutter gives an effective exposure of 1/35 sec.

The basic lens fitted to current models is an Ektanon of 13 mm. focal length with a maximum aperture of $f\ 2.7$, $f\ 2.3$ or $f\ 1.9$. It requires no focusing, and objects beyond 8 ft. or 10 ft. from the camera, depending on the model, are in sharp focus at all times. As the lens aperture is closed (conditions permitting) you can come in still closer to the subject. Wide-angle and telephoto converter lenses are available for the Model II, and are incorporated in the Turret model.

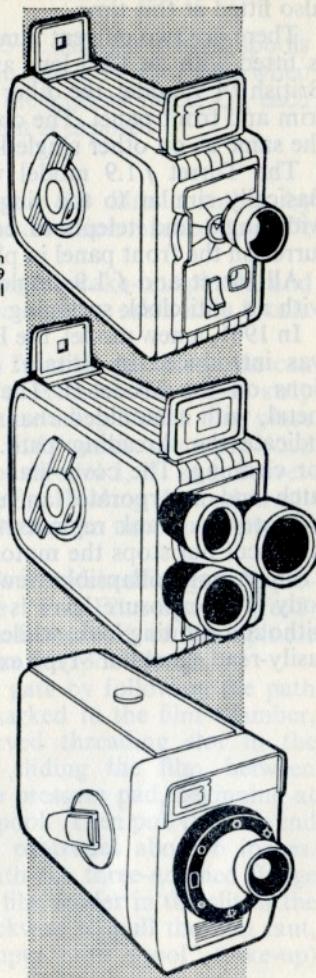
After loading, the operating instructions can be summed up in ten words: wind the motor; set the lens; press the exposure lever.

Brownie Movie Evolution

The Brownie 8 mm. Movie Camera was introduced by the Eastman Kodak Company of Rochester, U.S.A. and first imported into Britain in 1955. In the following year British production of the same model began at the Harrow factory of Kodak Limited.

The first series was fitted with a single $f\ 2.7$ lens and open frame finder. In 1957 a model II was introduced with "Sundial" type exposure calculator incorporated in the front panel. In 1958 a new lens with maximum aperture of $f\ 1.9$ was fitted, and the open frame finder was superseded by an optical finder with plastic front and rear elements. A more powerful spring motor, providing a continuous run of

BROWNIE 8 mm. MOVIE CAMERAS



Brownie Movie Camera, Model II ($f\ 1.9$ in Britain; $f\ 2.3$ in U.S.A.). The current $f\ 1.9$ American model has a restyled front panel and trim but the controls are identical.

Brownie 8 mm. Movie Camera Turret, $f\ 1.9$.

Brownie 8 Movie Camera, $f\ 2.7$.

9 ft. of film (40 seconds of screen time) at one winding, was also fitted at this time.

There are two current American single-lens models. One is fitted with an $f\ 2.3$ lens and is otherwise similar to the British $f\ 1.9$ model, the other has an $f\ 1.9$ lens and a restyled trim and front panel. The controls on the latter model are the same as on other single-lens models.

The Turret $f\ 1.9$ model was also introduced in 1958. Basically similar to the single lens model, it incorporates wide-angle and telephoto converter lenses in a movable turret on the front panel in place of the exposure calculator.

All turret and $f\ 1.9$ single lens models have been fitted with an anti-clock springing device from early 1959.

In 1961, a new model, the Brownie 8 Movie Camera $f\ 2.7$, was introduced in Britain. It embodies several modifications on the Model II. The body is of plastic instead of metal, with a moulded channel inside the film chamber to indicate the threading path. The film gate hinges open for cleaning. The cover has a locking knob in place of a latch and incorporates an automatically-resetting footage indicator. A crank replaces the winding key and an automatic cut-out stops the motor before it slows at the end of a run. A non-collapsible viewfinder is built into the camera body. The exposure lever is replaced by a broad bar, but without a running lock, while lens aperture is set on a large, easily-read "Sundial"-type exposure guide.

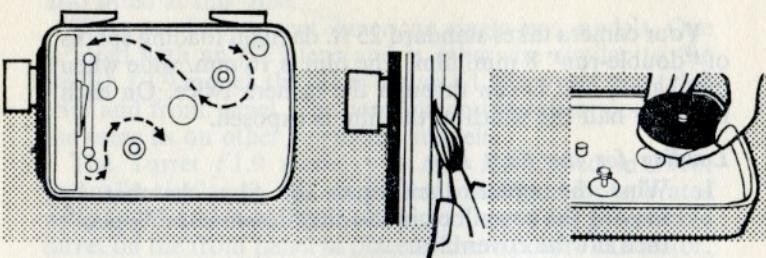
HANDLING THE BROWNIE CAMERAS

Your camera takes standard 25 ft. daylight loading spools of "double-run" 8 mm. film. The film is 16 mm. wide when purchased, and is run through the camera twice. On each run only half the width of the film is exposed.

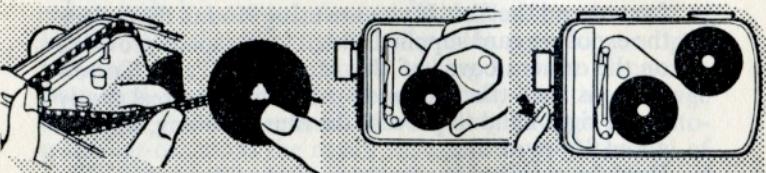
Loading for the First Run

1. **Wind the motor**, then open the film chamber by moving the cover lock in the direction marked "open"; then lift the cover clear.
2. **Remove the empty spool** from the take-up spindle, and dust out the film chamber with a sable-hair brush. Examine the gate.
3. **Remove the unexposed film from its can**. Keep the can and carton in a safe place. Remove the paper strip from round the film. If you are using Kodak film, place the exposure card supplied with it in the space provided on the camera cover of the Model I, II and Turret-cameras (not the Brownie 8). Holding the reel firmly in the right hand to prevent the film uncoiling, unwind about 12 in. of film.
4. **Hold the spool** so that the four-notched flange is uppermost and drop it over the "Full Film Spool" (feed) spindle. Make certain that the end of the spindle projects through the hole in the spool flange.
5. **Thread the leader into the gate** by following the path indicated by the arrow marked in the film chamber, guiding it along the curved threading slot in the Brownie 8 camera, and sliding the film between the aperture plate and the pressure pad, beginning at the end nearest the feed spool. Then pull the free end through the gate until it protrudes about 6 inches.
6. **Hold the take-up spool** with the three-notched flange uppermost and insert the film leader in the slit in the core. Wind the spool clockwise to pull the film taut, then place it on the "Empty Film Spool" (take-up) spindle.

HOW TO LOAD THE BROWNIE MOVIE CAMERAS



1. Wind motor and open camera.
2. Clean spool chamber. Examine gate.
3. Fit spool of film.

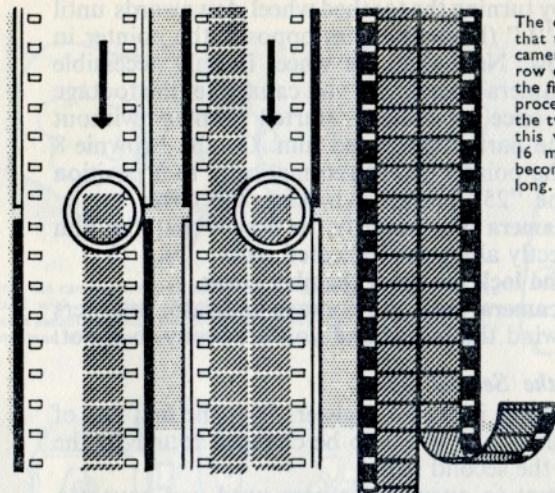


4. Thread film through gate and attach to take-up spool.
5. Fit take-up spool.
6. Run mechanism momentarily and check.



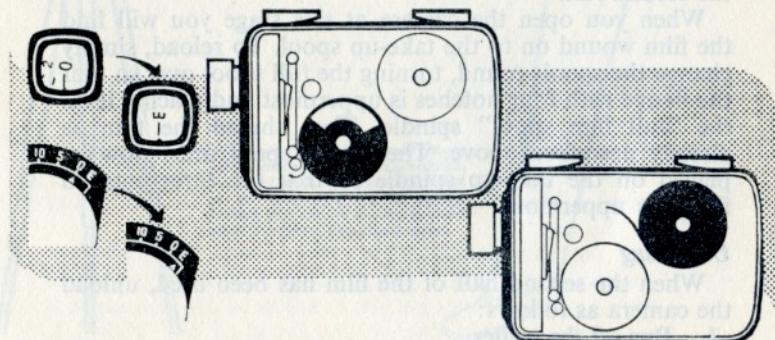
7. On Model I, II and Turret cameras, set footage indicator to "L", close camera and run until indicator reads "25".
8. The Brownie 8 indicator resets itself on locking the camera. Run until pointer moves from arrow to "25".

RELOADING FOR THE SECOND RUN



The double-run principle means that the film is run through the camera twice. Each run exposes a row of images down one side of the film. After the film has been processed it is slit lengthwise and the two ends joined together. In this way, a film that starts life 16 mm. wide and 25 ft. long becomes 8 mm. wide, and 50 ft. long.

Below: When the footage indicator reads "0", run the motor until it reads "E". This runs off the trailer. Open the camera and change the spools round by turning them over and putting the full spool on the supply spindle. Re-thread the film through the gate, attach the end to the empty spool and place it on the take-up spindle. Run the camera to check the mechanism. Set the footage indicator on Model I, II and Turret cameras to "L" (the Brownie 8 resets itself). Close the camera and run off the leader.



7. Set the footage indicator on the Model I, II and Turret cameras by turning the toothed wheel downwards until the letter "L" (loaded) comes opposite the pointer in the window. Note that the wheel is only accessible with the camera opened. So you cannot set the footage indicator once you have started filming without fogging the partially exposed film. On the Brownie 8 camera, the pointer resets automatically to a position beyond the "25" mark on locking the cover.
8. Run the camera momentarily, to ensure that the film runs correctly along the indicated path.
9. Replace and lock the spool chamber cover.
10. Run the camera until the footage indicator registers "25". Rewind the motor and you are ready to shoot.

Reloading for the Second Run

When the footage indicator registers "0", the first run of the film is finished, and it has to be changed round in the camera, to use the second half.

Do not attempt to open the camera until you have run the trailer through. So press the exposure lever and run the camera until the footage indicator registers "E" (empty). This indicates that all the film has now passed through the gate, and it is safe to open the film chamber and reload for the second run.

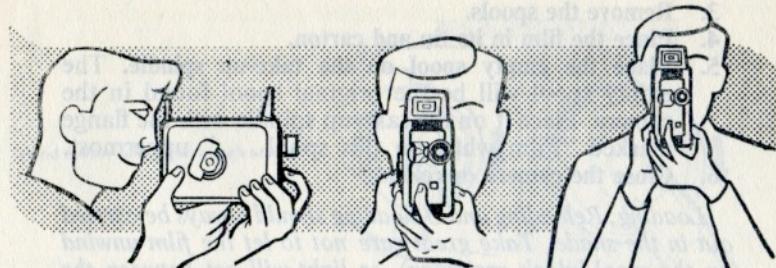
When you open the camera at this stage you will find the film wound on to the take-up spool. To reload, simply change the spools round, turning the full spool over so that the flange with four notches is uppermost and placing it on the "full film spool" spindle. Then thread the film as already described above. The empty spool must now be placed on the take-up spindle so that the three-notched flange is uppermost.

Unloading

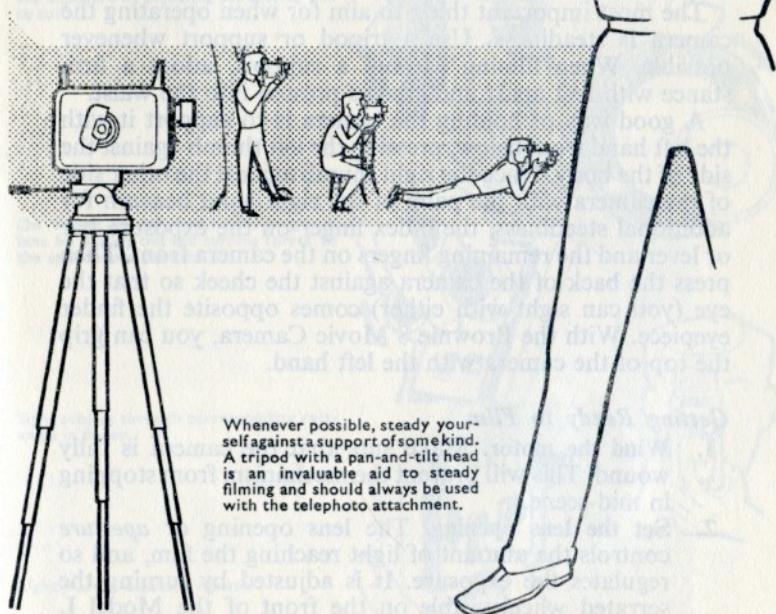
When the second half of the film has been used, unload the camera as follows:

1. Run off the trailer.

HOW TO HOLD THE BROWNIE MOVIE CAMERA



Grip the camera firmly in both hands, press it against your face and stand with your feet slightly apart, elbows into the sides. For extra steadiness with the Brownie 8 Movie Camera, you can wrap one hand across its top, since this will not obscure the viewfinder.



Whenever possible, steady your self against a support of some kind. A tripod with a pan-and-tilt head is an invaluable aid to steady filming and should always be used with the telephoto attachment.

2. Open the camera.
3. Remove the spools.
4. Place the film in its tin and carton.
5. Place the empty spool on the take-up spindle. The empty spool will be the original spool found in the camera. Place it on the take-up spindle with the flange marked "Film when on this spool . . ." uppermost.
6. Close the camera or reload.

Loading, Reloading and Unloading should always be carried out in the shade. Take great care not to let the film unwind on the spool (clock springing), or light will get between the coils.

Holding the Camera

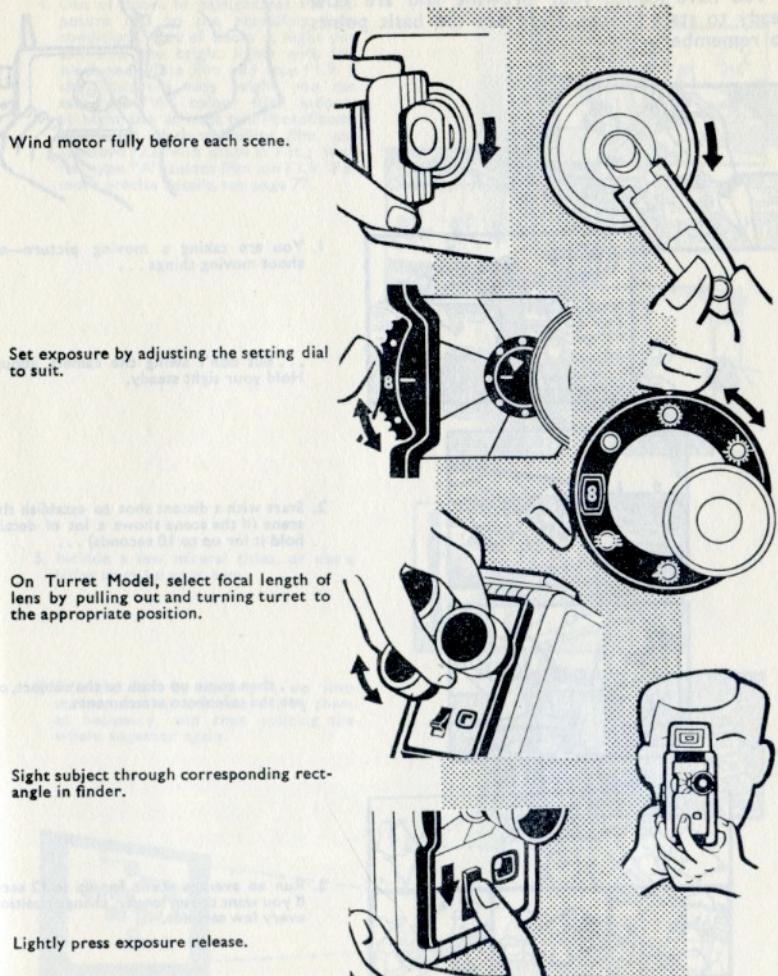
The most important thing to aim for when operating the camera is steadiness. Use a tripod or support whenever possible. When filming without a support, adopt a firm stance with feet apart and elbows pressed into the waist.

A good way of holding the camera is to support it with the left hand from below, pressing the left thumb against the side of the body. Place the right thumb against the other side of the camera with the palm of the right hand beneath for additional steadiness, the index finger on the exposure bar or lever and the remaining fingers on the camera front. Then press the back of the camera against the cheek so that the eye (you can sight with either) comes opposite the finder eyepiece. With the Brownie 8 Movie Camera, you can grip the top of the camera with the left hand.

Getting Ready to Film

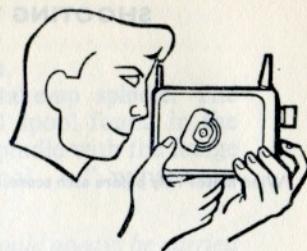
1. **Wind the motor.** Make sure that the camera is fully wound. This will prevent the mechanism from stopping in mid-scene.
2. **Set the lens opening.** The lens opening or *aperture* controls the amount of light reaching the film, and so regulates the exposure. It is adjusted by turning the serrated wheel visible on the front of the Model I,

SHOOTING WITH THE BROWNIE MOVIE CAMERAS



BASIC GUIDE...

You have loaded your Brownie and are now ready to start filming. Here are the basic points to remember—



1. You are taking a moving picture—so shoot moving things...



...but don't swing the camera about. Hold your sight steady.



2. Start with a distant shot to establish the scene (if the scene shows a lot of detail, hold it for up to 10 seconds)...



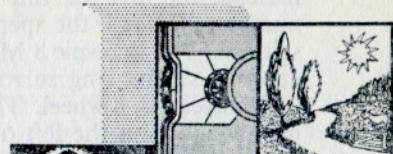
...then come up close to the subject, or use the telephoto attachments.



3. Run an average scene for up to 12 secs. If you want to run longer, change position every few seconds.

.... TO FILMING

4. Out of doors in daylight, set the exposure dial to the prevailing light conditions. Out of doors at night you can film the bright lights with fast black-and-white film and stop f1.9. If the lights are very bright you can use type "A" colour film. Indoors at night use at least two Photofloods. With fast black-and-white film use aperture f2.8 with lamps at 7 ft.; with fast type "A" colour film use f1.9. For more precise details, see page 77.



f1.9

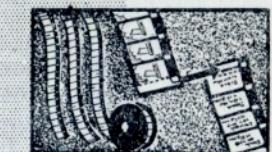


f2.8

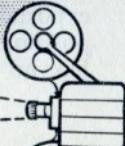


Down
on the
Farm

5. Include a few natural titles, or use a title to make your own.



6. Edit the film by cutting it up into scenes, pruning and rearranging them as necessary, and then splicing the whole together again.



II and Turret cameras. The numbers on the wheel indicate the size of the aperture: the *smaller* the number, the *larger* the aperture. The dots are half-stop settings. The Brownie 8 Movie Camera has a serrated aperture setting ring surrounding the exposure guide dial, instead of a wheel. The aperture numbers appear in a window on the left of the dial. *Never attempt to set the lens opening of any model between the dots and numbers. Always let it "click" into position.*

If you are using colour film rated at 21° B.S. or 10 ASA, e.g. Kodachrome or Gevacolor, the correct aperture setting for subjects in bright sun when the sun is behind the camera, is *f* 8. See the exposure table on page 77. For more details of films and exposures see pages 17 and 19 respectively.

3. **Sight the subject.** With the standard 13 mm. Ektanon lens everything beyond 8 ft. or 10 ft. from the camera is in focus (with the *f* 2.7 or *f* 1.9 lens respectively), whatever the aperture setting. At smaller apertures nearer objects are brought into sharp focus. The distance over which the lens gives a sharp image is known as the depth of field (see page 27). Depth of field is more restricted with the telephoto attachment. In dull weather, telephoto shots should not be attempted on subjects nearer than 30 ft.

When filming close subjects, remember to allow for the parallax error that arises from the separation between taking lens and finder. For details see page 27.

4. **Press the exposure release.** The camera is now ready for action. If the scene you intend to shoot is prolonged, or you wish to include yourself in it, you can fix the Model II and Turret cameras to a tripod and press the exposure lever right down into the continuous running position. The exposure bar on the Brownie 8 camera has no continuous-running lock.

(Main text continued after green pages)

BROWNIE MOVIE CAMERA— MODEL BY MODEL

These green pages give full details of all the controls and of each model and its handling in special circumstances. They also describe the various Brownie Movie Camera lens attachments and accessories. The section should be studied in conjunction with the general descriptions under the same headings in the general section, where the points common to all models are dealt with more fully. Note that the pages are numbered in heavy italic figures; which are also used in the page references given in this and the general section. Page references for the general section are in normal upright figures.

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BROWNIE MOVIE SINGLE LENS AND TURRET CAMERAS

The Kodak Brownie Movie Camera Series comprises a Turret and a single-lens model. The basic lens in both cases is a 13 mm. Cine Ektanon in a non-focusing and non-interchangeable mount. The maximum lens aperture is either $f1.9$ or 2.3 according to the model. Special afocal converter lenses are available for wide-angle and telephoto shots.

THE BROWNIE MOVIE CAMERA TURRET $f1.9$ camera has these converter lenses mounted in a turret which can be rotated to bring the required unit in front of the main lens. Coloured rectangles on the viewfinder front-element indicate fields of view of the three lenses which are colour-coded to match.

THE BROWNIE MOVIE CAMERA SINGLE LENS $f1.9$ is exactly similar to the Turret model but has no turret. Instead wide-angle and telephoto converter lenses screw into the main lens.

THE BROWNIE MOVIE CAMERA $f2.7$ was first put on the market with no exposure guide on the front. The improved Model II $f2.7$ followed and was later fitted with an exposure guide, over the aperture setting dial. This model resembled the $f1.9$ but had an $f2.7$ lens.

Main Features

THE MOTOR WINDING KEY. The cameras are driven by clock-work and, fully wound, will run for about 40 sec., corresponding to 8 ft. of film. There is thus ample reserve of power. The motor is fitted with a governor which maintains a constant speed of 16 f.p.s.

The winding key is on the right-hand side of the body. It folds flat when not in use. To wind the mechanism lift the key and turn it clockwise about 34 half-turns until the spring is wound tightly. Always fold the key flat after winding; otherwise it revolves when the camera runs and may disturb your grip. Do not attempt to turn the key anti-clockwise; you may damage the mechanism.

THE EXPOSURE LEVER. The exposure lever is on the front of the body, below the lens. For intermittent running, press slightly downwards with the forefinger. When it is released, the motor stops. For continuous running, slide the lever as far down as it will go: it remains fixed and the camera will then run for as long as spring tension permits, or until the lever is pushed upwards and released.

Before pushing the lever to the continuous running position, place or secure the camera on a firm support.

THE FOOTAGE INDICATOR. The footage indicator dial is visible through a window in the lens panel, below the lens. It registers the amount of film remaining unexposed to the nearest foot. On loading the camera, the dial is set to the letter "L" (loaded) by turning

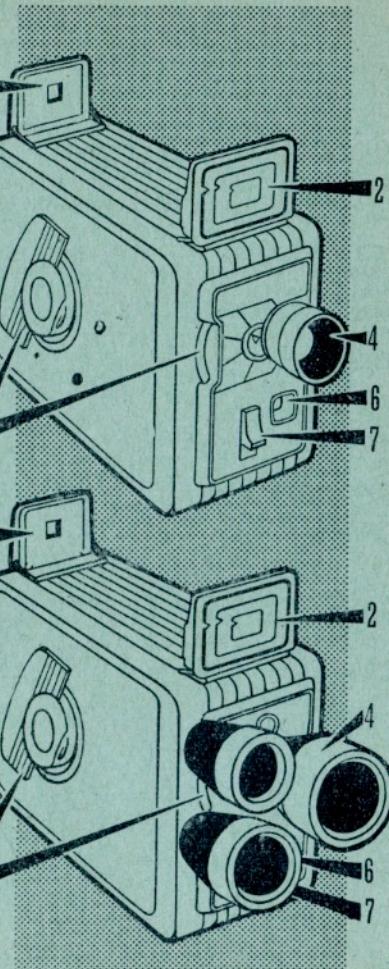
THE BROWNIE SINGLE LENS AND TURRET CAMERAS

Current single-lens Brownie movie cameras have an $f1.9$ or $f2.3$ lens according to the model and country of origin. The illustration at the top of this page corresponds to the British $f1.9$ and the American $f2.3$ cameras. The American $f1.9$ single-lens model has a re-styled front panel, but the controls remain as illustrated. The aperture setting wheel on single-lens models incorporates an exposure guide (page 4).

American and British $f1.9$ Turret models are identical, and illustrated opposite. They are similar to the single-lens models, except that the lens is sunk into the camera body and a turret on the front plate contains converters for changing the lens into a telephoto or wide-angle objective. A third position is a lens hood when using the lens at normal focal length.

The features of both models are:—

1. Rear sight.
2. Front sight.
3. The winding handle.
4. Lens (turret on Turret Model).
5. Aperture setting wheel.
6. Footage indicator.
7. Exposure lever.



the milled wheel which protrudes behind the lens panel when the spool chamber cover is removed. This toothed wheel must be turned clockwise (downwards) only. When the run of the film is completed, the indicator registers "0". The camera should then be run until the indicator registers "E" (empty), whereupon it may be unloaded and the film either reloaded for the second run or replaced in its carton if fully exposed.

The milled setting wheel is *only* accessible when the cover is removed. If you forget to set it on loading and start filming right away, you will not be able to adjust the footage indicator without opening the camera and fogging the film.

THE LENS. The normal lens fitted to the latest Model II and Turret cameras has a focal length of 13 mm. and a maximum aperture of $f/1.9$. There is no focusing control. The lens is set so that everything is sharp from infinity down to a minimum distance from the camera, dependent on the lens opening in use. This in turn depends on exposure conditions. The distance is greater for a large lens opening (small f-number) than for a small one (large f-number). It is also greater when the telephoto converter lens is used but smaller with the wide-angle converter.

The nearest points of sharp focus at each lens opening are given in the table on page 76, both for the standard and the converter lenses. These distances are also engraved round the individual lenses of the turret model.

EXPOSURE CONTROL. The camera has a fixed shutter speed of approximately 1/35 sec. So the only way of adjusting exposure is by the lens aperture. The aperture is adjusted by turning the serrated wheel which protrudes on the left of the front panel when viewed from in front.

If you look in the lens barrel while turning the serrated wheel you will see a succession of holes of different sizes pass in front of the lens. The wheel clicks into position when these holes are in register with the lens. When setting the aperture always let the wheel locate itself like this. Otherwise you will get no picture, for the lens will be obscured.

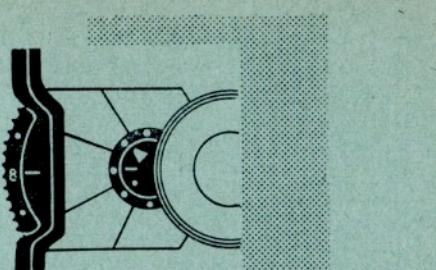
When the largest hole or aperture registers with the lens, the figure 1.9 is visible on the serrated wheel. As you move the serrated wheel, a dot and a number come alternately into view. As the aperture numbers increase, the size of the aperture itself decreases until you reach the smallest, which is marked "16". The dots provide intermediate positions. The figure "8" is engraved in red; it is an average setting normally used for exposing colour film of 10 ASA in summer sunlight during the middle of the day.

The usual term for closing a lens aperture is to "stop down" the opposite action is known as "open up". When you wish to "stop down" (close the aperture) you simply move the serrated wheel to a larger number. Conversely to "open up", you move the wheel in the opposite direction, to a smaller number.

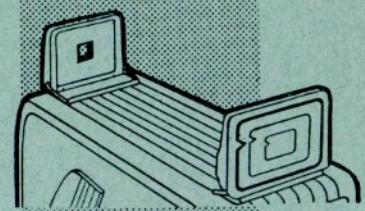
EXPOSURE GUIDES. All models have a holder for an exposure

THE CAMERA CONTROLS

The aperture setting wheel and exposure guide.



The viewfinder with three different coloured frames for three focal lengths.



The footage indicator.



The exposure lever.



Winding handle.



card built into the camera cover (left-hand panel). Cards to fit the holder are supplied with Kodak movie film and indicate the correct lens aperture to use, according to the lighting, when shooting average subjects with the film in question. The card supplied with "Kodachrome type A" film is double-sided and gives settings for use both indoors (with "photoflood" lamps) and outdoors.

All current single lens models are additionally fitted with a further exposure guide engraved on the front panel. As the serrated aperture wheel is turned, an arrowhead, a dash and also a dot appear opposite weather markings. These symbols indicate the correct lens settings when using films of different speeds. For any particular film, look up the speed in the ASA (American Standards Association) scale, and set the lens aperture by using the mark which tallies with the speed rating, as follows:—

- 10-12 ASA ◀ (arrowhead).
- 20-25 ASA — (dash).
- 40-50 ASA ● (dot).

The arrowhead is the mark to use with the original Kodachrome and Gevacolor. For Kodachrome II use the dash mark.

For more details of film speeds and exposure, see pages 17 and 19.

THE VIEWFINDER. The optical finder on current models consists of transparent plastic mouldings mounted at the front and rear of the top panel. They are spring-loaded and fold flat when not in use.

The front element is a negative lens with three coloured rectangles engraved in it: the red rectangle indicates the field of view of the standard 13 mm. (1 in.) lens. The outer green rectangle shows the area covered by the wide-angle attachment; the inner yellow rectangle that covered by the telephoto attachment. On the turret model the hood of the standard lens, and the two attachments, are colour-coded to match the corresponding finder rectangles.

The rear element incorporates a positive lens, and forms the eyepiece.

Earlier models of the camera up to and including the model II with $f2.7$ lens, were fitted with an open frame viewfinder.

PARALLAX CORRECTION. As the viewfinder is located about $2\frac{1}{2}$ in. above the taking lens, you see a slightly different view in it from that recorded on the film. The difference is called parallax, and you have to allow for it when taking close shots, or you may, for example, chop off the head of your main actor. All models have provision for parallax correction.

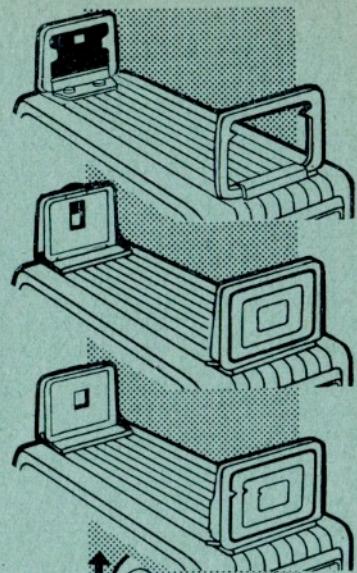
Early models (up to model II with $f2.7$ lens) fitted with open frame finder, have two sighting marks on the front frame. For subjects between $3\frac{1}{2}$ and 6 ft. from the camera, aim so that no part of the subject comes above the right-hand pointer marked "4". When filming at 2 ft. from the subject, keep the subject below the left-hand pointer marked "2".

Some optical finders were fitted with a parallax slide in the rear element, calibrated for distances of 3, 4, 5, 8, 15 ft. and infinity.

THE VIEWFINDER

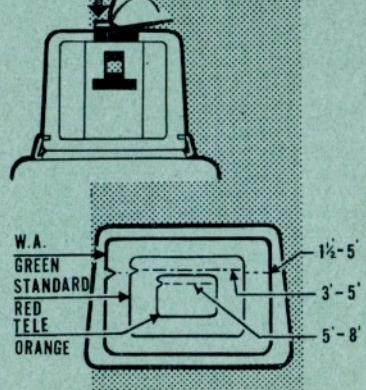
The early Brownie movie camera with $f2.7$ lens has an open frame finder, the front and rear elements of which fold flat for carrying. The rear sight has a fixed aperture while the front sight is a simple open frame with two notches indicating parallax at 4 feet and 2 feet from the camera.

The $f1.9$ movie camera has a folding optical finder, the front sight being a plastic lens engraved with coloured concentric rectangles showing the fields of the various lenses. The rear sight has a parallax-correcting slide which is explained below.



The latest models have an exactly similar finder but with no slide, parallax being indicated by notches on the front site.

Adjust the parallax correcting slide of models with the original optical finder by pulling out the tab until the appropriate figure, indicating distances in feet to the subject, appears on one side or other of the sighting aperture.



On the latest model of viewfinder, the front sight is engraved with concentric rectangles coloured as shown. The parallax correction at the distances shown is indicated by notches.

At the closer filming distances the rear eyepiece is raised relative to the front one. On later camera models (from 1960) parallax correction for close-ups is indicated by a pointer in each of the coloured frames of the front element. The pointer in the outer green (wide-angle) frame applies to distances between 1½ and 3 ft. That in the middle red (normal) frame is for use between 3 and 5 ft, while the pointer in the inner orange (telephoto) frame applies to distances between 5 and 8 ft.

Special Features

THE TURRET MODEL. The turret has three positions. The first has a converter lens which adapts the standard lens for wide-angle use; the second converts the standard lens for telephoto use (see also page 17); the third is vacant, acting as a lens hood for the standard lens.

The turret is located by gently pulling it away from the camera front and turning it either way until the required position is in front of the lens. On releasing the turret, it automatically locates itself.

Each unit is colour-coded to match the rectangles engraved in the finder: wide-angle—green; normal lens—red; telephoto—orange. On some cameras each unit is also marked with the nearest subject distances for all lens openings.

THE SINGLE LENS MODEL. On later single-lens models, the front panel incorporates an exposure dial for various weather conditions. Distinctive symbols corresponding to films of various speed ratings (page 17) are brought into register with the weather symbols by turning the serrated aperture setting wheel.

Special Exposure Conditions

The exposure dial on the single-lens model and the cards supplied with Kodak films give lens openings (*f*-stop numbers) for average scenes with about equal amounts of light and shadow. For darker than average scenes (e.g. groups or close-ups indoors or in shade) "open up" the lens by moving the setting wheel one or more clicks to a smaller number. For lighter subjects (e.g. light buildings, landscapes) "close down" the lens by moving the wheel to a larger number.

An exposure meter simplifies the problem, shutter speed being 1/35 sec. But in either case, always expose for the main object of interest in the scene.

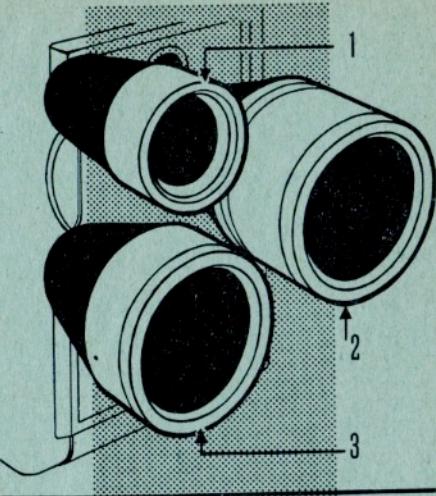
Loading

1. Wind the motor and open the film chamber by sliding the latch in the direction indicated.
2. Remove the empty spool.
3. Remove the film from its can. Take off the paper strip and unwind about 12 in.
4. Hold the full spool, four-notched flange uppermost, and drop it over the feed spindle.

THE TURRET AND EXPOSURE GUIDE

The standard 13 mm. lens is recessed into the front panel of the camera, the turret contains a 24 mm. telephoto converter lens, a 9 mm. wide-angle converter lens, and an open extension hood for use with the normal lens. The appropriate lens is selected by gently pulling out the turret, turning it until the appropriate position is opposite the standard lens, and releasing it. The turret will then click back into place. The turret lens barrels are engraved in distinctive colours corresponding to the coloured rectangles in the viewfinder. These are as follows:—

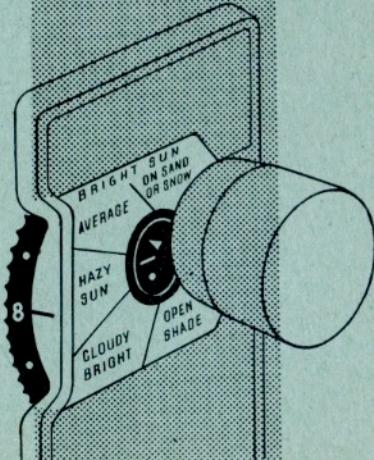
1. Wide-angle—green
2. Telephoto—orange
3. Standard—red



On the single lens models, the aperture setting wheel is incorporated into an exposure guide on the front panel of the camera opposite the lens. At the centre of this guide is a dial on which appear three code marks referring to the speed of the film in use. These are as follows:—

Film speed 10 ASA ▲
 Film speed 20 ASA ▲
 Film speed 40 ASA ●

Around the cut-out are engraved panels referring to the light conditions. The code marks inside the cut-out move with the aperture setting wheel, so if you have film rated at 10 ASA in your camera and you are shooting an average subject, i.e. group in garden, in bright sun, turn the aperture setting wheel until the mark ▲ is against the appropriate panel as shown in the illustration.



5. Thread the leader into the gate.
6. Hold the take-up spool, three-notched flange upward; attach the film leader and fit the spool over the take-up spindle.
7. Run the camera for a few seconds.
8. Set the footage indicator to "L".
9. Replace the cover of the film chamber and lock.
10. Run the mechanism until the footage indicator reads "25".

Reloading for the Second Run

1. Run the camera until the footage indicator registers "E", then rewind the motor.
2. Open the film chamber.
3. Remove both spools.
4. Turn the full spool over and place it on the feed spindle.
5. Re-thread the film.
6. Turn the empty spool over. Attach film end and place it on the take-up spindle.
7. Run the camera momentarily.
8. Set the footage indicator to "L".
9. Replace the cover of the film chamber and lock.
10. Run the mechanism until the footage indicator reads "25".

Unloading

1. Run the camera until the footage indicator registers "E".
2. Open the film chamber.
3. Remove both spools.
4. Place the full spool in its tin and carton.
5. Place the empty spool on the take-up spindle.
6. Close the camera or reload.

Shooting

1. Wind the motor.
- 2a. On single-lens models: set the lens aperture by referring to the exposure guide card or the dial on the front (page 6) and turning the serrated wheel accordingly. Alternatively, refer to the exposure table on page 77 or use an exposure meter (page 22).
- 2b. On the Turret model: refer to the exposure table on page 76 or use an exposure meter (page 22), then set the serrated wheel on the camera front accordingly.
3. Sight the subject in the viewfinder.
4. Press the exposure lever.

THE BROWNIE 8 MOVIE CAMERA f2.7

The Brownie 8 camera constitutes a new departure in the Brownie series: the body is of moulded polystyrene instead of metal and it is somewhat simpler than the earlier models, but embodies several improvements. The viewfinder is built into the body and is non-collapseable; motor winding is by a cranked handle instead of a key; there is a large, improved "Sundial" exposure guide on the front of the camera with aperture setting incorporated; and beneath this a large and accessible exposure bar for starting the motor. This has no continuous-run lock, however. The removable side panel over the film chamber embodies a self-setting footage counter and an improved type of cover lock. The film chamber contains countersunk depressions to take the feed and take-up spools and from these curved channels run to and from the camera gate so that there can be no confusion in lacing up the film. The camera gate itself is of a new type and cannot be dismantled. The lens is a Kodak Movie "Ektanon" 13 mm. with maximum aperture of f2.7.

Main Features

THE MOTOR WINDING HANDLE. The Brownie 8 Movie Camera f2.7 is fitted with a clockwork motor set to run at a governed speed of 16 f.p.s. When fully wound, the motor will drive about 7 ft. of film, giving a duration of about 35 sec.; it then cuts out automatically.

The motor winding handle is located on the right-hand side of the camera body. To operate, unfold the handle and turn it clockwise until the spring is wound tightly. Then fold and lock the handle against the camera; otherwise it will rotate when the motor runs.

THE EXPOSURE BAR is located on the front of the body, below the lens. To start the motor, lightly press the exposure bar. To stop the motor, release the bar. It can be operated with either the right- or left-hand index finger, whichever is more convenient.

THE FOOTAGE INDICATOR is incorporated in the film chamber cover. It is calibrated at intervals of 5 ft. and registers the amount of film remaining unexposed. When the camera is loaded and the film chamber cover placed in position and locked, the indicator pointer is to the left of the figure "25". The mechanism is run until the pointer comes opposite this figure and the camera is then ready for shooting. When the whole run of film is completed, the indicator registers "0". The camera should then be run until the indicator registers "E" (empty), whereupon it may be unloaded and the film either reloaded for the second run or replaced in its carton if fully exposed.

THE LENS. There is no focusing control. The lens is set so that everything is sharp from infinity down to a minimum distance from the camera, dependent on the lens opening in use. This, in turn, depends on exposure conditions. The distance is greater for a large lens opening

(small *f*-number). It is also greater when the telephoto converter lens is used. The nearest points of sharp focus at each lens opening are given in the table on page 76, both for the standard and the converter lens.

EXPOSURE CONTROL. The aperture is set by turning a milled ring built into the camera front. As the ring is turned it brings a succession of holes of different sizes into register with the lens, thus varying the amount of light reaching the film when the camera runs. The holes correspond to the aperture or *f*-numbers which appear in a window beside the lens. When the largest aperture registers with the lens, the figure 2.7 appears. If you turn the ring clockwise, you reduce the size of the aperture by stages marked alternately by numbers and dots until, at the last-but-one setting, the figure 16 appears, the last being a dot. Never set the ring between a dot and a number: you would get no picture for the lens would be obscured.

The setting ring travels round a dial marked with typical weather conditions and calibrated for summer conditions. It carries two pointers representing film speeds. When the camera is loaded with film rated at 21 B.S., e.g. daylight Kodachrome, all that is necessary to obtain the correct exposure is to set the white pointer to the appropriate weather reading. With bright sun behind the camera and film of this rating, the indicated aperture is *f*8. The other pointer is for use with films rated at 25 B.S.

THE VIEWFINDER. The camera has an enclosed optical viewfinder which accurately shows the field covered by the cine Ektanon lens at a distance of 6 ft. and beyond. The small orange rectangle visible in the finder front lens (British-made cameras only) shows the field of view given by the Telephoto Converter.

PARALLAX CORRECTION. As the finder lens and main camera lens are a short distance apart, they do not see quite the same field of view. The difference is negligible at 6 ft. and beyond but when the subject is closer this so-called parallax error has to be allowed for. In order to film a close-up of a person's head at a distance of between 3 ft. and 5 ft., aim the camera so that the top of the subject is below the level of the notched mark on the left-hand side of the viewfinder. The subject will then appear correctly centred on the screen.

With the Telephoto Converter, you will have to correct for subject distances between 6 ft. and 8 ft. (about the closest distances in focus). Use the orange rectangle and keep the top of the subject below the notched mark on the left-side of this.

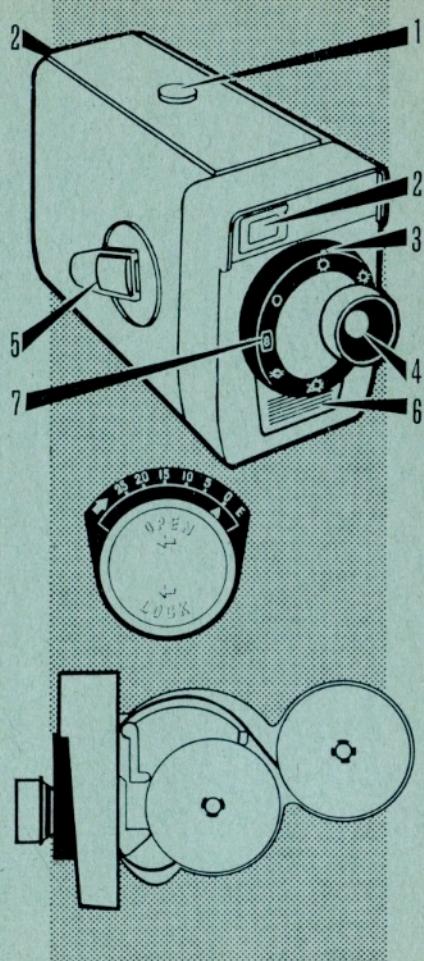
For an extreme close-up at about 2 ft. from the subject, fit a No. 255 size "Kodisk" close-up lens and tilt the camera up until there is as much space between the top of the subject and the sighting mark as there is between this mark and the top of the viewfinder frame.

Before taking close-ups it is important to ensure that the aperture setting to be used will provide sufficient depth of field (page 76). The extreme close-up described above can be obtained at an aperture of *f*8, the normal setting when filming in summer sunshine with daylight Kodachrome or Gevacolor.

THE *f*2.7 BROWNIE 8 CAMERA

The Brownie 8 Movie Camera has a single lens with aperture setting ring incorporated in an exposure guide dial (page 4).

1. Dust cap covering socket for Movie Light.
2. Viewfinder.
3. Aperture setting ring with exposure guide.
4. Lens.
5. Winding handle (in folded position).
6. Exposure bar.
7. Aperture indicator window (*f*-stop numbers).



The footage indicator and cover lock. The pointer indicates the amount of film remaining.

The film chamber, film spools and film path are partly recessed into the back of the chamber, with arrows indicating the direction of film travel. The film moves from the full spool (right) along a curved channel, through the gate and on to the take-up spool (left).

Special Exposure Conditions

The exposure guide on the camera gives lens openings for average summer scenes with about equal amounts of light and shadow. In winter (except in snow conditions) the lens should be opened to give one stop larger (*smaller f-number*) than the dial indicates. To do this, turn the setting ring two "clicks" in an anti-clockwise direction.

For subjects which are lighter than normal, use a half-stop less than the indicated exposure (move the ring clockwise one click). For dark subjects give half a stop more by moving the ring *anti-clockwise* one click.

When using films of speed ratings other than 21 or 25 B.S., consult an exposure table (page 77), or better still, use a meter. The effective exposure given by the shutter is 1/35 sec.

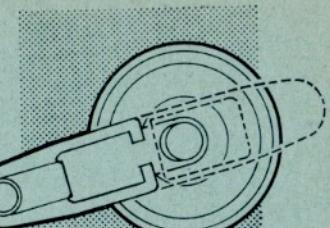
Loading

1. **Wind the motor then open the film chamber** by turning the locking knob in the side cover anti-clockwise as far as it will go, then lift the cover clear.
2. **Remove the empty spool.**
3. **Remove the film from its can**, take off the paper strip and unwind not more than 12 in.
4. **Hold the full spool, four-notched flange uppermost**, and drop it over the feed spindle. The end of the spindle should project through the hole in the spool flange.
5. **Thread the leader into the gate**, guiding the film along the curved threading slot (indicated by the arrow). Slide the film between the pressure pad and the aperture plate.
6. **Hold the take-up spool, three-notched flange upward**, attach the film leader to the core by folding the end into a hook and inserting this in the slot in the core. Take up the slack in the film by turning the spool clockwise, then place over the take-up spindle.
7. **Run the camera briefly** to check that the film is correctly threaded.
8. **Replace the film chamber cover.** First make sure the locking knob is turned fully anti-clockwise, then slide the lip of the front edge into the slot of the front housing. Press down on the rear of the cover and turn the locking knob clockwise as far as it will go.
9. **Run the mechanism** by pressing the exposure bar until the pointer on the footage counter reaches the figure "25".

Reloading for the Second Run

1. **Run the camera** until the footage indicator registers "E", then rewind the motor.
2. **Open the film chamber.**
3. **Remove both spools.**

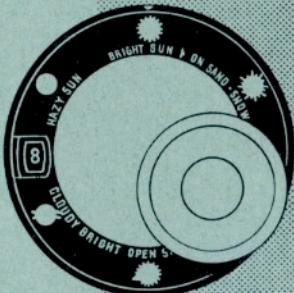
The motor winding handle.



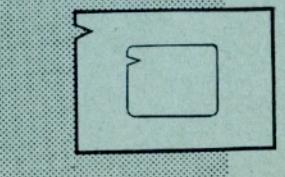
The exposure bar.



The aperture setting ring and exposure guide dial.



The viewfinder front cell. The central rectangle defines the telephoto field. The notches indicate parallax correction at distances between 3 and 5 ft. (normal lens) and 6 and 8 ft. (telephoto).



4. Turn the full spool over and place it on the feed spindle, with the four-notched flange uppermost.
5. Re-thread the film.
6. Turn the empty spool over. Attach the film end and place it on the take-up spindle, three-notched flange up.
7. Run the camera momentarily.
8. Close the lid of the film chamber.
9. Run the mechanism until the footage indicator reads "25".

Unloading

1. Run the camera until the footage indicator registers "E".
2. Open the film chamber.
3. Remove both spools.
4. Place the full spool in its tin and carton.
5. Place the empty spool on the take-up spindle.
6. Close the camera or reload.

Shooting

1. Wind the motor. Unfold the handle and turn it clockwise until the spring is wound. Fold and lock the handle against the camera.
2. Set the lens aperture by referring to the exposure guide on the camera front and setting the serrated ring accordingly. Alternatively refer to the exposure table on page 77 or use an exposure meter (page 22).
3. Sight the subject. Hold the camera so that the rear sight of the viewfinder is close to your eye. Place one hand underneath the camera, and the other on top. The upper hand can rest against the forehead to provide extra steadiness.
4. Press the exposure bar, using the index finger of the hand which holds the camera from below.

BROWNIE MOVIE ACCESSORIES

Accessories for the Brownie Movie cameras include telephoto and wide-angle converter lenses, filters, close-up lenses, and an extra lens hood.

The standard lens has a focal length of 13 mm. This gives a fairly narrow angle of view. To get a close-up of a person's face, the camera has to be between 3 and 4 ft. from the subject.

The Telephoto and Wide-Angle Converter Lenses

Special afocal attachments for changing the regular field and converting the standard lens for telephoto and wide-angle shots are built-in on the Turret model. They are supplied as separate screw-in adaptors for the single-lens cameras. They have no focusing adjustment and do not affect the lens aperture.

THE TELEPHOTO UNIT doubles the focal length of the lens, bringing it to 25 mm. It brings distant objects nearer like a telescope, and lets you take close-ups even when you cannot get near the subject. Depth of field (page 27) is reduced, however, and very close objects will not be sharp if filmed at large apertures. It fits both the Model II and the Brownie 8 cameras. The field covered by the telephoto attachment is shown by the orange rectangle visible in the viewfinder front element of the Model II and Turret cameras, and also in the British-made Brownie 8 viewfinder.

THE WIDE-ANGLE UNIT reduces the focal length to 9 mm. and increases the angular field of the lens by 50 per cent. This means that you get more in the picture and it is useful in confined spaces when you cannot get far enough back from the subject to get it all in with the normal lens. In addition, depth of field is increased (page 27) and everything is sharp down to 5 ft. at f1.9. The wide-angle converter is not suitable for the Brownie 8 camera.

Filters

The manufacturer supplies a wide range of filters in special mounts to fit all the Brownie Movie Cameras and the converter lenses. The most useful filters are:

WRATTEN No. 1A AND "KODISK" HAZE, for use with colour film to avoid excessive blueness at high altitudes, near large expanses of water, or when the sun is hazy. This filter does not affect exposure.

No. 8 YELLOW: for use only with black and white film, to bring out clouds by darkening the sky. When using this filter, open up the lens by one whole stop (two "clicks" on the aperture setting).

Close-up Lens

The "Kodisk" Close-up Lens enables you to take shots at 2 ft. from the subject. When filming at this distance, make extra allowance for parallax error (page 6) by aiming so that the top of the subject is well

below the close-up sighting mark on models so fitted. On models with a parallax slide on the rear-finder element, pull the slide right out to the 3 ft filming mark, then aim so that the top of the subject is well *below* the top of the appropriate rectangle in the finder front element.

Lens Hood

A supplementary "Kodisk" lens hood is available for single-lens models and its use is recommended with a filter or close-up lens.

Sizes of Filters, Close-up Lenses and Lens Hoods

For the Brownie Model II, ask for the required accessory in size No. 250. The Turret model requires separate drop-in filters for each of the three units. The sizes are: standard and wide-angle No. 206; telephoto No. 320. The Brownie 8 camera takes size No. 255 push-on.

Carrying Cases

Cases are available to fit all the Brownie Movie Cameras. They are built on the ever-ready principle. To prepare the camera for shooting, it is only necessary to undo a single press-button at the rear and the top of the case can be swung forward and down, below the camera.

In the absence of any handle on the camera body, a case provides the best means of transporting and protecting it from damage. But the ever-ready type of case cannot provide full protection against damp, dust and sand. Extra precautions are advisable where rough usage is likely, such as wrapping in polythene sheeting.

The Brownie 8 Movie Light

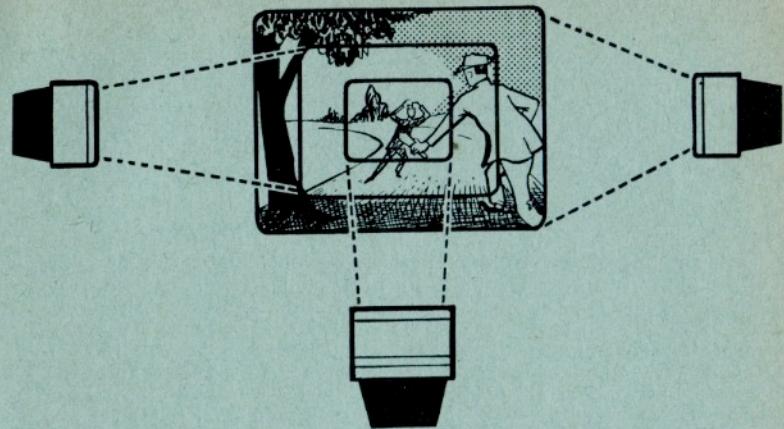
The Movie Light is designed for use on the Brownie 8 camera which has a threaded socket on top of the body to which the Movie Light is attached. It can be used with the other models by means of a bracket. (See page 57).

The Movie Light consists of a V-shaped bracket, carrying a lamp-holder at the end of each arm, and a length of flex with a switch on it. The unit has a built-in exposure guide calibrated for Kodachrome Type A film or film with a similar tungsten speed (16 ASA).

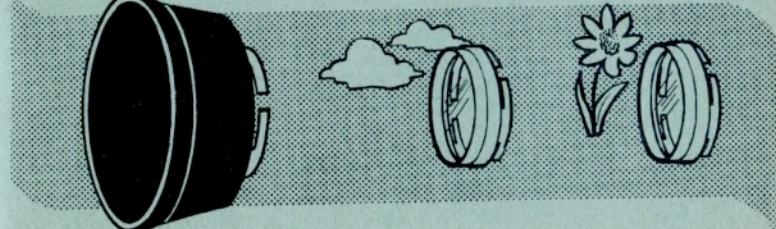
To fit the Movie Light to the camera, unscrew the plastic button which serves to keep the threaded hole in the top free from dirt. Do not lose this: you will need to replace it when the Movie Light is removed. Place the Movie Light on the camera, with the lamps in line with the lens, and fix it in position by means of the knurled screw located in the apex of the V-bracket.

Connect a suitable plug to the end of the flex and insert two 500-watt reflector photoflood lamps, Type NM, in the lampholders. The unit can be connected to any 5-amp. lighting or 13- or 15-amp. power socket. If other photoflood lamps are being used at the same time, they can be connected to the same power socket but not to the same lighting socket.

BROWNIE MOVIE LENSES



The areas covered by the three lenses are here shown as they would appear in the Brownie view-finder. The standard lens (left) covers the intermediate rectangle, the telephoto (below) covers the smallest rectangle, and the wide-angle lens (right) covers the largest rectangle.



Lens Hood.

Filters.

Close-up lens.

With the Movie Light attached to the camera, it is possible, within the limits of the length of flex provided, to follow moving subjects, such as children and animals, and keep the exposure level fairly constant. But if the subject moves markedly closer or farther away from the camera, the picture will be overexposed or underexposed respectively. Stop filming, reset the lens aperture and start shooting again—preferably from a different angle (see page 37). Do not try to change aperture while the camera is running; it will only result in blank frames while the lens is obscured between one stop and the other (see pages 4 and 12.).

The Kodak Presstape Movie Splicer

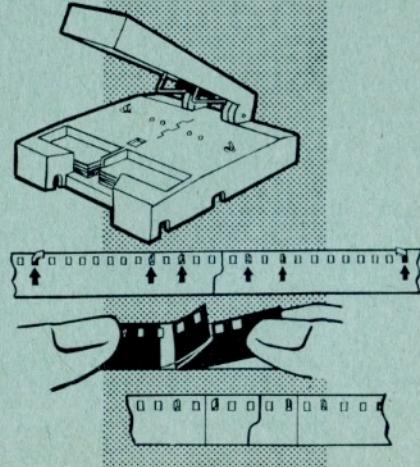
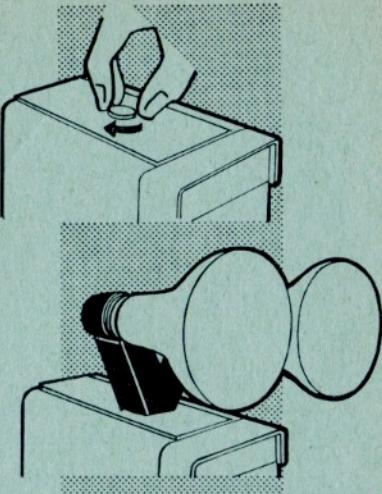
You will eventually want to edit your films and join some of them up into a continuous whole. This is described in the chapter on Editing on page 62, and requires the use of a film splicer. The Presstape Movie Splicer uses special transparent pressure-sensitive adhesive tape to make a butt-splice, instead of the conventional cemented lap-joint. This has the advantage of being very easy and clean to make, stronger than the conventional splice, and less noticeable when passing through the projector since there is no double thickness of film to throw the picture momentarily out of focus and also make an obtrusive click.

The Presstape Movie Splicer consists of a plastic moulding with pins to hold the two ends of film rigidly in place and a swinging knife which makes a notched cut for extra strength. Packets of pre-perforated tapes are supplied with the splicer.

1. **Raise the cutting knife handle.**
2. **Place one end of film over the pins, one sprung and two fixed, on the left of knife slot in the base of the splicer. The film end must project beyond the knife slot.**
3. **Place the other end of film over the pins to the right of the knife slot, with the end also overlapping the slot. The film must be same side up (dull or shiny) as the first end of film.**
4. **Lower the knife handle and press down to cut the overlapping ends of film at the centre line. This produces a notched cut.**
5. **Raise the knife; remove the loose pieces of film, leaving the trimmed ends to be joined in place.**
6. **Take a tape from one of the Presstape packages supplied and apply over the centre cut, engaging the tape perforations with the fixed pins on either side of the cut.**
7. **Hold down the left side of the tape and carefully pull off the protective paper flap covering the right-hand end of the tape. Smooth down the tape on to the film with the finger.**
8. **Pull off the left paper flap in the same way, holding down the right side of the join. Smooth down with the finger.**
9. **Remove the film, turn it over and apply another piece of tape to the other side in the same way. Rub down the tape on both sides of the film with the fingernail to seal it firmly to the film.**

THE BROWNIE MOVIE LIGHT AND KODAK SPLICER

The Brownie Movie Light attaches to the screwed socket on top of the camera. Unscrew the plastic dust cap, screw on the Movie Light, plug the lead into a mains power supply and switch on. A table on the unit gives the correct aperture setting.



The Kodak Presstape Splicer joins two lengths of film by a butt splice covered with transparent adhesive tape. Fit the two ends of film over the pins (arrowed), overlapping at the centre and trim with the knife. Lay a piece of splicing tape, supplied, over the joint, peel off the backing paper and smooth down the tape. Turn the film over and repeat the process on the other side.

CAMERA MAINTENANCE

The Brownie Movie Cameras are so straightforward that they need little maintenance. However, it is essential to keep them clean. A dirty lens cannot possibly produce the best definition in the tiny pictures, while accumulations of dust in the camera gate show up as scratches or irregular marks on the film which are enormously enlarged on the screen.

Care of Lenses

The lens is built into the camera, and only the front element is accessible. If the lens becomes dirty, turn the aperture setting to its wide-open position so as to uncover the lens completely, dust out the lens with a sable-hair brush, finishing off if necessary with a fluffless cloth. Do not use silicone treated lens tissue or any metal object for the purpose. If the lens is scratched, it cannot be repaired.

To clean the 13 mm. lens on the Turret model, you must swing the turret round into an intermediate position in order to gain access. The wide-angle and telephoto converters on this model can easily be cleaned at both front and rear by turning the turret so that they stand out beyond the camera body on the winding key side.

Cleaning

Every time you get ready to load the camera, clean out the film chamber first with a sable-hair brush or a soft fluffless cloth. It is not advisable to use a brush on the camera gate, in case a hair gets left behind, and protrudes into the picture area. On the Brownie 8 model, pull back the pressure pad behind the film gate and blow out any dust or use a vacuum cleaner. On no account use any metal object for cleaning any part of the camera.

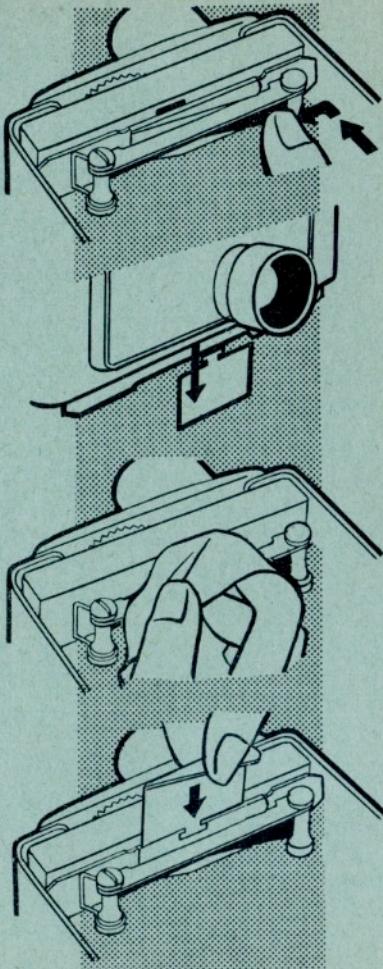
On the Model I, II and Turret cameras, the pressure pad and spring are detachable and should be removed to provide access to the gate for cleaning. The spring is a strip of steel with an elbow which bears on the pressure plate. To remove the spring, press against it so as to release the upper end from the upper film guide bar which acts as a locating stud. Then turn the spool chamber upside down, and spring and pressure plate will fall into your hand.

With these parts removed the aperture and film channel are clearly visible. Clean them with a soft fluffless cloth, such as the corner of a well-washed handkerchief, wrapped round a match stick.

To replace the parts, insert the pressure plate shiny side towards the lens, behind the aperture. The T-shaped tongue will then engage with a slot beside the claw. Grasp the crooked end of the spring with thumb and forefinger of the right hand, orientate it so that the kink in the middle points towards the gate, insert the straight end behind the lower film guide bar, then press the thumb against the crooked end to locate it behind the upper film guide bar.

CLEANING THE BROWNIE MOVIE CAMERA

The camera gate should be cleaned regularly between films. Open the camera. Remove the spools. Then press forward and down on the end of the spring holding the pressure pad in place.



Turn the camera over and the pressure pad will fall out into the hand.

Clean the gate and pressure pad very carefully with a slightly moist cloth. Do not use a metallic object. Polish with a soft fluffless cloth.

Drop the pressure pad back into place, ensuring that the T-shaped tongue engages in the slot at the bottom of the gate bracket. Replace the spring by sliding the lower end between the gate and the lower film guide bar, then press forward and up on the hooked end of the spring until it sits under the upper film guide bar.

NOTES

FACTS ON FILMS

Your camera accepts 25 ft. daylight loading spools of double-run 8 mm. film, which is available in colour and black-and-white. The film when purchased is 16 mm. wide, but must not be confused with that intended for use in 16 mm. cameras—the perforations are different.

As its name indicates, double-run 8 mm. film is run through the camera twice, only one half being exposed each time. During processing the film is split down the middle and the two halves, now 8 mm. wide, are then joined end to end, producing a 50 ft. length which is returned to the user on a projector spool. Each frame (or single picture) of 8 mm. film measures 3.51×4.8 mm., and there are 80 frames per foot. A full 50 ft. reel, when projected at the standard speed of 16 f.p.s., thus runs for 4 min. 10 sec. Although the frame is so small, a good quality projector can give an adequately bright 30×40 in. screen image without difficulty.

All colour films and most black-and-white films are reversal material which yield a direct positive image after processing. The film that comes back from processing, though now 8 mm. wide, is the same one that you exposed in the camera, and it is your only copy. So treat it carefully. If it is damaged, there is nothing you can do about it. Some laboratories can print further copies, and this is worth while if your film is valuable. But send your original for copying as soon as possible; scratch marks will show on the copy.

Film Speeds

Your camera setting will be largely governed by the sensitivity or speed of the film you are using.

Film speeds are measured either on an arithmetic scale, in which the speed is directly proportional to the number (e.g. ASA), or on a logarithmic scale, in which every increase of 3° doubles the film speed (e.g. BS log. index, DIN). Therefore, a film rated at 20 ASA or 14° DIN is twice as fast as one rated at 10 ASA or 11° DIN. See p. 79.

Colour Films

Most amateur movie makers now use colour film only. Most 8 mm. colour films are relatively slow—around 10-20 ASA (11°-14° DIN) in daylight. Given correct exposure the colours are excellent, provided that subject contrasts are not excessive. Therefore, avoid heavy shadows, and until you have gained experience, expose in sunny weather only and with the sun behind the camera. For detailed hints on shooting colour outdoors, see page 47 onwards. But use only colour films clearly marked for daylight shooting.

Certain types of colour film are also obtainable for filming by artificial light. Special Photoflood bulbs are needed, and you will find full details on page 55 onwards.

Filming in Monochrome

Black-and-white films are available in various speeds, and can be roughly classified into slow, medium and fast. With medium speed or fast black-and-white film you can get shots that would be impossible with the slower colour emulsions; e.g., sports events in bad light and night scenes. Some of the fastest materials go up to 100 ASA or 31° BS. But fast film is not suitable for all occasions. The photographic image in a black-and-white film is made up of minute silver grains which, when greatly enlarged, produce a coarse pattern known as "graininess". Unfortunately, in the faster films the grain particles in the image tend to be large and so more obtrusive on the screen. So unless you intend to film consistently in bad light outdoors, or indoors either by natural or artificial light, you will do better to use slow films.

Apart from the coarse grain, fast films have the disadvantage that they cannot be used for average subjects in bright sunlight unless you fit a neutral density or colour filter in front of the camera lens. This is because such films are so fast that they are over-exposed, in normal daylight, resulting in a washed-out image, even if you close the aperture right down.

EXPOSURE EXPLAINED

What do we mean by correct exposure? The sensitive film needs a given amount of light to produce a picture. The "slower" or less sensitive films—including most colour films—need more, the "faster" films less.

The daylight we use for most filming varies according to season, weather and clock time; but the film of our choice needs to receive a constant amount of light.

So the camera is fitted with a lens diaphragm to vary the amount of light passing through the lens. Adjustment of this diaphragm is the normal way of regulating exposure.

The method of adjustment depends on the camera. All models have a numerical aperture scale, which is explained below; some, in addition, have a pictorial exposure guide incorporated on the scale. Others have a built-in exposure meter; this may be fully automatic and itself set the lens aperture directly; or semi-automatic, and linked to a pointer which indicates the correct aperture setting.

The Aperture Scale

Lens apertures are calibrated in so-called *f*-numbers. The usual range of figures is 1.9 (or 2), 2.8, 4, 5.6, 8, 11 and 16. As the *f*-number *increases*, so the aperture size gets *smaller*. When you move the aperture control from one number to the next higher, you *halve* the amount of light reaching the film. Move it in the opposite direction and you *double* the amount of light admitted. When you *increase* the aperture, you are said to *open up*. The numbered settings are commonly referred to as *stops*. On many cameras it is possible to set the aperture midway between the marked stops.

Exposure in Practice

The eye is a bad judge of light intensity. It is so adaptable that after a short period of accommodation it accepts poor lighting conditions as normal. It can also detect a far greater

range of tones and colours than any film can record. This means that, until you have gained considerable experience, you will do well to consult an exposure table or meter before setting the aperture. If your camera incorporates a meter, so much the better. But neither tables nor meters are infallible, and we will take a closer look at them.

Exposure Tables

Film and camera manufacturers have devised simplified tables in which the lighting (and sometimes also the subject) conditions are classified and indicated by pictorial symbols. A typical weather classification may cover bright sun, hazy sun, light shade, and cloudy dull. In the first case, the recommended aperture with a slow colour film when the camera is running at 16 f.p.s. is $f\ 8$. For each of the other conditions the aperture has to be opened up by one whole stop in turn. Each step in the progression towards dull weather requires, in other words, double the exposure.

The Average Subject

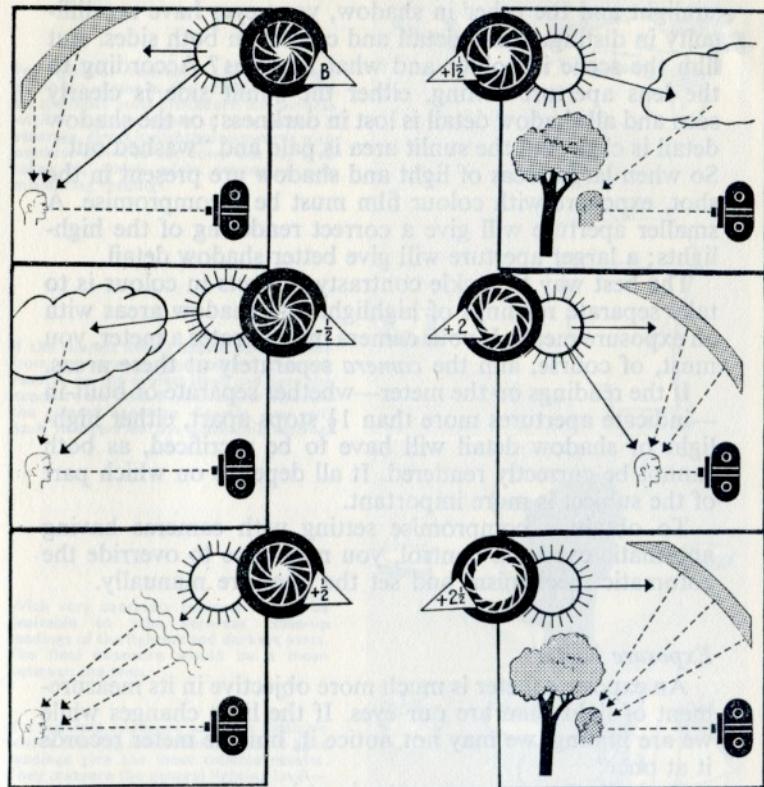
Such tables assume an average subject. Typical average subjects are groups in the open; urban scenes with no large areas of shade; and subjects with areas of sun and shade in about equal proportions.

But the subject may be lighter or darker than average. Seaside, mountain and snow scenes and distant views require less exposure (close the aperture half to one stop); views in which shadows predominate require more (open up half or more stops).

Contrasty Subjects

When a sunlit scene includes shadow areas with important detail in them, photographic film is unable to render both shadow areas and highlight detail as the eye sees them. The range of brightness is too great, with the result that either

BASIC EXPOSURE VARIATIONS



Exposure guides for reversal film, especially in colour, are best based on a basic exposure found by trial. This applies to clear sun and blue sky on the subject (top left). For sunshine and white clouds, reduce the basic exposure by half a stop (centre left); for hazy sunlight, increase it by half a stop (bottom left). Subjects in the shade with no direct light from the sun need $\frac{1}{2}$ stops extra if the light is reflected from clouds (top right) and $2\frac{1}{2}$ stops extra if the light is reflected only from blue sky (bottom right). For back lighting (centre right) two stops extra is required.

highlight or shadow detail suffers. And with colour film the colour rendering is also affected.

In a street scene where one side of the road is in full sunlight and the other in shadow, your eyes have no difficulty in distinguishing detail and colour on both sides. But film the scene in colour and what happens? According to the lens aperture setting, either the sunlit side is clearly seen and all shadow detail is lost in darkness; or the shadow detail is clear and the sunlit area is pale and "washed out". So when large areas of light and shadow are present in the shot, exposure with colour film must be a compromise. A smaller aperture will give a correct rendering of the highlights; a larger aperture will give better shadow detail.

The best way to tackle contrasty subjects in colour is to take separate readings of highlight and shadow areas with an exposure meter. If your camera incorporates a meter, you must, of course, aim the *camera* separately at these areas.

If the readings on the meter—whether separate or built-in—indicate apertures more than $1\frac{1}{2}$ stops apart, either highlight or shadow detail will have to be sacrificed, as both cannot be correctly rendered. It all depends on which part of the subject is more important.

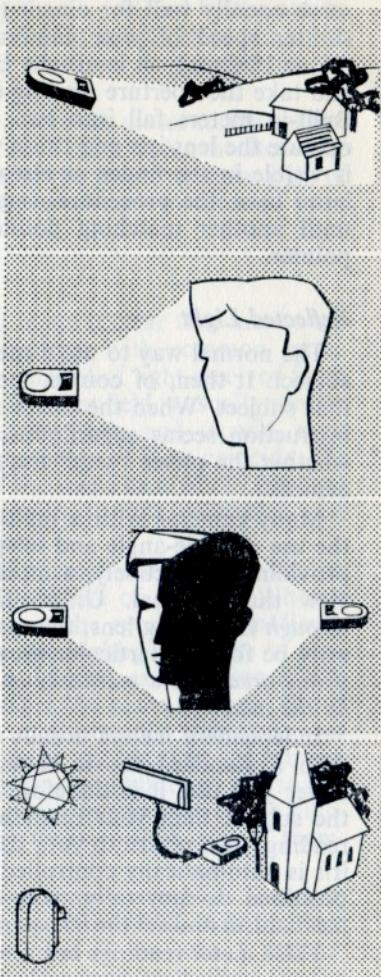
To obtain a compromise setting with cameras having automatic exposure control, you may have to override the automatic mechanism and set the aperture manually.

Exposure Meters

An exposure meter is much more objective in its measurement of light than are our eyes. If the light changes while we are filming, we may not notice it, but the meter records it at once.

Basically, an exposure meter is an instrument for measuring the extremely small electric current generated by the action of light on a photo-electric cell. On independent meters a pointer moves over a scale, and the reading obtained is usually transferred to a calculator where it is translated into lens aperture values (and for still cameras also

EXPOSURE METER READINGS



For general reflected light readings, point the meter at the subject. This will be the most usual procedure for cameras with a built-in meter. If the meter is separate, direct it slightly downwards with outdoor views to cut down the sky area taken in, which might otherwise give misleading readings.

If the subject differs appreciably in tone from its surroundings, take a close-up reading on the subject itself and base the exposure on that. If your meter actuates the camera aperture directly, you will have to override the automatic setting.

With very contrasty subjects it may be desirable to take separate close-up readings of the lightest and darkest parts. The final exposure would be a mean between the two.

If a separate exposure meter is available with a diffusing attachment, incident light readings give the most reliable results. They measure the general lighting level—in other words, the light falling on the subject—and so ensure correct exposure for the lighter and medium parts of the scene. These matter most in reversal films (especially colour).

For an incident light reading, point the exposure meter from near the subject at the camera position, with the diffusing screen over the cell.

shutter speeds). Meters designed for use with still cameras serve equally well for cinematography. You ascertain the shutter speed of your camera at normal running speed (16 or 18 f.p.s.)—it is usually between 1/30 and 1/40 sec.—and take the aperture reading opposite your shutter speed. Built-in meters fall into two types: those which directly operate the lens iris and those which operate a pointer that is visible in the finder or elsewhere on the camera. In the latter case, the procedure usually is to adjust the lens iris until another matching pointer registers with the meter pointer.

Reflected Light

The normal way to use a meter is simply to aim it at the subject. It then, of course, measures the light reflected by that subject. When the meter is built into the camera this instruction seems superfluous, until we come to consider whether the meter "sees" the same area as the lens of the camera.

Many cameras with a built-in meter have provision for the use of wide-angle and telephoto lenses or attachments, providing, respectively, a much wider or narrower field of view than normal. Unless the meter actually operates *through* the taking lens, the reading it gives will not necessarily be for the particular area covered by the taking lens, *if this area differs markedly in tone value from that covered by the meter.*

Independent meters usually take in a wider field of view than a standard movie camera lens. Whichever type of meter you use, it is therefore advisable to move closer to the subject than your intended filming position, take the reading, then return to your camera station. If your camera iris is automatically controlled and the readings in the two positions do not tally, you can override the automatic mechanism and set the iris manually for the actual shooting.

False meter readings can also be caused by *unusually dark* or *unusually light* backgrounds. Such backgrounds, even

when part of the intended scene, will cause the meter to give a lower or higher reading than is justified by the nature of the most important part of the subject. Here again the remedy is to hold the meter as close as possible to the important part of the subject.

It is not always possible to approach closer to the subject than the camera position. In such cases you can often take a substitute reading by pointing the meter at some part of the view which has similar characteristics to those of your subject.

Incident Light Measurement

The foregoing hints should make it clear that meters are not infallible, but require handling with common sense. They add up and average the amount of light received from all parts of their field of view. But that field is usually greater than the coverage of the camera lens, and second, even when they are so held that the fields of view coincide, the *average* brightness reading of the scene as a whole may not always provide the right exposure for the particular part of it in which you are interested.

In movies we are generally most concerned with an acceptable rendering of the *highlights* of a scene. When a given shot appears on the screen the eyes of the audience are immediately attracted by the highlights; there is then usually insufficient time for a detailed examination of the darker tones of the picture before the scene changes. But it is also important to obtain a reasonable consistency of average density from one scene to another, as abrupt changes in overall brightness can be irritating. All this is usually achieved by ensuring accurate exposure of the highlights and allowing the darker tones to take care of themselves.

The highlights of an average scene have been found in practice to reflect a definite proportion of the light incident upon them, usually between 60 and 80 per cent. It follows from this that we can calculate the correct exposure for the

highlights of an average scene by measuring the light incident upon it, and without any reference to the scene itself.

Most independent meters can be adapted to measure incident light. A special cover of translucent white plastic is usually placed over the cell so that it is no longer only sensitive to light coming from a particular direction, but is affected by light from a wider area. In this case the meter is held in front of the subject and *facing the camera* (not the light source!) so that it receives the same light as the subject itself.

The translucent cover, besides collecting the light from a wide area, also absorbs a fixed proportion of it corresponding to the average absorption of the subject. The remainder then affects the photo-electric cell and gives a reading from which the correct aperture can be directly read off, as with the reflected light method.

When taking an incident light reading, make sure that the meter receives the *same lighting* from the *same angle* as the subject itself. Even if you cannot get near enough to the subject for the purpose, you can probably hold the meter facing the camera position and parallel to the subject.

The incident light method works satisfactorily with all normal subjects. Its particular advantage is that meter readings are unaffected by excessive brightness or darkness of areas surrounding the subject but outside the camera field of view, or of the subject background itself.

With the incident light method there is only one reservation, and this is that you may require to make a small modification to maintain a consistent general density. If the subject is uniformly dark, containing no bright highlights, use half a stop larger. If it contains no dark tones, but consists entirely of lighter tones, use half a stop smaller.

Though we have attempted to cover the subject of exposure fairly thoroughly in this chapter, the main emphasis has been on filming in daylight. Artificial light is dealt with on page 55.

HOW TO GET YOUR PICTURES SHARP

The lens of your camera has no focusing adjustment. It is so set by the manufacturer that, in normal filming, everything from people in the foreground to the distant view behind will be adequately sharp on the film. Expressed in technical language, the lens gives adequate *depth of field* in normal circumstances; e.g., out of doors in good weather.

But when the light is bad, or you are filming indoors by artificial light, you have to allow for depth of field being reduced. The extent of depth of field, or the sharpness of the image in near and distant objects, is governed by the lens aperture. In bright light you use a small aperture, and this is when depth of field is greatest. In poor light outdoors, or with artificial light, you open up the lens aperture and this has the unfortunate effect of reducing the depth of field.

Fixed-focus lenses are set to give a sharp image of distant objects irrespective of aperture setting. So your background is always in focus. As the aperture is closed the increase in depth of field brings *nearer* objects into focus. So your aperture setting, dictated by film speed and the prevailing lighting conditions, determines the nearest point of sharp focus. The brighter the light, the nearer you can come to the subject. The table on page 76 gives the nearest points of sharp focus for the stop in use.

Using Lens Attachments

Supplementary lenses for close-up, wide-angle and telephoto shots are available for most cameras. Some models have wide-angle and telephoto attachments mounted on a revolving turret, and ready for instant use.

CLOSE-UP lenses are designed for use at fixed distances such as 20 in. or 10 in., often in conjunction with titling attachments. These lenses give a sharp image over a very small area in front and beyond the specified filming distance. But this is no drawback, as great depth of field is not required in this case. It is, however, important to ensure that

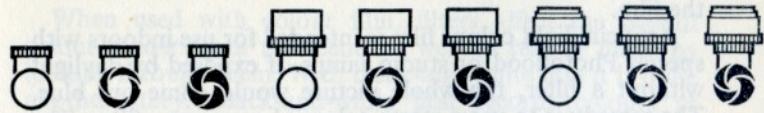
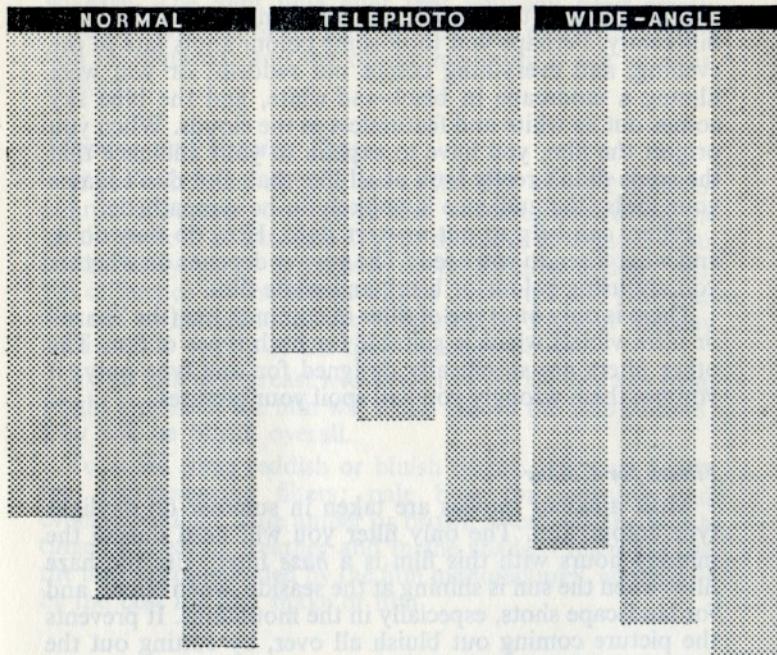
the subject is properly centred. At the close distances involved the camera finder no longer shows the correct field of view, and the closer you get to the subject, the greater the discrepancy between what you see in the finder and what is actually recorded on the film. A simple remedy with flat objects and titles is to measure the displacement between taking lens and finder both horizontally (which may be only a fraction of an inch) and vertically (probably 2-3 in.) and make corresponding marks at equal displacement at the corners of the subject. When these marks are aligned in corresponding corners of the finder image, then the subject will be correctly centred.

WIDE-ANGLE lens attachments increase the field of view of the normal lens, and also give greater depth of field. So with a wide-angle attachment, still nearer objects are in focus; unless you are using a very wide aperture everything in a normal wide-angle shot will be sharp.

If you are accustomed to handling a still camera, you may have a natural preference for a wide-angle attachment, as it covers about the same area as the "standard" lens on a snapshot camera, and overcomes the cramped feeling you may get at first with the rather narrower-angle "standard" lens on your movie camera.

But remember that to get "punch" into your films you need to come close. It is all very well to get the family group all in one shot without the need to swing the camera. But the wider area you cover, the smaller the individual details, and the less impact the shot will have. Close shots are most easily taken with the standard lens or a telephoto attachment.

TELEPHOTO attachments have the exactly opposite effect on both field of view, which is narrowed as by a telescope, and depth of field, which is greatly reduced. So with telephoto shots you have to ensure that the subject is not too close, especially in dull weather, or the image will be blurred. The table on page 76 shows the safe working distances for all lens combinations. Telephoto shots are first-rate for "impact", *provided they are steady*. So use a firm camera support, preferably a tripod.



The sharply rendered zone (depth of field) varies with the lens aperture, as indicated by the shaded blocks opposite each lens. Thus, with the normal lens, at full aperture (left) the nearest point of sharp focus is farther from the camera than when the lens is at medium aperture (centre). At a small aperture (right) the nearest point is closer still. In each case the zone of sharp focus extends from the nearest point to infinity. The telephoto attachment reduces depth of field, so that the nearest point at each aperture setting is farther away than when using the normal lens alone. The wide angle attachment increases depth of field, bringing the nearest point of sharp focus very close to the camera. For exact distances at all apertures, see page 76.

HOW TO USE FILTERS

Cine film and the human eye sometimes see things quite differently. Perhaps you took some colour shots late in the evening, and everything comes out reddish; or you were filming a landscape in black-and-white, and the blue sky comes out as white and featureless as the clouds. When you project the film, you have to explain to your audience that the scene didn't really look at all like that. But don't blame your tools; the audience is unlikely to be sympathetic.

Filters can help to put matters right. How do they do it, and what filter do you need? The answer depends on whether you are using colour or black-and-white film.

There is only one type of filter in common use (the "haze" or ultra-violet) which is suitable for both types of film. The other filters are specifically designed for one type only; if you use them wrongly you will spoil your pictures.

Filters for Colour

Most amateur movies are taken in summer on daylight type colour film. The only filter you will need during the midday hours with this film is a *haze* filter. Use the haze filter when the sun is shining at the seaside, when afloat, and for landscape shots, especially in the mountains. It prevents the picture coming out bluish all over, by cutting out the (to us) invisible ultra-violet rays which record as blue on the film.

Artificial light colour film is intended for use indoors with special Photoflood or studio lamps. If exposed by daylight without a filter, the whole picture would come out blue. The remedy is to use a straw-coloured *conversion* filter. The type A film can then be exposed by daylight exactly like the daylight type film. The conversion filter also does duty as a haze filter for daylight. In fact, it is quite satisfactory to use this type of film for all your colour filming, indoors and out, keeping the filter ready for use in daylight.

If you wish to do it the other way round, and expose

daylight type colour film by artificial light, things are not so easy. The light blue filter that you will need greatly reduces the speed of the film, so that very powerful lighting will be required; and the colour rendering is not so satisfactory.

Morning and Evening Shots

If you take shots early or late in the day, within 2 hours of sunrise or sunset, your colour film will faithfully record the reddish colour of sunlight. If your morning or evening shots immediately follow or precede shots taken by midday sun, the difference on the screen will be quite striking. Our eyes are not so conscious of the difference throughout the day because the colour of the light changes slowly.

If you film in overcast weather, or in the shade away from bright sunshine, the film will again record the true colours; they will be bluish overall.

To avoid these reddish or bluish tinges, ask your dealer for *light-balancing* filters: pale blue for morning and evening sunlight, pale amber or brown to cut out the bluish tinge in overcast weather and in the shade. Preferably use the filter recommended by the film manufacturer, which will be the best for that make of film.

Filters for Black-and-White

When used with colour film, filters affect the overall colour rendering of the scene, as we can readily judge by looking through them. With black-and-white film it is quite another story. Black-and-white film records colours as different shades of neutral grey; and it is more sensitive to some colours than to others. Skies in early photographs were invariably plain white with no trace of cloud effects, because the emulsion could not distinguish between blue and white. Modern films give a much better balanced rendering of various colours, but it can be still further improved by filters.

How Filters Work

As far as their effect on black-and-white films is concerned, coloured filters allow the light of their own and related colours to pass, while holding back complementary colours. The simple rule is: to lighten a colour in the subject, use a filter of the same colour; to darken a colour, use a filter of a complementary colour.

The filter most commonly used with black-and-white film is coloured yellow. It passes its own colour and red, but absorbs its complementaries, ultra-violet and blue. It is generally used to emphasize cloud effects. It does this by holding back the blue of the sky, which consequently appears darker on the film, so that the clouds stand out.

The green filter passes its own colour and absorbs ultra-violet, some blue and some deep red. Skin tones are rendered darker, which may be an advantage both in daylight and artificial light (but beware of freckles!) In landscape shots the green filter brings out the brilliance of the green grass and foliage, which is otherwise inclined to come out rather too dark.

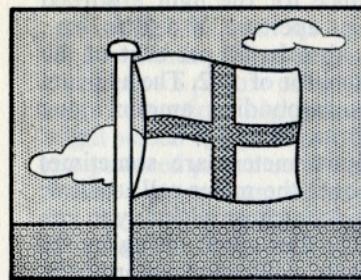
The orange filter passes yellow, orange and red and absorbs ultra-violet, most of the blue and some green rays. It brings out the contrast between blue sky and clouds, and reduces atmospheric haze, to a greater extent than the yellow filter. Green objects appear darker, while red ones are somewhat lightened. It is also useful in bringing out detail in brownish red subjects.

The red filter passes yellow, orange and red and absorbs ultra-violet, blue and green rays. It gives strongly pronounced outdoor contrast effects with dark sky. When clouds are present in a blue sky, the impression of an impending storm is created. Green subjects are darkened and yellow and red ones lightened. Moonlight effects are obtained in daylight if the film is slightly underexposed.

Filter Factors

When using dark amber or brown light-balancing filters

FILTERS FOR FILMING IN MONOCHROME

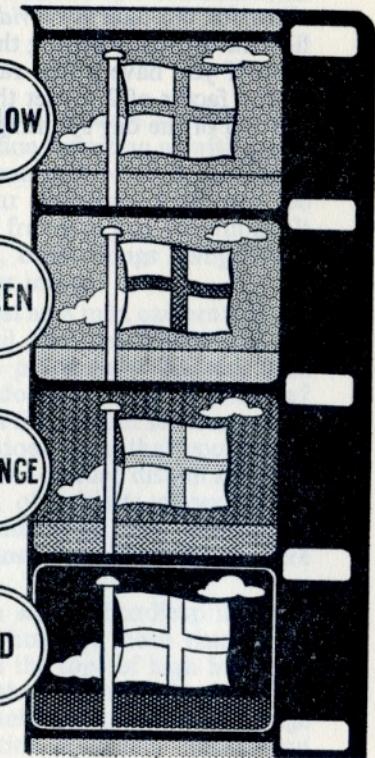


YELLOW

GREEN

ORANGE

RED



This drawing of a red cross upon a white flag standing in a green field is a good example of the way in which filters will alter the colour rendering of a subject.

The shot through the green filter shows the best result, for a green filter will slightly darken the blue of the sky and also the red of the cross. At the same time, it lightens the green of the grass.

The shot through the red filter shows that the filter has absorbed all the blue light and transmitted all the red light. The sky is thus almost black, the green grass is very dark, and the red cross practically white.

A basic rule: to lighten a colour on the film, use a filter of the same colour.

To darken a colour on the film use a filter of the opposite (complementary) colour.

with colour film and any coloured filter with black-and-white film, you have to make allowance for the light absorbed by the filter when setting the lens aperture. If a filter, e.g., a yellow filter for cloud effect, absorbs 50 per cent of the incident light, it is said to have a factor of $\times 2$. The aperture must then be opened by a corresponding amount: one stop, i.e., from $f8$ to $f5.6$ or from $f5.6$ to $f4$.

Cameras with built-in exposure meters are sometimes fitted with a mask which slips over the meter cell to allow for the use of a filter. If there is no such provision, you can allow for the filter by *dividing* the film speed rating by the filter factor and resetting the meter calibration accordingly. Thus if you have a film rated at 20 ASA, and use a filter with a factor of $2 \times$, set the film speed as for 10 ASA. At the end of the day's filming, remove the filter and *reset the meter*.

MOTION PICTURE PRODUCTION

Your camera uses the smallest and most economical of the sub-standard film gauges. Though the image is so small, it produces a picture altogether adequate for showing in the home; a modern high-powered projector will give a good bright screen image measuring 30×40 in., and even with a low-powered projector you can obtain a larger, and certainly clearer picture than all but the most expensive television sets can provide; and you have the choice of black-and-white or colour.

Remember 8 mm. Film is Small

Of course, you cannot expect to fill a large screen with an 8 mm. picture and get the same fine definition as with larger film gauges. To obtain a screen image 30×40 in. the 8 mm. frame already undergoes a linear enlargement of over 200 times; the figure for a 16 mm. frame is just 100 times. It stands to reason therefore that, other things being equal, the larger film will give a sharper image.

So you have to face the fact that an 8 mm. camera will not always record all the fine detail that you observe in the scene you are shooting. This is particularly the case with the more distant objects. What does this mean in practice? It does not mean that you cannot film distant scenes, such as landscapes, successfully. But it does mean that you should limit the amount of footage you use on such distant subjects, and shoot a higher proportion of subjects closer to the camera. In motion-picture terminology, film fewer long shots and more medium and close shots than if you were using a larger gauge of film.

This may at first sight seem a serious handicap for your film-making. When you are on holiday, those vistas from mountain peaks and views from the tops of high buildings are impressive at the time, and the natural inclination is to record them on film. Unfortunately, amateur narrow-gauge film cannot give the same definition in distant views as you

get in the professional cinema. But if you can include some foreground interest in the picture, the result will be quite acceptable. All you have to do is ensure that your foreground is not closer than the nearest point of sharp focus, according to the lens aperture in use.

Even if you only intend to make family films and show them in the home, you can learn a great deal by visiting the cinema and watching television. And by comparing the production techniques of the cinema and television, you can also learn how to make the most of 8 mm. film. While the cinema can afford to show you the landscape vistas on its wide screen, this is just not possible on the smaller screen of television. There is, in fact, a useful parallel between the limitations of television and those of 8 mm. film. Next time you watch television notice how the camera shows plenty of intimate detail, concentrating chiefly on foreground interest and letting the background take care of itself.

Motion Pictures Should Move!

Obvious as it may seem, it cannot be stressed too often that the essence of cinematography is the recording of movement by the camera and its reproduction by the projector. Many people take up movie-making after some experience with a snapshot camera; if you are one of them it is particularly important to bear the foregoing in mind. The snapshooter turned movie-maker is in danger of handling his new instrument as he did the old. The result can only be a kind of snapshot album of static subjects, strung together on celluloid in chronological—but not necessarily logical—sequence, and far less convenient to handle than the traditional article.

A snapshot with a still camera and a scene filmed with a cine camera are very different things—or they should be!

It is sometimes claimed that movie-making is easier than taking snapshots with a still camera. Indeed, once your camera has been loaded with film and the motor wound, actual operation is very easy. There is no focusing to worry

about; the depth of field of your lens takes care of most subjects.

Beware Over-enthusiasm

The first film with a new camera will always give the owner and his friends a thrill, and provided it is clear what is going on, no one at this stage will wish to be too particular about the finer points of technique. Yet this natural eagerness to get started without going further into technicalities sometimes leads to disappointment. For, as one soon discovers, it is one thing to produce a reel of clear and properly exposed pictures, but quite another to present a story or event in a convincing manner on the screen.

Attention to the following points will result in much more satisfying and effective pictures.

Keep the Camera Still

We have seen that the essence of motion-pictures is movement in the subject. The corollary of this is that the camera should remain steady. Nothing ruins a picture more than an unsteady camera. Always adopt a firm stance when shooting. If possible, steady the camera or lean against a solid object. Stand with legs apart, elbows pressed into the body and camera held firmly against the nose. For maximum steadiness, use a pistol grip or, better still, a firm tripod. The great improvement in picture quality will more than repay the extra trouble involved in carrying it around. The tripod should be fitted with a pan-and-tilt head to enable you to execute certain legitimate camera movements which we discuss on pages 46 to 48. If you use a telephoto attachment a tripod is really essential, as any unsteadiness is magnified.

Establishing the Scene

The audience who will see the finished film will not be as familiar as you are with the circumstances prevailing at the

time the film was shot. As time passes, your own memory will fade. So you should set the scene in a way that will establish clearly *what* is going on *where*, and *when*. Let us take a typical episode in family life, and see what lessons it holds for us. It is a hot summer's day. Your children are disporting themselves in a brand-new swimming-pool on the lawn. They start to pour water over one another. Ah, you think—movement! You reach for the camera and take a shot of their antics.

It is usual to establish a scene by giving a general view showing the relevant action—here the preparations for the new pool—in its context. The scene might for instance include the part of the garden where the proceedings are taking place and some grown-ups standing admiringly by. It is equivalent to what a stranger would see first if he were to call at the house at that moment.

Expressed in filmic terms, the episode of the swimming pool might go like this:

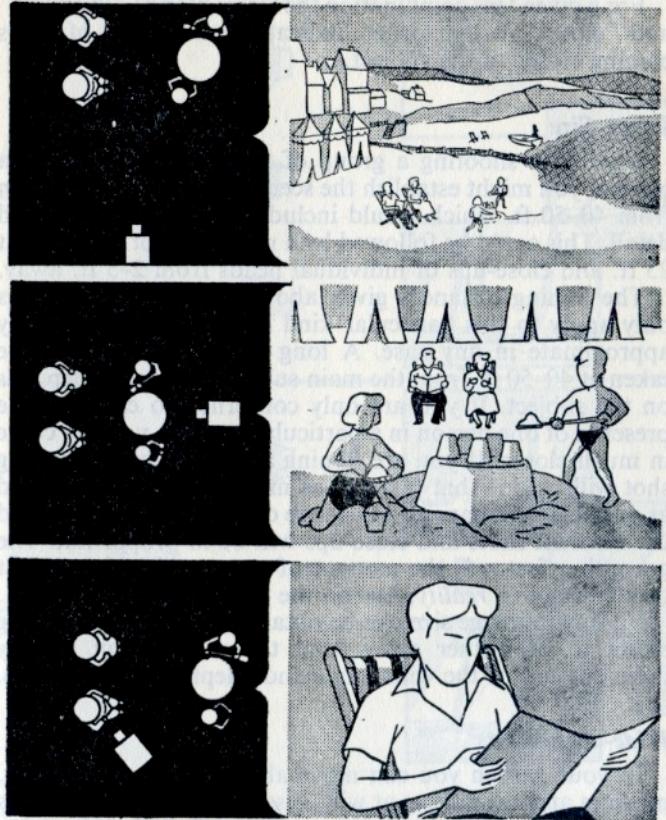
	Running time (sec.)
1. L.S. (Long shot) garden, pool and bystanders.	10-12
<i>Cut to:</i>	
2. M.S. (Medium shot) assembling the pool.	8-10
<i>Cut to:</i>	
3. C.U. (Close-up) child's hands at work (fade out).	5
4. C.U. (Close-up) (fade in) water in pool—pan up to children at play.	10
<i>Cut to:</i>	
5. C.U. (Close-up) Boy pours water over other boy.	5
<i>Cut to:</i>	
6. C.U. (Close-up—reaction shot) the victim's mother.	5
And so on.	

At the camera running speed of 16 f.p.s., 1 ft. of film passes through every 5 sec.; it is therefore easy to calculate the total footage required for this or any other episode.

This example of a brief shooting script has introduced a number of terms which we will examine in more detail.

SHOOTING SCENES

CAMERA POSITIONS



Shoot a scene from several different angles and distances, starting with an establishing shot (top) to show what it is all about. Then move in to the centre of interest (centre) and vary the sequence with close-ups of onlookers (bottom).

THE MECHANICS OF FILMING

For a given lens combination the terms "long", "medium" and "close", in that order, indicate a succession of shots coming closer to the subject.

Image Size

If you are shooting a group of four or five people in a garden, you might establish the scene with a long shot taken from 40-50 ft. which would include plenty of background detail. This could be followed by a medium shot from about 25 ft. and close-ups of individual heads from 2-3 ft. away.

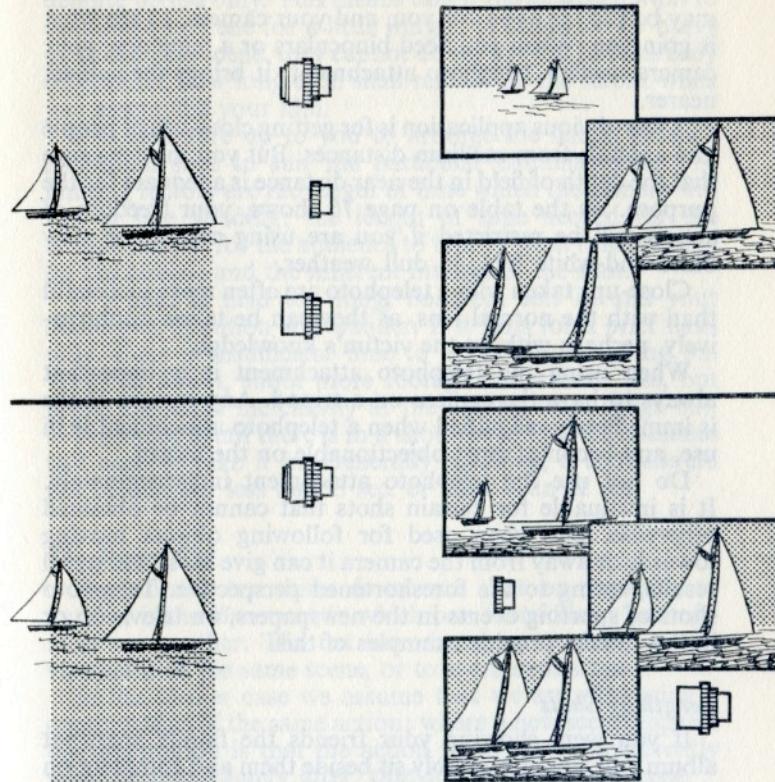
The filming distances given above for the various shots only apply to this particular kind of subject, and are only approximate in any case. A long shot is not always one taken at 40-50 ft. from the main subject. It entirely depends on the subject. If you are only concerned to establish the presence of one person in a particular locality, you can come in much closer. If you are filming a football match, a long shot will be one that takes in as much of the football field as possible—perhaps at a distance of 50 yards or more; and the medium shots and close-ups will be in proportion. The governing factor is the amount of space which the subject occupies not in *reality*, but on the *projection screen*.

Variety in image size can be obtained not only by moving closer to or farther away from the subject, but also by judicious use of the wide-angle and telephoto attachments.

Wide-angle Shots

In your garden you can move about and get your long, medium and close shots at will. Elsewhere this is not always possible. If you are indoors you may find it difficult to include everything in the frame. This is where a wide-angle attachment will prove very useful, as it usually increases the field of view by between 50 and 100 per cent. At a given distance a much larger area can now be included.

FOCAL LENGTH AND PERSPECTIVE



Upper group: The longer the focal length of the camera lens, the larger the image scale from a given camera position. At the same time, long focus lenses (bottom) take in less of the subject area than wide-angle ones (top).

Lower group: By changing the focal length and the camera position, it is possible to control perspective as well as image scale. A near shot with a wide-angle lens (top) makes nearer objects loom up large, and dwarfs more distant ones. In a distant shot with a long focus lens (bottom), the image of the nearer boat may still be the same size. But the second boat is now almost as large in the picture, since the distance between the two becomes negligible in comparison with the distance of the camera from both.

Telephoto Shots

At sporting and other public events the important action may be too far away for you, and your camera, to see what is going on. When you need binoculars or a telescope, your camera needs a telephoto attachment; it brings the subject nearer.

A less obvious application is for getting close-ups of people and animals from medium distances. But you must be sure that the depth of field in the near distance is adequate for the purpose. As the table on page 76 shows, your freedom of action will be restricted if you are using colour, or slow black-and-white film, in dull weather.

Close-ups taken with a telephoto are often more successful than with the normal lens, as they can be taken unobtrusively, perhaps without the victim's knowledge.

When using the telephoto attachment it is important always to have the camera on a tripod. Any camera shake is immediately magnified when a telephoto attachment is in use, and becomes most objectionable on the screen.

Do not use the telephoto attachment indiscriminately. It is invaluable for certain shots that cannot be obtained otherwise, but when used for following objects moving towards or away from the camera it can give most unnatural results, owing to the foreshortened perspective. Telephoto shots of sporting events in the newspapers, on television or in the cinema provide examples of this.

Length of Shots

If you were showing your friends the family snapshot album you would probably sit beside them and comment on the pictures. You would let them take their time, perhaps pausing longer over a group picture, and turning the pages more quickly when there was less detail to be taken in.

When you come to show your films to your friends, you may also provide a running commentary. But there the similarity of the two situations ends. Your film runs—or should run—at a constant speed through the projector,

with the result that each scene remains on the screen for a definite period only. This means that if the audience want to examine one scene for a little longer, or alternatively hurry on to the next scene, they cannot do so, for you have already determined how long each shall remain on the screen when you assembled your film.

It is therefore up to you to arrange the length of each individual shot to suit the particular circumstances. The limiting factors are the length of time which the camera will run at one winding; the length of time needed for the time needed for the audience to take in what is happening on the screen; and the inherent interest of the shot.

If a shot is held too long, boredom sets in and your audience's attention will wander. If it lasts for a brief flash only, there is insufficient time to grasp what is going on. When in doubt, shoot more footage rather than less, but prune the shots mercilessly at the editing stage (page 62).

The more detail there is in a shot, the longer the audience will need to take it in. Generally speaking, a shot should not be held for less than 3 sec. or more than 12 sec.

The Direct Cut

The normal transition from one shot or sequence to another is the *direct cut*, in which one shot follows immediately on another. The cut introduces us to either a new viewpoint of the same scene, or to a different scene.

In the former case we assume that we are witnessing a continuation of the same action; where a new scene appears the assumption is that the action takes place concurrently with, or immediately after, that in the preceding scene.

We have already compared and contrasted the human eye and the camera. Our eyes are constantly "cutting" from one scene to another, which is the basic justification for making the camera do likewise.

We have also seen that very few shots are worth more than 15 sec. screen time. When the moment comes to show our audience the scene from another angle, or a closer view

of part of it, how do we choose our next shot, and when precisely should we cut to it?

Cutting is an art, not an exact science, so that it is impossible to be dogmatic; but the following rule, even if it is a counsel of perfection, is worth bearing constantly in mind. It is that *every cut should make a significant point*.

Suppose that you are filming a tea party, and wish to draw the audience's attention to a particular guest. After a medium shot of the party, you wish to cut to a close shot of your guest. You might do this as he leans forward to speak to a fellow guest. But unless you wait for, or contrive, this moment for your next shot, you may find yourself shooting him just as he is raising a cup to his lips. To do this is to give unwarranted significance to the drinking of tea, which has doubtless already been clearly established earlier on. Everyone at the table is drinking tea, so why emphasize it? When the guest leans forward to speak to someone, he is making a point, which you can follow up. If you shoot him sipping tea, there is no point, and a weak cut results.

Cutting on Movement

Significant movement or action on the part of the person on whom you are concentrating can provide opportunities for cutting to another angle and/or another image size (larger or smaller). If the audience is prepared for the action by some significant detail of the previous shot, the cut can even take place *immediately before* the action begins; otherwise it can take place *during* the action.

Supposing your tea guest puts his cup down with an air of finality and glances hurriedly at his watch; he is clearly about to take his leave. So after establishing these details in close shot, you can cut to a medium shot of him rising from the table and leaving the room. Alternatively, you can cut from the close shot to the medium shot *while the guest is actually rising from the table*.

In either case you will have to enlist this person's co-operation and ask him or her to remain perfectly still while

you change your camera position. If you do not, an obvious "jump cut" will be the result.

Avoiding "Jump Cuts"

At first sight it might appear that any change of camera viewpoint during a single scene would of itself cause an obvious jump in continuity. But modern cinema and television techniques prove the contrary: scenes are invariably shot from several different angles, and we have become so accustomed to a smooth transition from one camera angle to another that a conscious effort is required to observe these transitions at all. What is at once noticeable is any inconsistency in the apparent positions and movements of actors and properties as between one shot and another.

Thus our man drinking tea must not be seen seated with cup in hand in one shot, then rising from the table with empty hand outstretched towards his hostess in the next.

Variety in camera angles, far from being a hindrance to continuity, is in fact a definite help. Conversely, when filming a scene in a succession of shots designed to show the main subject progressively larger on the screen, i.e., in the order long shot, medium shot, close-up, avoid if possible a succession of camera positions lying in a straight line. If you are getting your closer shots by using the telephoto attachment, do not shoot from the same viewpoint. The reason for this advice is that a succession of shots taken along a straight line gives the impression that the camera made a series of jumps towards the subject. With a different camera angle for closer shots, the result will be much smoother.

If for any reason you do make a series of progressively closer shots of the subject at points along a straight line towards the subject, or use a telephoto attachment without altering the camera position or aim you can improve the final result at the editing stage (page 62) by inserting some *cut-away* shots of *other* features of the scene—taken from other camera positions—between those that were filmed along a straight line.

Wipes and Fades

When we wish to indicate a passage of time and/or a change of location between one shot or scene and another, the direct cut already described may not be appropriate; wipes and fades can be used.

Ready-made special effects of this kind in the form of adhesive strips for sticking to processed film can be obtained in various patterns. One scene can be made to "wipe" the other from the screen, or the first can be faded or blocked out, and the next introduced by a fade-in.

To make a fade in the camera, use a graduated fading glass. This is moved over the lens, starting at the opaque end for a fade-in and the clear end for a fade-out.

Deliberate Camera Movements

There is a great temptation to move the camera about during shooting when the subject is too large to take in otherwise. Resist the temptation; the result is always disappointing. Separate shots from different positions with a static camera will often give better results.

But sometimes there is a broad expanse of scenery, perhaps a landscape, all of which is of equal interest. We can then legitimately swing the camera horizontally along the subject from one end to another. This movement is the commonest form of the panoramic or panning shot, which is considered in more detail below. Other legitimate forms of this movement are used to follow a moving object and (only in special cases) to obtain a dramatic effect by rapid transition from one part of the subject to the other.

In all these cases, the camera should be moved *in one direction only*, coming to rest at its destination. The movement "there and back", whether accompanying a moving object or not, is graphically stigmatized as "hosepiping". It is much practised by beginners when they do not know how to get everything of interest into the picture. If the main subject moves off again in a different direction at the end of a

following pan, you should resume shooting from a different camera position.

Panning Shots

THE STATIC PAN. Plan the *end* of your shot before you begin. It should finish on a significant feature of the view. Movement must be very smooth, and much slower than appears necessary at the time. A tripod is really essential. A panning movement in which the camera pivots through 90° should be timed to last at least 20 sec. Thus the camera should move more slowly than the second hand of a watch. The length of a panning shot is, of course, limited by the maximum running time of the motor, which means in practice that you should not attempt to pivot through more than about 120° at one winding.

In all panning shots the first sector of the panorama should be "held" for 2 to 3 sec. before swinging the camera. At the end of the panorama the camera should likewise remain static for 2 to 3 sec. before ending the shot.

Panning movements of this kind with a telephoto attachment are not recommended.

THE FOLLOWING PAN. When following a moving object, the speed at which the camera is panned will be governed by the speed of the subject. If the subject returns to its original position, take a fresh shot from a new angle.

THE "ZIP" PAN. Here the camera is swung so rapidly from one part of the subject to the other that all intervening images are blurred. This shot is only used for dramatic emphasis and becomes ludicrous if overdone.

Tracking Shots

In the professional cinema scenes are regularly shot from a camera moving about on a special carriage fitted with wheels and known as a dolly. So mounted, the camera can move in one continuous "take" from a medium to a close shot, or pull back in the other direction.

You should only attempt a tracking shot if you have a really firm wheeled support and a smooth surface to run it on. If you wish to film from a car in motion, stand on the floor, not on a spring seat, and hold the camera firmly in the hands. Unless the running of the car and the road surface are both exceptionally smooth, do not mount the camera directly on the car, as the vibration will spoil the picture.

Aim the camera either forwards or backwards, not across the direction of movement.

Filming Rapid Movement

When people, animals or vehicles are to move rapidly within the camera's field of view, and the camera remains static, arrange as far as possible for the movement to take place either directly towards or away from the camera, or at an oblique angle—not laterally, from one side of the picture to another. Lateral movement, especially when close to the camera, is reproduced as a series of sharp jerks, and the illusion of a smooth flow of movement obtained in a motion picture is destroyed. If lateral movement cannot be avoided, arrange for it to be at a fair distance from the camera.

Avoid altogether filming rapid movement with the telephoto attachment and a static camera. The jerky effect becomes more pronounced as the image becomes larger.

Preserving Continuity

We have already seen that to tell a story in pictures you have to break it down into a number of different shots in which the camera does duty for the roving eye of an imaginary witness of the actual scene. These shots are taken from different viewpoints with the deliberate aim of obtaining an element of variety which a static camera cannot give. They may also, of course, be taken on different occasions.

In a properly constructed film this variety is not obtained at the expense of smooth continuity.

Matching Shots

Obviously, separate shots of the same scene which will ultimately appear in sequence in the finished film (whatever the chronological order in which they were actually exposed), must show persons wearing the same clothes and objects in the same positions throughout. Professional film studios employ a "continuity girl"; so make careful notes when parts of a scene are to be shot on different occasions.

Preserving a Sense of Direction

When filming successive shots of movement from different viewpoints, arrange the camera position so that the movement takes place in the same direction on the screen. Supposing you film a child getting on to his bicycle in close shot, he rides out of shot to the right, and your next shot shows him in long shot riding across the garden; in this last shot he should also move from left to right.

Plan Your Filming in Advance

Good films call for planning and preparation. You will often find yourself faced with the choice of either spending a lazy afternoon at home with the children, or making a record of an afternoon in the life of those children. You cannot have both! You can go to a public event with the intention of enjoying it and seeing all there is to see; or you can go there to make a film of it. The latter alternative in each case is more tiring; and far less enjoyable than the former at the time. But your film record will give enjoyment later.

Prepare a Script

Whenever possible, prepare a written outline of what you intend to film before you start shooting. It need not be an elaborate shooting script; but even if it is only a series of notes, it will prevent you from exposing precious footage of an unexpected subject which you cannot resist filming, then running short of film at a critical moment.

FILMING IN COLOUR

There are few subjects that do not look better in colour than in black-and-white, and it is small wonder that as the difference in cost is not great, many movie-makers use nothing but colour film. But to get results that really justify its use, a good deal of extra care is needed over and above that which will suffice for good black-and-white pictures.

The Right Approach to Colour

Do not assume that because you have a "colourful" scene before you, the camera and film will record it and the projector reproduce it for you, as it appeared at the time. In fact, colour film is at its best with quite "ordinary" subjects, which may not strike you at the time as particularly colourful. There is plenty of colour even in a queue of people at a bus stop, a brood of ducklings following their mother into a pond, or an express locomotive steaming out of Waterloo, to take only three random examples.

Sunlight Governs Colour

Colour film does not require bright sunshine for good results; but if you are using colour for the first time, it is best to expose your first reel outdoors on a sunny day.

Sunlight is by no means standard. Its colour or spectral composition varies according to the latitude, the time of day and the season. In the early morning and evening it is redder; near midday, bluer. As the colours of objects we see around us are determined by the colour of the sunlight falling on them, it follows that the colours of the objects themselves also vary according to the time of day.

The colour of daylight is also affected by the amount of haze or cloud in the sky. Consequently shots taken in overcast weather will appear bluer and "colder" than those taken in direct sunlight, and the same applies to scenes filmed in open shade under a cloudless blue sky.

It would not be necessary to stress the foregoing but for the remarkable ability of the human eye to accommodate itself to wide variations in a colour, or colours, so that it does not notice gradual changes, like the progressive reddening of sunlight towards evening. But colour film records colours objectively, as they actually are; and when shots taken at different times of day are projected in sequence, the sudden change from the bluish midday light to the reddish evening light will appear most unnatural.

Beware of Colour Casts

Our eyes are also apt to overlook another phenomenon, sometimes with unfortunate results. When sunlight is reflected from a coloured surface, the reflected light is coloured accordingly. When a London bus draws up beside a queue of people on a sunny day, their faces suddenly turn red. You do not notice it at the time. But if you were to film the occasion the result would surprise you!

Therefore, beware of large coloured surfaces, whether they are inside or outside the actual picture area. They may reflect their own colour on to the subject and cause a disturbing overall cast of that colour.

Colour Temperature

There is an objective method of measuring the colour of sunlight, or any continuous-spectrum incandescent light such as a photoflood bulb. It is based on the relationship between the temperature of a black body and the colour of the light emitted by it. Measurement is in degrees Kelvin ($^{\circ}\text{K.}$), which are equal to degrees Centigrade plus 273°. The higher the temperature, the bluer the light; the lower the temperature, the redder the light.

The colour temperature of noon summer sunlight is about 5,900 $^{\circ}\text{K.}$ At sunrise and sunset, the colour temperature may be as low as 2,400 $^{\circ}\text{K.}$, while the light from a cloudless blue sky only may be as high as 12,000 $^{\circ}\text{K.}$

Colour temperature meters are available for the measurement of the composition of sunlight or artificial light.

Films for Colour

Most colour films are available in two different emulsions, one balanced for daylight at 5,900°K. (sunlight with blue sky and white clouds), the other for artificial light at 3,400°K. (Photoflood lamps).

Obviously the summer months are the best time for outdoor filming, while in the winter you have more opportunity of shooting indoors by artificial light, using the appropriate type of film in each case.

Conversion filters are available to enable daylight type film to be used by Photoflood light, and artificial light type film to be used in daylight (see page 30).

These filters are specially useful when the camera is loaded with one type of film, and a subject presents itself that can only be filmed by the other type of lighting. But while excellent results can be obtained in daylight with artificial light type film plus conversion filter, the daylight type film is not so satisfactory for artificial light as a greatly increased exposure is required, which may preclude shooting altogether unless very powerful lighting is available. One solution of the problem is to use the artificial light type film all the year round, keeping the conversion filter on the lens for all daylight shooting.

The Exposure Problem

When using colour film, exposure is very critical. An error of one stop in the aperture setting one way or another can make the difference between success and failure. An under-exposed colour film is dark and muddy; over-exposed film appears washed out like a very pale water-colour. This is because colour film has much less latitude than black-and-white. An exposure meter is therefore essential for consistent results.

Limited Contrast Range

Colour film differs from black-and-white in that it can only reproduce a limited range of brightness. If the lightest part of the subject is much brighter than the darkest, and nothing is done to reduce the contrast, colour reproduction will suffer at one end or other of the tone scale, according to the exposure. If you expose for the highlights, the shadows will be underexposed; if you expose for the shadows, the highlights will be burnt out.

Making a Start

The best procedure if you are making a start with colour is to film in bright sunlight in the period between two hours after sunrise and two hours before sunset, and arrange the subject so that it faces the light. In this way you will get the brightest light with the minimum of shadows.

The first thing that you will notice in any correctly exposed shot with important shadow areas is how much darker these areas appear on film than they did in reality. Here is an illustration of the inability of colour film to give true tone and colour rendering of contrasty subjects.

Side-lighting

Sooner or later you will want to film subjects that are lit from the side; for one thing, it is kinder to people who do not look their best squinting into the sun. But unless you are filming at the seaside, or with a white wall or pavement nearby that reflects light into the shadows, side-lit subjects filmed in bright sunlight and correctly exposed as regards the highlights, will produce very harsh contrasts with either no detail at all, or dark false colours, in the shadows. The remedy is to arrange some form of reflector of white, or light but neutral-toned material (it must *not* be coloured, or the colour will appear in the subject) to even up the contrast between shadows and highlights. In an emergency, a newspaper can be pressed into service. Before filming, take

separate reflected light readings of shadow and highlight areas with an exposure meter; you can thus ensure that they are within the contrast range of the film.

Against the Light

Remarkable results can be obtained by exposing colour film against the light, but take particular care to shield the camera lens, and the meter cell if the camera is fitted with one, from the direct rays of the sun. For shots of this kind you do not expect to light the shadows sufficiently to obtain a true colour and tone rendering; it is the contrasts themselves that will make the picture. An effective use of this technique is to film a seaside bathing party with early morning or late afternoon sun behind and above the bathers. They are then seen silhouetted against the reflection of the sunlight dancing on the waves. Sunsets also provide many opportunities for silhouette effects.

The best shots of flowers are often obtained by arranging the camera position so that the sun shines through the petals towards the lens.

In the Shade

When the sun is shining unobscured in summer within three or four hours either side of midday and your friends are seated in the shade, there may be no need at all to drag them into the full sunlight to film them. If the trees or buildings do not actually overhang the subject area, the light will probably be sufficient for an aperture of $f\ 2.8$ to $f\ 4$. Expressions will be much more relaxed than in full sunlight, and contrasts much less pronounced. A black-and-white shot under these conditions would lack sparkle; but the loss of tone contrast is offset by the ability of colour film to show up the flesh tints to advantage.

Shots taken in open shade under these conditions will have a distinctive overall "coldness" or bluish cast, which will be the more pronounced the clearer the sky and the

greener the surrounding foliage. If desired, this effect can be corrected by using light-balancing filters (page 31); but it does not follow that it will be objectionable, or even noticeable to the average spectator. Such effects become obtrusive when they precede or follow shots filmed in the comparatively "warm" colour of direct sunlight, especially if the latter were exposed early in the morning or late in the evening. A little ingenuity at the editing stage will suffice to preclude unfavourable comparisons between the different overall hue of shots taken under widely differing lighting conditions.

In Dull Weather

You will normally wait for good weather before exposing colour film; but there are occasions when you wish to shoot a particular event which cannot be repeated, and the weather is cloudy. What should you do?

Some people maintain that colour film is wasted in bad weather, and that it is only worth using black-and-white. This is perhaps a matter of opinion; you can form your own by visiting your local cinema when a coloured documentary film, shot outdoors in the uncertain climate of Britain, is on show. The makers of these films often cannot wait for good weather; or they may be overtaken by bad weather while shooting a particular sequence. If you look carefully at the individual shots of some episodes, you will see that some were filmed in bright sunlight, others with the sky overcast. Yet the result is perfectly acceptable, and you may be the only member of the audience who notices the discrepancy.

And bad weather is not confined to the British Isles. The Empire Games in Vancouver were held in bad weather; but this did not prevent an excellent colour film from being made by a big Hollywood company. And for outdoor documentary filming in normal daylight, the colour films available for your camera are capable of giving results on the home screen in every way comparable to those obtained by the professional.

Colour Composition and Harmony

When composing the picture, think not only of the arrangement of the masses in the subject, but also of their colours and the relationship between them. You can learn much about colour composition by studying the works of the great painters and viewing films directed by men of repute. Colour harmony is important in many fields besides photography, and if you are at a loss at the outset, you will benefit from consulting someone of known artistic sense, who does not need to know anything about photography.

Matching Colours

Some closely related colours, like red and purple, clash badly when seen together. So be sure that the lady's dress in your picture does not clash with the surroundings.

Complementary colours such as red and green will usually go together all right. But see that your subject does not include equal unbroken areas of two complementary colours. The result is to chop the picture into two halves; proper balance is lost through too much symmetry. Composition is greatly improved if the mass of one colour can be broken up and distributed more widely over the picture area.

Introducing Variety

Your first reel of colour will probably be exposed outdoors, perhaps in the country. As we have seen, the 8 mm. gauge of film is at its best in medium and close shots; but this does not rule out an occasional establishing long shot of a landscape, or a seaside view. Unless there are interesting cloud patterns, such views often show a predominance of one colour—green with a landscape and blue at the seaside—which may be monotonous. We can introduce variety by ensuring that the foreground interest—which is needed in any case to give depth and movement to the scene—also introduces an element of contrasting colour—e.g. a lady in a red dress in a landscape or a young bather in the seascape.

FILMING INDOORS

Your camera offers plenty of scope for indoor filming. It is possible to take close shots by daylight alone near a window in very bright weather but for best results use artificial light only, as then the lighting is entirely under control. In practice, this means that indoor filming—especially in colour—is best done after dark.

Type A Colour Film

If you are working in colour, use the artificial light type emulsion and special Photoflood bulbs (see below). Do not on any account use a mixture of daylight and artificial light with colour film; everything lit by daylight will look blue, and the rest reddish by contrast. Do not use ordinary household bulbs with colour film either—they are not powerful enough, and, besides, they burn much too red.

With black-and-white film the objections to mixed lighting do not apply, but Photofloods remain the most convenient light source, being both compact and powerful.

Lighting for Interiors

Photoflood bulbs are designed for indoor photography, and give natural colour rendering with artificial light (type A) colour film. There are two types: Nos. 1 and 2.

The No. 1 Photoflood is rated at 275 watts, but gives a light output equivalent to 800 watts. To obtain this output, the filament is over-run, and the lamp has a life of only about 2 hours. The lamp looks like an ordinary domestic bulb, and can be plugged into any bayonet socket; but it burns very hot and may damage or burn any fabric or plastic shade. In any case, ordinary shades absorb a great deal of light, so you will normally use Photofloods in metal reflectors.

The No. 2 Photoflood rated at 500 watts with a light output equivalent to 1,600 watts, lasts about 6 hours. It has a screw cap and so needs special light fittings.

On standard British 240-volt mains the No. 1 Photoflood consumes just over 1 ampère. You can safely use one or two on domestic lighting circuits, but four or more should be connected to the power (13 or 15 amp) circuit.

Minimum Lighting Requirements

For normal indoor filming you will need at least two Photofloods in reflectors. If you are shooting in colour with only two lamps, you will have to confine yourself to close-ups or close shots; you will not have enough light for a larger set-up. The No. 1 Photoflood is cheap; with four or more of them you will have extra scope with colour film.

Lamp-to-Subject Distance

Outdoors you study the weather. Indoors your main concern, once you have assembled your lights, is the distance between them and the subject. This distance is extremely important; a foot or two either way makes a vital difference to subject brightness, and appreciably affects exposure.

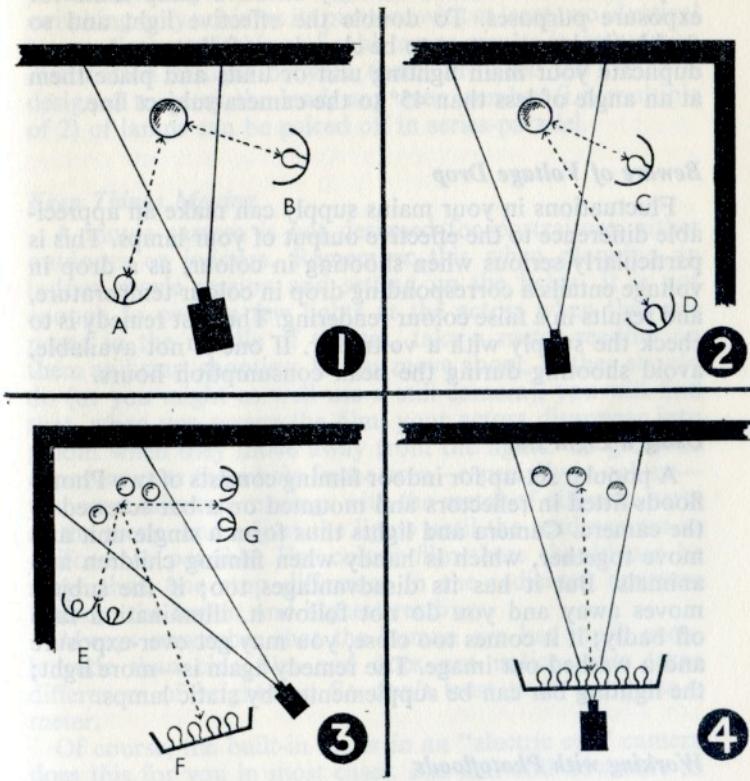
If you double the distance, you reduce the brightness to one-quarter; if you halve it, you increase it by the same amount. For instance, if a scene filmed with two Photofloods at $3\frac{1}{2}$ ft. from the subject needs an aperture of $f4$, the same subject with the lights at 7 ft. will need $f2$ (or $f1.9$).

Lamp Positioning

To be fully effective, a lamp should point as directly as possible at the subject. The main lighting is usually placed above and slightly to the side of the camera. When lamps are placed at between 45° and 60° to the camera-subject line, they only light the subject half as brightly; between 60° and 70° the effective brightness is reduced to one-quarter; and beyond 70° their effect on exposure is negligible.

This is not to say that lamps should not be placed in oblique positions; it is indeed often essential for proper

INDOOR LIGHTING SET-UPS



1. The simplest basic set-up uses two lamps, A and B, each about $3\frac{1}{2}$ ft. from the subject. These provide the main and fill-in light. 2. For more contrasty side lighting, the fill-in lamp, D, moves farther away from the subject—about twice as far as the main light C, and comes from the same side. 3. For a larger set-up a bank of floods, F, can provide the fill-in lighting, while two pairs of single lamps, E and G, nearer to the subject provide modelling and highlights. 4. For flat lighting, use two or more lamps near the camera. When setting up the lights remember to allow for subject movement. A bank of up to six Photofloods provides sufficient light for the slower colour films.

lighting of the subject and background. But in such positions they cannot be counted as fully effective lamp units for exposure purposes. To double the effective light and so enable the lens aperture to be closed one full stop, you must duplicate your main lighting unit or units and place them at an angle of less than 45° to the camera-subject line.

Beware of Voltage Drop

Fluctuations in your mains supply can make an appreciable difference to the effective output of your lamps. This is particularly serious when shooting in colour, as a drop in voltage entails a corresponding drop in colour temperature, and results in a false colour rendering. The best remedy is to check the supply with a voltmeter. If one is not available, avoid shooting during the peak consumption hours.

Using a Light Bar

A popular set-up for indoor filming consists of two Photofloods fitted in reflectors and mounted on a bar screwed to the camera. Camera and lights thus form a single unit and move together, which is handy when filming children and animals. But it has its disadvantages too; if the subject moves away and you do not follow it, illumination falls off badly; if it comes too close, you may get over-exposure and a washed-out image. The remedy again is—more light; the lighting bar can be supplemented by static lamps.

Working with Photofloods

Photofloods will last much longer if they are switched on at half power and only used at full power for meter readings and the actual shooting. When working this way, they also generate less heat and glare, and so cause less discomfort to those taking part in the proceedings.

To use Photofloods, or any other lamps, at half power, they must be connected through a two-pole two-way switch

providing series (half power) wiring in one position and parallel (full power) wiring in the other. Series-parallel switching only achieves its purpose with at least two identical lamps. Series switching of odd lamps results in an uneven distribution of light between them. Provided the switch is designed to carry the load, any even number (i.e. multiple of 2) of lamps can be paired off in series-parallel.

Keep Things Moving

A movie camera is not designed for portraiture, either outdoors or indoors. Remember this when planning an indoor movie session and setting up the lights. It is not enough to point a few lights at the actors when they are posed in the middle of the set, take a meter reading on them and start shooting. If they move about, as they should do (or you might as well use a still camera), you will find that, when you screen the film, your actors disappear into gloom when they move away from the lights. To get even exposure over the whole frame area—especially in colour—you must take test readings with the meter of different parts of the scene, and adjust the lights until the readings are as uniform as possible. For colour film there should not be more than one stop difference in the indicated aperture between the lowest and highest readings.

Always remember that the human eye has much more latitude than cine film and does not notice quite large differences of brightness. So don't trust your eyes; use a meter.

Of course, the built-in meter in an "electric eye" camera does this for you in most cases. But it is still advisable to check that the camera lens and film can cope with the brightness range.

EDITING

Movie-making does not end when a reel of film comes back from the processing station. You will naturally want to project the results at once; but do not imagine that you now have a finished film. In the professional cinema the director sees "rushes" of the previous day's shooting; they are hurriedly assembled for screening, but are nothing more than the raw material from which the finished film is made up. Your newly-processed reels are like these "rushes", and equally incomplete. To make a coherent film out of them they will need editing.

Creative Editing

Editing can mean tidying up a film and cutting out the failures; or it can be something more—the last in the sequence of creative stages in film-making, following scripting, direction and shooting. It is up to you.

How, you may ask, can the term "creative" be applied to a process which consists merely in joining a lot of shots together in a particular order? The reason is that the significance of many of these shots may vary according to the context in which they are shown; in other words, splicing them together in a particular order may create a particular impression not inherent in the isolated shots.

The Professional Way

We can learn much from the methods of the masters of professional editing technique. The Russian director Pudovkin carried out a striking experiment by putting together shots which were actually quite unrelated.

He took close-ups of an actor whose expression was neutral, then joined them successively to shots of a plate of soup; of a dead woman lying in a coffin; and of a girl at play. An audience which had not been let into the secret was impressed by the heavy pensiveness of the actor's mood

over the soup; was moved by his deep sorrow as he looked at the dead woman; and admired the happy smile with which he observed the girl at play. Yet in all cases the face was the same! Among Pudovkin's dicta on editing is the following: ". . . editing is the creative force of filmic reality; nature provides only the raw material with which it works." Though he seems today to have been overstating the case, the experiment does show what editing can do.

What You Can Do

Reduced to the homely terms of everyday amateur filming, Pudovkin's thesis is that individual shots can be made to acquire greater significance through judicious editing. Here is a practical example.

You spend a day at the seaside with your friends and take the camera along. A friend's dog is fond of running into the sea after pebbles thrown for him. You try to get a shot of the dog poised ready to dart into the surf. When the film comes back you find the shot is a failure; all you have is a long shot of the dog running down the shore and disappearing in the waves. On your next visit to the seaside in the same company you get the dog's master to hold a ball up in the air, out of range of the camera, while you film him in close-up. When you come to edit the film, you then splice in the shot of the expectant dog before that of him running into the surf.

By rearrangement of the shots you are suggesting that those of the dog were taken on the same occasion, and that the animal was reacting to a stone in both. In a sense you are cheating, but here the end justifies the means—the end being a convincing portrayal of an incident which actually happened but which you were unable for physical reasons to film on a single occasion.

Incidents of this kind will crop up frequently. All you have to do is to ensure that there is nothing incompatible in the two shots—e.g. that the weather conditions are similar, and

no person or feature of the scene is visible in one shot and noticeably absent from another.

The procedure described above is exactly that followed in the cutting room in a professional film studio; shots taken "on location" are spliced into studio shots of details of the same incidents which could not conveniently be filmed outdoors.

Editing in Practice

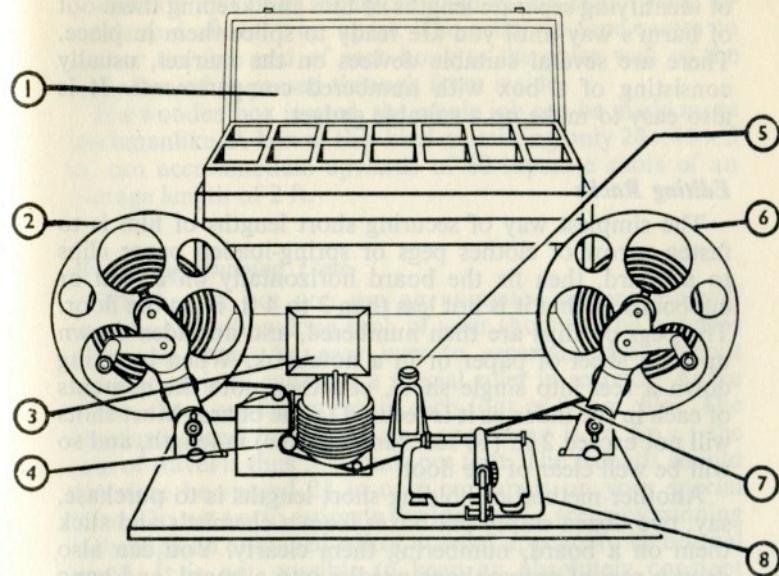
The basic requirements for editing are: a pair of rewind arms, scissors, splicer, film cement, cotton gloves, and a magnifier or animated viewer.

Some form of magnifier is really essential. The individual frames of 8 mm. film are so small that proper editing is impossible without some means of enlarging the image. Simple viewers incorporating magnifiers are available, but the best apparatus for the purpose is undoubtedly an animated viewer. Though relatively costly, the animated viewer provides an enlarged moving image like a projector, with the important difference that the film can be turned in either direction and stopped at any desired point.

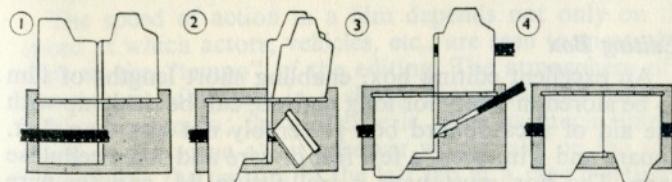
Editing can be a fascinating pursuit; it requires a deft pair of hands, calls for absolute cleanliness and gives an outlet for artistic sense. It is important to master the mechanics of the process before going into the aesthetic side.

Splicing is done either with cement and an overlapping joint splicer, or butt-spliced with special adhesive tape. For an overlapping splice, place the ends of film in the splicer, emulsion upwards, scrape the emulsion from the left-hand end, apply cement, then press the other end over it. In butt-splicing you join the ends with transparent tape which you either buy ready perforated, or punch in the perforations in the splicer.

If you are content to remove the lengths of blank film from the middle of your reels and cut out the unsuccessful shots, you can keep your equipment to a minimum. But if you go in for serious editing, which will involve the arrange-



An editing table makes cutting and splicing of films simple. It contains the various items of equipment needed readily at hand. 1. Pigeon-holes to store individual film lengths. 2. Supply reel. 3. Screen of animated viewer. 4. Shutter drive sprocket. 5. Film cement. 6. Take-up reel for edited film. 7. Film. 8. Splicer.



Splicing films. 1. Place the piece of film, emulsion side up, on the base plate, and clamp down. 2. Scrape the emulsion off (most splicers have built-in scrapers). 3. Apply the cement to the scraped portion and fit the second piece of film into the splicer. 4. Bring down the splicer plates to join the film and hold it tight.

ment and transposition of shots, you will need some means of identifying separate lengths of film and keeping them out of harm's way until you are ready to splice them in place. There are several suitable devices on the market, usually consisting of a box with numbered compartments. It is also easy to make up a suitable gadget.

Editing Racks

The simplest way of securing short lengths of film is to fasten a row of clothes pegs or spring-loaded paper clips to a board, then fix the board horizontally on a wall or cupboard so that it is not less than 3 to 4 ft. from the floor. The pegs or clips are then numbered, and an index drawn up on a sheet of paper or in a notebook. When breaking down a reel into single shots, you then note the contents of each in the index as it is secured to the board. Most shots will not exceed 2 ft. (10 sec. running time) in length, and so will be well clear of the floor.

Another method of holding short lengths is to purchase, say, two dozen empty pill-boxes from a chemist's and stick them on a board, numbering them clearly. You can also drive a row of gramophone needles into a board, and hang the strips of film by the perforation holes. Any exceptionally long strips which you may not wish to cut down can be stored on empty 50 ft. projector spools of which you will accumulate a quantity in the course of time.

Editing Box

An excellent editing box, enabling short lengths of film to be stored in safety for long periods, can be made up with the aid of a cardboard box preferably not less than 2 ft. square and 5 in. deep, a few feet of wire and some cellulose tape. The box must have a well-fitting lid, and the wire must be thin enough to pass easily through the film perforation holes.

The wire is cut up into short lengths (2-3 in.), each piece

being bent into a hook; the hooks are then fastened in a row inside and near the upper edge of the box, facing inwards and about 1 in. apart. The cellulose tape serves to anchor the free end of each hook to the outer wall of the box after it has passed through from inside.

If a wooden box is used, the whole job can be made more workmanlike. A box of this kind measuring only 24 x 15 x 5 in. can accommodate upwards of 60 separate shots of an average length of 2 ft.

Measuring Running Time

Whether or not you use an animated editor, you will need to know how long each of your shots will be in terms of screen time. An easy way to ascertain this without calculation is to calibrate a special ruler in seconds. As we know, there are 80 frames in each foot of 8 mm. film. The standard speed for taking and projecting is 16 f.p.s.; the rate of travel is thus 5 seconds per foot. The seconds should therefore be spaced $2\frac{3}{8}$ in or 6 cm. apart on your special ruler. Do not try to estimate the length of a scene by running it through an animated editor at what appears to be normal speed. It is not possible to keep an absolutely constant speed when cranking the rewinder; the film travels progressively faster as the spool fills up.

Tempo and Variety

The speed of action in a film depends not only on the speed at which actors, vehicles, etc., are seen to move, but also on the "tempo" of the editing. The atmosphere of a hot August afternoon in a sleepy provincial city calls for a leisurely tempo; the audience is given as much time to dwell on the scene as an observer would take on the spot. Conversely, the tension of the last lap at a race meeting is conveyed by rapid cutting from one shot to another; perhaps some close reaction shots of spectators and flashes of horses' hooves will remain on the screen for less than a second.

Variety is as important in films as in life generally. A leisurely tempo, if maintained throughout a film, becomes tedious. So does an artificial attempt to maintain a dramatic quick-fire tempo beyond the needs of the incident or story. After the leisurely afternoon there can follow a riotous evening of frivolity; after the tension of the horse-race climax, we can end on a shot of the deserted course after the last spectators have left.

Cutting Surplus Footage

Every movie-maker is proud of his work. This natural pride makes us reluctant to discard a single foot of film unless it is hopelessly spoiled—quite apart from the feeling that in doing so we are throwing away something that cost good money.

In the professional world, only a very small proportion of the footage shot ever reaches the screen of your local cinema. Admittedly, the cost of film is the smallest item in the professional's budget, while it is probably the amateur's largest expense; but there is still a lesson to be learned from the ruthless elimination practised in the studios.

To refrain from discarding surplus footage merely because it cost money is understandable; but it cannot lead to good films. The surest form of waste is to shoot film at random, in the hope that something worth while will result. The best way to avoid waste footage is to prepare a script.

TITLES AND EFFECTS

Titles give a film the final polish. Every film, even the most unpretentious family record, should have at least a main and an end title. You can get titles made for you in a variety of styles, but it is far cheaper and more satisfying to make them yourself, if you can devote the time to it.

The basic requirements for making your own titles are a titler comprising a camera platform and title card holder, a suitable close-up lens and a pair of lamps in reflectors. Some camera manufacturers supply titlers specially designed to fit particular cameras. There are also a number of universal titlers on the market. The majority are designed for horizontal use, but some can also be used vertically. With horizontal models, letters of course have to adhere to the vertical background; with the vertical type the letters can simply be laid flat down.

If you are handy with tools, there is no difficulty in making up a titler which will be as accurate as any you can buy, though it may be less versatile. All you need to make a vertical titler is a firm baseboard and a means of securing the camera at the desired height above it.

Tripod into Titler

The simplest (but not the most accurate) method of titling is to place the camera on a tripod, tilt it vertically downwards and lay the title card on the floor or a table.

Aligning the Titler

Take a rectangular card the same size as the proposed title card, draw in the diagonals, place card and camera in position, hold the titler so that the camera is directly above the card and suspend a plumb line from the lens to the card. If the line coincides with the intersection of the diagonals, the title is properly centred.

After making a test titling shot, wait till the film is pro-

cessed and try it out on your projector. Projector gate apertures are smaller than camera apertures, and this may affect the title layout by leaving less margin than was anticipated. Projection is also the best way of checking for centring and alignment.

Exposure

Exposures in titling, in both black-and-white and colour, are more critical than in normal cinematography. But there is the advantage that once the set-up has been established, results can be reliably repeated.

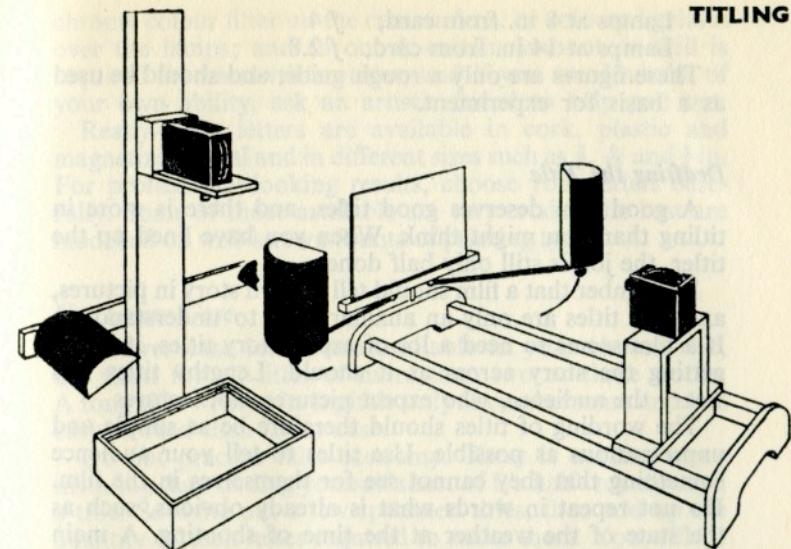
Coloured titles in which the *background itself is coloured* can be shot on colour film and exposed just like a normal subject. That is to say, they can be filmed outdoors, or by Photoflood light indoors, with the appropriate film (and conversion filter when needed). You can best take an exposure reading by pointing the meter at the card.

With coloured title letters on a *black* background, set the lens aperture according to the colour and tone of the letters themselves, ignoring the background. A direct meter reading on the card will give over-exposure; you can either take a substitute reading on a coloured card of the same hue as your titling letters; or proceed by trial and error.

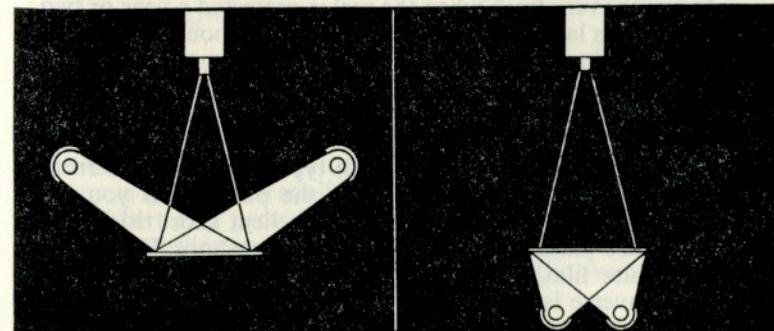
Black-and-White Titles

Most titles made for black-and-white films consist of white lettering on a black background. Here, again, it is useless to take a meter reading from the actual title. Instead place a sheet of newspaper or very slightly off-white card in the title position and take a reading from it, applying it to the camera in the normal way. This will give correct exposure for the white lettering, while the black remains almost unrecorded and so registers black in the positive.

Suggested exposures for white-on-black titles using slow (22°-25° BS, 12-25 ASA) black-and-white film and two 100-watt pearl lamps in reflectors are:



The titler basically consists of a camera stand which supports the camera square to the title area, and permits forward and backward movement. A set of lights completes the unit. The set-up can be either vertical (left) or horizontal (right), and may range from simple home-made units to advanced and complex titlers.



Two basic lighting arrangements are possible. Left: The conventional set-up consists of the two lights shining down on the title card—usually opaque. Right: With transparent titles, the lights illuminate the title from behind.

Lamps at 8 in. from card, *f* 4

Lamps at 14 in. from card, *f* 2.8

These figures are only a rough guide, and should be used as a basis for experiment.

Drafting the Title

A good film deserves good titles, and there is more in titling than you might think. When you have lined up the titler, the job is still only half done.

Remember that a film should tell its own story in pictures, and that titles are only an auxiliary aid to understanding. If a film seems to need a lot of explanatory titles, it is not getting the story across as it should. Lengthy titles will weary the audience, who expect pictures, not lectures.

The wording of titles should therefore be as simple and unpretentious as possible. Use titles to tell your audience something that they cannot see for themselves in the film. Do not repeat in words what is already obvious, such as the state of the weather at the time of shooting. A main title, for instance, need contain no more than two or three words, plus perhaps a date.

Do not try to be facetious in titles. The joke is unlikely to appear very fresh when the reel is projected a year or two later; films last a long time. Do not be pompous or pedantic either; you may get a laugh when you least expect it.

Lettering

Titles can be written by hand, typed or composed from sets of letters made specially for the purpose. If you are shooting in colour you can make excellent short titles with children's plastic letters available from toyshops. For black-and-white film, use white letters on a black background; the converse is not so easily legible. With colour film you have a wide choice: white letters on coloured background; coloured letters on contrasting colour background; white letters made to appear coloured by the use of a mono-

chrome colour filter on the camera lens, or coloured gelatin over the lamps; and so on. A certain amount of skill is required for handwritten titles, and if you are doubtful of your own ability, ask an artistic friend to help you out.

Ready-made letters are available in cork, plastic and magnetized metal and in different sizes such as $\frac{3}{8}$, $\frac{9}{16}$ and $\frac{3}{4}$ in. For professional-looking results, choose your letters carefully. Some of those available are very crude. The best are modelled on well-known founts of printing type.

Use Lower Case

If lower case letters are available in your chosen size, use them for all titles of more than two or three words. A long title written in capitals only is cumbersome and less easy to read than lower case.

Do not practise false economy. There is nothing more irritating than finding yourself short of E's half-way through a title. So write out a few specimen titles, then add up the quantity of each letter required to make them. You will be surprised how many you need. It is best to buy an assortment of at least 200 letters to be on the safe side.

"Ready-Made" Titles

There is no need to use special titling letters all the time. When you are filming in a new locality, take some shots of signposts, street names or characteristic landmarks for use later as inserts to establish the scene. If you are filming a public event, make sure to get a copy of any printed programme that may be available. It may be usable as an insert; it will certainly provide valuable background information for future titling purposes. If there is no programme, secure copies of newspapers publishing reports of the event.

Timing Title Shots

Titles should remain on the screen long enough for them

to be read through comfortably. The main title of a film, which is like an establishing visual shot (page 37) should be held for somewhat longer, so as to give the audience time to get in the right frame of mind for what is to follow.

Main Titles and Sub-Titles

The minimum screen time for a main title should be 4 sec., even if only a single word. A one-line-main title can run for about 6 sec. two lines need about 10 sec.

A single-word sub-title should not run for less than 2½-3 sec. unless there is a special reason for cutting in an interjection such as "Help!" in a fast-moving dramatic sequence. Such a word might be flashed on the screen for as little as 1 sec. Longer sub-titles of 15-20 words should remain on the screen for up to 12 sec.

As in normal filming, you can safely shoot titles at somewhat greater length in the camera, provided you cut them down at the editing stage. Before shooting a title, measure the time you take to read it aloud slowly and deliberately, then add half as much again for the actual shooting. This allows for the fact that *you* already know it by heart.

If titling a film for children, make the titles run a little longer, according to the age of your audience.

Animation

If your camera has provision for exposing single frames you can produce a variety of original effects. Titles can be made to spell themselves out if you add a letter at a time and expose one or two frames for each letter.

You can also make solid objects, drawings and maps appear to move, or a line or series of arrows run along a map to trace a route. First establish your subject by exposing between 16 and 32 individual frames without making any alteration. Then animate the subject by making very slight additions or alterations between each exposure.

Objects can be assembled or dispersed in apparently magical fashion by exposing one frame at a time, moving an object or objects slightly between each exposure. Thus crockery can be made to arrange itself on a table piece by piece in a few seconds. You can start with an empty table (8 frames), then expose 6 frames for each cup and saucer, and finish with 16 frames on the completed table. With 6 cups, the table appears to lay itself in 4 seconds.

Time-Lapse

Action which takes place over a period of hours or even days can be "compressed" into a few seconds screen time by setting up the camera on a tripod and exposing a single frame or a brief succession of frames at regular intervals on the chosen subject.

Start by deciding how many seconds you wish the final result to run on the screen, then multiply this by 16 to find the number of single frames needed to make up this running time. Next ascertain how long the action to be recorded actually lasts, and divide the total time of the action by the number of single frames you intend to expose. If for instance you wish to study the change of light falling on a building as the sun moves across the sky for about three hours, and "compress" the period into 10 sec. on the screen, you will expose 160 frames in 3 hr., or 180 min. At the rate of 1 exposure per min., you will have your 10 sec. running time in 2 hr. 40 min.

The Disappearing Trick

People and objects can be made to appear or disappear by stopping the camera in the middle of a shot, removing the person or object, and resuming the shot. The camera must be on a tripod, and all other features of the scene must stay still while the camera is stopped, or a "jump cut" (page 45) will spoil the illusion.

FACTS AND FIGURES

This section gives the more important data for exposure, depths of field, films, etc., in handy tabular form for ready reference.

DEPTH OF FIELD

The Brownie 8 mm. Movie Cameras have a fixed-focus lens, set to cover everything from infinity down to a few feet without adjustment. The nearest distances at which objects will be sharp at various apertures and with various lens attachments are shown in this table.

Nearest Sharp Distance at Aperture							
	f 1.9	f 2.8	f 4	f 5.6	f 8	f 11	f 16
13 mm. Camera Lens only							
Feet	10	8	6	4½	3½	2½	2
Metres	3.04	2.45	1.8	1.38	1.06	0.76	0.61
13 mm. Camera Lens with 24 mm. Telephoto Attachment							
Feet	30	24	19	15	11	9	6
Metres	9.1	7.2	5.8	4.5	3.35	2.75	1.8
13 mm. Camera Lens with 13 mm. Wide-angle Attachment							
Feet	5	4	3	2½	2	1½	1
Metres	1.52	1.23	0.91	0.76	0.61	0.45	0.3

CLOSE-UP DEPTH

With close-up attachments on the normal lens the range of near distances is reduced to inches but the sharp zone no longer extends to infinity. The sharp zones with the +1 dioptre Kodisk close-up lens and with +2 and +3 dioptre close-up lenses are given below:

Aperture						
	f 2.8	f 4	f 5.6	f 8	f 11	f 16
Depth with 1 Dioptre lens						
Inches	28½ to 40	28 to 44	25 to 50½	22½ to 65½	20 to 102	17 to 200
Centimetres	73 to 102	68.6 to 112	63.5 to 129	57.1 to 166	51 to 259	43.1 to 51
Depth with 2 Dioptre lens						
Inches	16½ to 20	16 to 21	15½ to 22½	14½ to 24½	13½ to 29	12 to 39
Centimetres	42.5 to 51	40.6 to 53.2	38.4 to 57	36.8 to 62	34.3 to 73.5	30.5 to 99
Depth with 3 Dioptre lens						
Inches	11½ to 13½	11½ to 13½	11 to 14½	10½ to 15½	10 to 16½	9½ to 20
Centimetres	29.8 to 33.6	29.2 to 35	27.9 to 36.8	26.7 to 38.7	25.4 to 42.5	23.5 to 51

Maximum aperture is not given, since it is not recommended to use apertures larger than f 8 with these close-up lenses.

APERTURES FOR AVERAGE SUBJECTS

Light	Films (see page 78)					
	ASA	80-100	32-40*	20-25†	10‡	
Bright sun	—	f 16	f 11	f 8
Hazy sun	—	f 11	f 8	f 5.6
Light shade	f 16	f 8	f 5.6	f 4
Cloudy dull	f 8	f 5.6	f 4	f 2.8

* Corresponds to the ● marking on the setting dial of the Brownie 8 mm. Single-lens Movie Camera.

† Corresponds to the — marking on the setting dial of the Brownie 8 mm. Single-lens Movie Camera. (Use for Kodachrome II film)

‡ Corresponds to the — marking on the setting dial of the Brownie 8 mm. Single-lens Movie Camera. (Use for the original Kodachrome and Gevacolor film).

AVERAGE SUBJECTS are those of average tone or with evenly mixed light and shade, such as groups, gardens or street scenes.

For LIGHT SUBJECTS which have no heavy tones, such as distant views or groups in very bright surroundings, such as on a beach, use 1 stop smaller (larger f-number).

For DARK SUBJECTS which have few bright tones, or subjects with the sun behind them, use 1 stop larger (smaller f-number).

These settings apply for the period April-October in the northern hemisphere. From November-March, use 1 stop larger (smaller f-number).

APERTURES USING TWO PHOTOLOODS

(for light-toned room)

Lamp-to-Subject Distance feet	Films (see page 78)		
	ASA 80-100	32-40	16-25
1½	16	11	8
2½	11	8	5.6
3½	8	5.6	4
5	5.6	4	2.8
7	4	2.8	2.3
10	2.8	—	—

Note: For light subjects use 1 stop smaller (larger f-number); for dark subjects use 1 stop larger (smaller f-number).

BLACK-AND-WHITE FILMS (REVERSAL)

Make	Speed (ASA)	Make	Speed (ASA)
Adox U 17	40	Gevaert Gevapan 23	12
		Gevapan 26	25
		Gevapan 32	100
Agfa Isopan F	25	Perutz Perkine U 15	25
		Perkine U 21	100
		Perkine U 27	400

COLOUR FILMS (REVERSAL)

Make	Speed (ASA)	Make	Speed (ASA)
Agfa Afgacolor CT 13	16	Gevaert Gevaicolor R 5	12
Afgacolor CK 8	32	Kodak Kodachrome Dayl.	10
Ansco Moviechrome 8	20	Kodachrome A	16
		Kodachrome II Dayl.	25
Ferrania Ferraniacolor	25	Perutz Perutz Color C 12	12

CONVERSION OF FILM SPEED SYSTEMS

ASA and BS Arith. *	ASA Log	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°

* Also Weston.

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