1 Beginnings

This manual is a basic guide to black-and-white photography, covering all the points taught in a typical introductory class. It starts at the beginning, assuming you know little or nothing about photography, and guides you through using your camera, developing film, and making and finishing prints.

Although there is much to learn, it's not all that difficult. Modern films and printing papers are easy to work with and today's cameras offer a considerable amount of automation, all of which make the job easier. Automation is not foolproof, however. A camera can't know exactly what the subject looks like and how you want to photograph it. Much can go wrong, even in the most automated cameras, for example, film that doesn't load properly, autofocus that's off the mark, or inaccurate meter readings. And, of course, there's always user error. The more you understand about how everything works, the fewer problems you will encounter along the way and the more control you'll be able to bring to the process, even when working with your camera on automatic mode.

35 mm SLR camera

To get the most from this book, you'll need a reasonably sophisticated camera, preferably one that works manually as well as automatically. Don't worry if you don't have a top-of-the-line model; you can make great pictures using very basic equipment. Photographic equipment varies somewhat in design and usage from one camera system to another, so keep your manufacturer's instructional manuals handy to supplement the information in this text for details specific to your equipment.

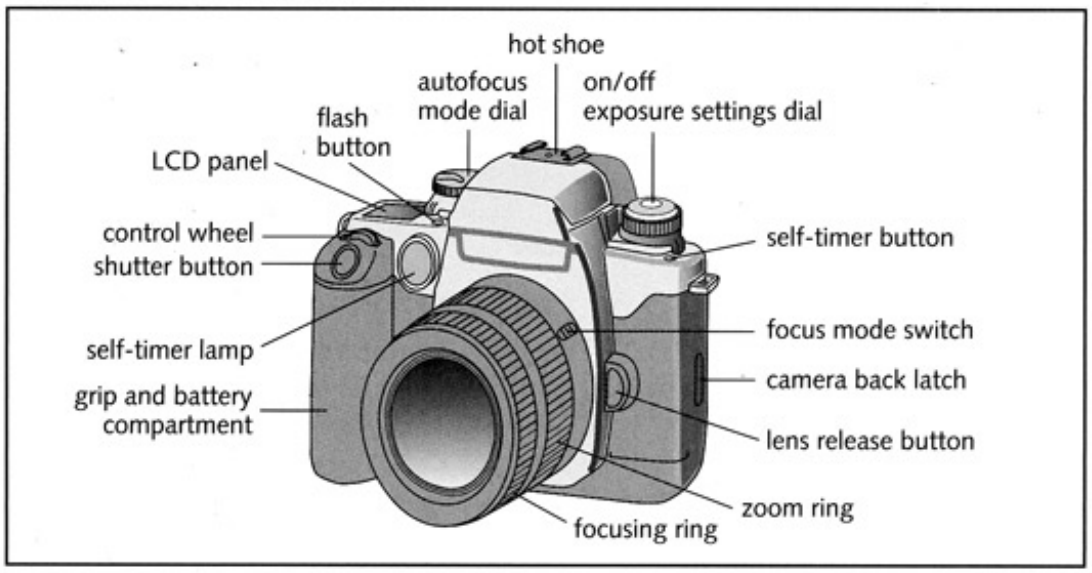
To make the best use of the sections on developing film and making prints, you will need access to a darkroom. Both in the darkroom and when taking pictures, refer to your equipment as you read the instructions. It will make understanding the process much easier.

Getting Started

SLR: pages 11–14

Here are some very general instructions and tips on getting started with your camera, assuming it is a 35mm **single-lens-reflex** (**SLR**) camera, a commonly used model. Later chapters cover these points and other types of cameras in far greater detail.

Automatic Camera: Front View

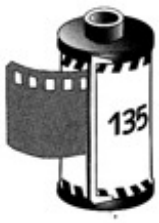


Check the battery and turn on the camera. Your camera needs one or more batteries to operate. Different models take batteries of different sizes. If your camera is new, it probably comes packaged with the needed battery or batteries. If you haven't used it for a while, you may need new batteries. At any rate, you'll need replacements after shooting about 25–50 rolls of 35mm, 36-exposure film, depending on the camera model and other factors; for instance, the more automation you use, the more battery power you'll drain. Some cameras have a battery power indicator, usually displayed on an LCD screen. It's a good idea to bring extra batteries with you when you are photographing, just in case you need them.

Automated cameras usually have a power switch or button that you must turn on to operate the camera. Keeping the power on drains battery power, so switch off the camera when you're not using it. Manually operated cameras are often ready for use all the time, without having to be turned on.

Film speed and ISO: pages 23–24

Choosing and loading film. There are many different films available for black-and-white photography. The most important difference among these films is their relative **film speed,** how sensitive they are to light. Every film has an **ISO** number that rates its sensitivity; the higher the ISO number, the more light-sensitive the film. You'll usually need a high-speed film (ISO 400 or higher) if you are photographing indoors or in a low-light situation (without a flash) to best capture what little light there is. You can generally use a medium- or slow-speed film (ISO 200 or lower) in bright light outdoors or with a flash, when there is plenty of light to expose the film adequately.



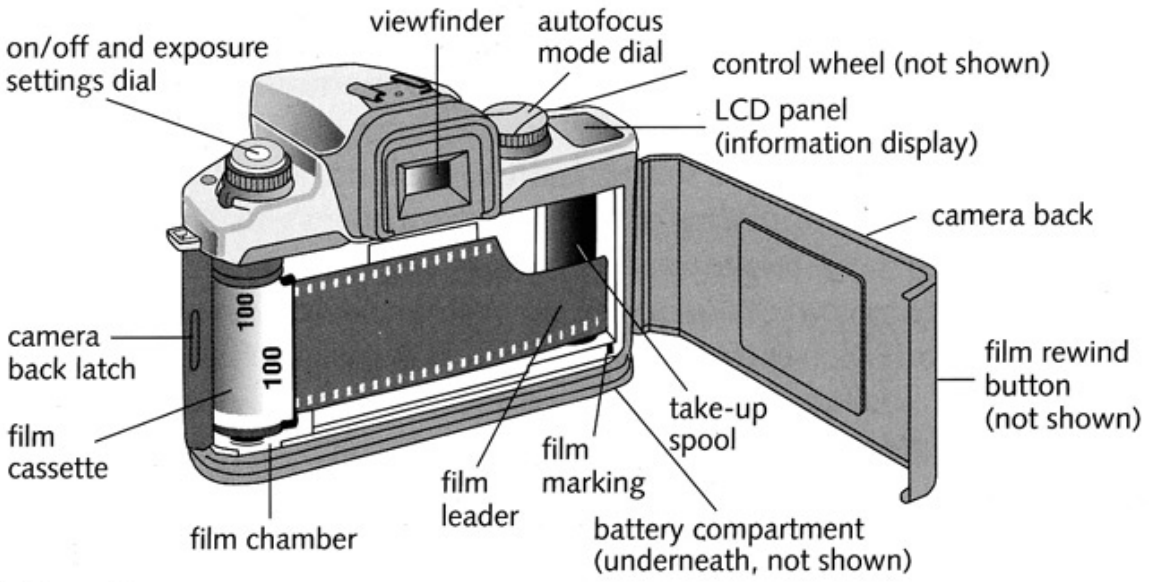
35mm film cassette

Thirty-five-millimeter film is packaged in a cylindrical cassette with the **leader,** the tapered end of the film, sticking out. To load the cassette into your camera,

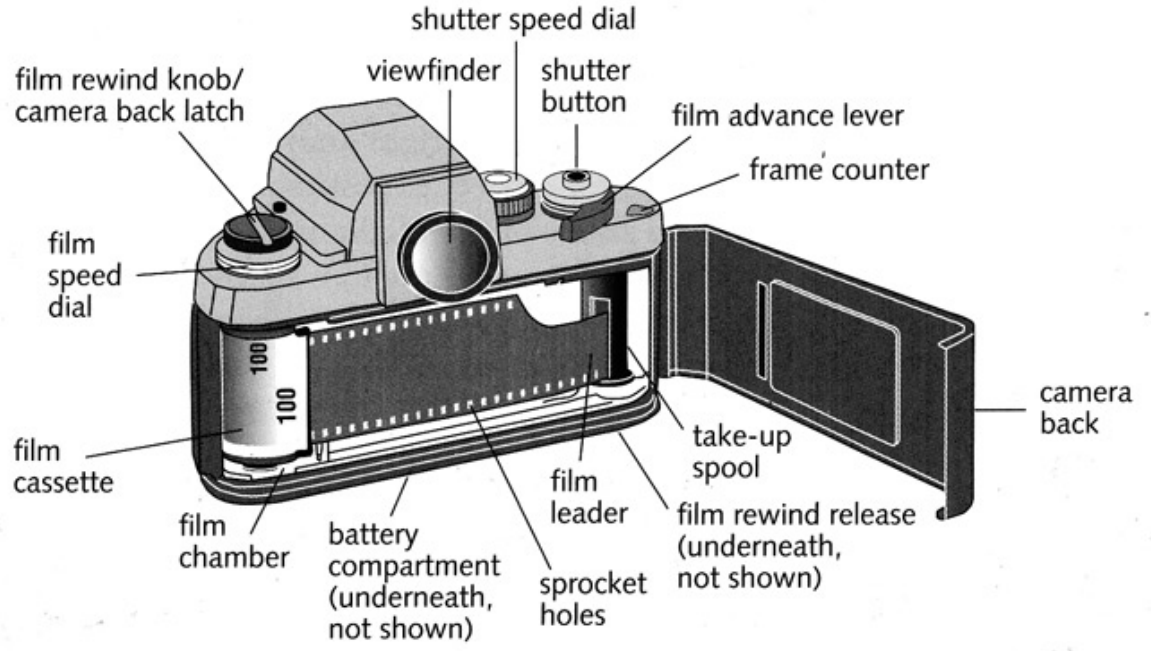
first swing open the back of the camera, usually by sliding or twisting a switch on the side of the camera or by lifting a knob on the top left side.

The camera back has two chambers; usually the left chamber is empty and the right chamber contains a **take-up spool,** to wind the film as it advances out of the cassette. You insert the film cassette in the empty chamber with the extended spool end down. Then, pull the film leader to uncover enough film to reach the right chamber of the camera's interior. Don't pull out more film than you have to.

Loading Film



Automatic camera



Manual camera

With cameras that advance film automatically, you'll need just enough film so the front of the leader reaches just beyond the middle of the take-up spool; this point is often indicated by a marking (sometimes colored red or orange). With cameras that advance film manually, you'll have to slip the end of the film leader into a groove on the take-up spool and advance the film using the film advance lever located to the right on the top of the camera. Thirty-five-millimeter film has **sprocket holes,** square perforations along the edges. Advance the film one or two times until the sprocket holes on both sides of the film fit into small teeth in the spindle of the take-up spool. These teeth grab the film and move it along after you take your pictures.

Close the camera back and advance the film. Make sure the back clicks shut. If your camera loads automatically, it may advance the film as soon as you close the cover when the camera is turned on; on some models you'll need to press the **shutter button,** the button used to take pictures, to initiate the film advance. After advancing, the camera's LCD panel should show a "1" to indicate you are on the first exposure. Some models advance the entire roll of film onto the take-up spool, then wind the film back into the cassette as you take your pictures. On these models the LCD panel may show the total number of exposures the film allows (usually 24 or 36) and count back to 1.

If your camera loads manually, you can only advance the film one frame at a time. Alternate between moving the film advance lever and pressing the shutter button until the **film counter,** usually a window on top of the camera, indicates that you're ready for the first exposure (1).

Compose your picture and set the film speed, lens aperture, and shutter speed. Looking through the **viewfinder** on the top and back of the camera, you can compose your subject the way you like it. But you also must make sure that the film is receiving the right amount of light (**exposure**) to record the subject. The first step for correct exposure is to set your ISO number, or film speed, on the camera so the built-in **light meter** knows how much light your film needs. Most modern cameras set the film speed automatically by reading a bar code on the film cassette. On older or fully manual models, you must set the film speed yourself, often using a dial located on the top of the camera body.

Camera parts: pages 4–5

Setting the ISO: page 74

f/2

Once the film speed is fixed, the light meter can measure light in the scene to determine how to set the camera for correct exposure. There are two settings to control light. One is the **lens aperture,** an adjustable opening inside the lens, measured in **f-stops.** A low f-stop number, such as f/2, indicates a wide lens opening that lets in a lot of light, whereas a high number, such as f/16, indicates a small opening that lets in much less light.

Film exposure: chapter 6

The other light-controlling setting is **shutter speed,** a measurement of how long the **shutter** (a curtain or set of blades located between the lens and the

Lens aperture, f-stop: pages 35, 38–41

Shutter, shutter speed: pages 57–60

film) opens up to allow film to be exposed. The most commonly used shutter speeds are indicated as fractions of a second; a "slow" shutter speed (1/30) lets in light for a much longer period of time than a "fast" speed (1/1000).

The job of the light meter is to provide the right combination of f-stop and shutter speed to achieve correct exposure. In fully automatic cameras, or cameras in a **program autoexposure mode (P),** the camera sets the f-stop and shutter speed for you, often displaying the chosen settings in its viewfinder or LCD panel. In nonautomatic cameras, or cameras set in **manual mode (M),** you'll have to set f-stop and shutter speed yourself with guidance from the meter. Many cameras offer various other semiautomatic exposure modes, described later.

Exposure modes: pages 81–85

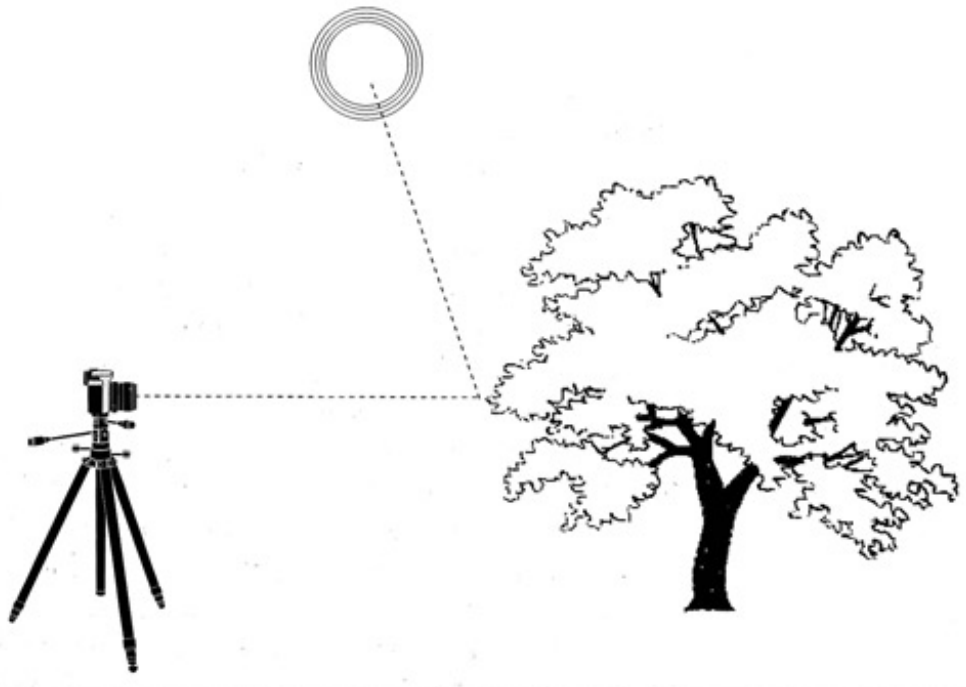
There's a lot to know about getting the right film exposure. But to begin with you may want to shoot a few rolls in automatic or program mode to become familiar with the mechanics of picture taking. Good exposure technique is covered in great detail in later chapters.

Focus and take your pictures. Once you've composed your picture and established the correct exposure, make your subject sharp by setting the **focus,** either automatically (**autofocus**) or manually; most cameras offering autofocus have a switch that allows you to choose either manual or autofocus. In most cameras, to use autofocus you push the shutter button halfway down; there is often an

Autofocus: pages 35–37

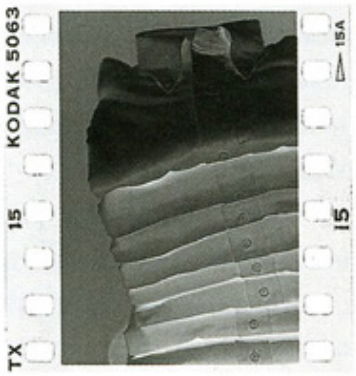
Film Exposure

In the camera, film is exposed by light bouncing off the subject. The light that reaches the film is controlled by the lens aperture (f-stop) and shutter speed settings.



Negative and Positive

After it is processed, exposed film becomes a negative, a reversed image of the original scene; light areas render dark (dense) and dark areas render light. Making a print from the negative corrects this reversal and produces a positive—a faithful representation of the scene.



indicator such as a green dot in the camera's viewfinder that lights up when the subject is in focus. For manual focus, you turn a **focusing ring** on the barrel of your lens until you see the subject become sharp as you look through the camera's viewfinder.

Once your picture is composed, the exposure set, and the subject focused, press down on the shutter button to take your picture. Be very careful to hold the camera steady while you press the button; if your camera moves during the exposure, you may get a blurry image.

Rewind the film and remove it from the camera. At the end of a roll of film, many cameras wind the film back automatically into its cassette. If your camera doesn't have automatic rewind, you'll have to rewind it manually by first pressing a button (or sliding a switch) on the camera body and then flipping a crank on the rewind knob and slowly rotating it in the indicated direction. Once the film is safely back in its cassette, you can open the camera back and remove the film cassette.

Taking pictures is one part of the equation, but just as important are the steps of film developing and printing. Developing turns your film into a reversed image, or a **negative**—dark areas appear light or clear on the film and light areas appear dark. This all happens in a succession of chemical baths.

You can send film to a processing lab for development, but you can also process it yourself. You don't even need a dedicated **darkroom,** which is a room generally used for film and print processing. Developing your own film helps guarantee that your film will be carefully handled, which isn't always the case at processing labs. It also gives you more control over the final results. For example, you can increase or decrease the overall image contrast by extending or reducing the developing time.

Once you have negatives, you can make positive **prints.** This process is more complicated than developing film and requires a darkroom, but it is relatively easy to learn. You put the negative in an apparatus called an **enlarger,** which projects the image onto a sheet of photographic paper. Then you put the paper through a series of chemical baths similar to those used for developing film.

You can send your negatives to a processing lab for printing, and many labs produce excellent results. But a lab technician can't predict exactly how you want a picture printed. Even if you have labs make your prints in the future, knowing how to make prints gives you an idea of what kinds of results are possible and how to communicate what you want to achieve.

The best reason for learning how to make prints, as well as develop film, is to take control of the process. You'll soon see how much of a difference you can make with simple techniques to frame the image exactly the way you want it, make a print darker or lighter, alter the contrast of a negative or a print, or selectively darken or lighten specific print areas. Aside from the control it offers, successfully developing film and making prints can be very satisfying—even exhilarating. Some photographers actually like darkroom work more than they like taking pictures.

The rest of the text discusses other approaches to taking pictures and making prints which may give you ideas on how to produce your own visual style. It also covers various ways to finish a print—by changing its overall color, retouching it, and matting or mounting it.

When you have completed reading, you will have learned all the techniques necessary to make excellent black-and-white prints. You also will have learned much of what you need to know when photographing in color or by digital means. However, a book can only carry you so far. Like most skills, good photography comes from practice and hard work. The good news is that you'll have a lot of fun along the way.

2 Camera Types

There are many different types of cameras for you to choose from, ranging from cheap generic models used by millions of snapshooters to costly specialized models used by very few advanced amateurs and professionals. Most modern cameras are quite sophisticated; they are controlled by small computerized circuitry, and they offer more features than you will ever need or even learn how to use. Such models are often linked to a **camera system,** an array of lenses, flash units, and other accessories made by one manufacturer, designed to work together with the camera for maximum effect and automation.

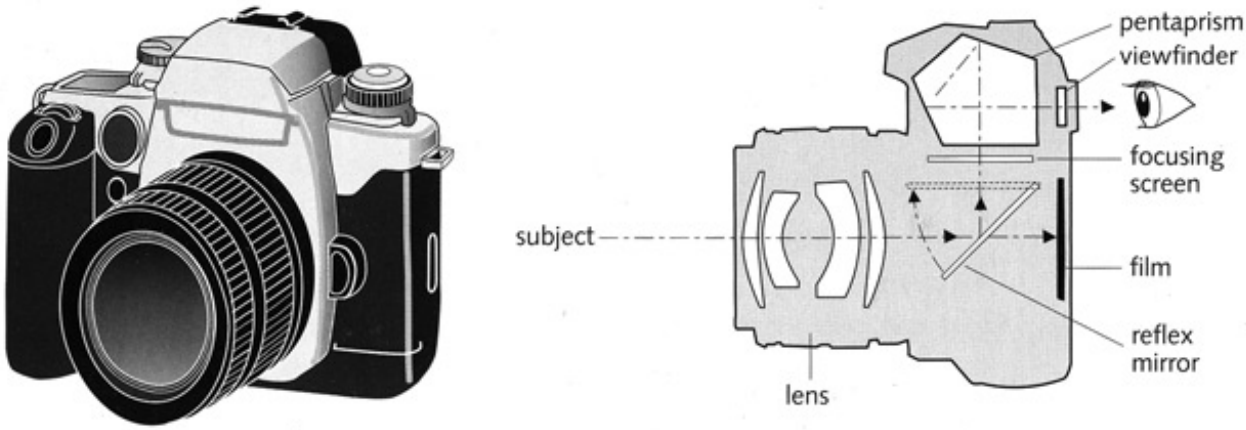
Good pictures are made by photographers, not cameras, so don't worry if a complicated camera doesn't suit your budget or your creative goals. You don't need the most expensive model or fancy features; many wonderful pictures are made with simple, even primitive equipment. Still, it helps to understand the various types of available cameras, so you can evaluate your options and make informed choices.

One way to categorize cameras is according to the size film they use: 35mm cameras use 35mm film, for example, and medium-format cameras use size 120 (or 220) film. Another way is according to the viewing and focusing systems they use, such as single-lens-reflex (SLR) or rangefinder. This chapter describes the different categories of cameras and how to use them.

A **single-lens-reflex (SLR) camera** is so named because you view, compose, focus, and take a picture through a single lens with the help of a reflex mirror. You can't see directly through the lens, because the film and shutter are in the way; they have to be positioned right behind the lens to do their job. So the SLR redirects the light from the lens to your eye with a reflex mirror, focusing screen, pentaprism, and viewfinder (see the illustration on the following page).

Reflex mirror. The **reflex mirror** is located in the camera body right behind the lens and in front of the film. It's positioned at a 45-degree angle; when light comes through the lens, the mirror reflects it upward. The mirror also is hinged; when you press the shutter button, it flips up and out of the way as the

Single-Lens-Reflex Camera



In a single-lens-reflex camera, a reflex mirror reflects light traveling through the lens up to a focusing screen, where the image can be viewed and focused. When you press the shutter button, the mirror swings up to allow light from the lens to expose the film.

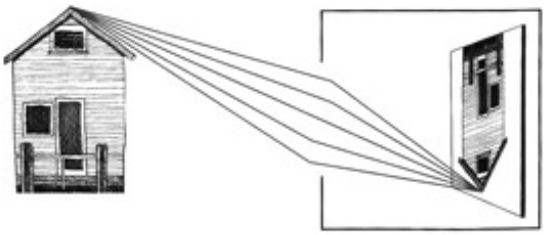
shutter opens, permitting light to expose the film. The mirror then quickly flips back into position, so you can view the subject and take another picture. It's this flipping action that creates most of the noise you hear when you take a picture with an SLR—and it also may cause the camera to vibrate somewhat.

The reflex mirror has another important function. All lenses naturally project an image that is upside down and laterally reversed, so that the left side of the picture is on the right and the right side is on the left; for example, words read backwards and upside down (see the illustration on the following page). The reflex mirror turns the image right side up to allow you to view your subject more easily, but it doesn't correct the lateral reversal. That comes later.

Focusing screen. Light reflected upward strikes a **focusing screen,** a textured sheet of thin plastic or glass. This is where the right-side-up (but still laterally reversed) image forms for you to view and focus. The screen is positioned at exactly the same total distance from the lens as it is from the film. Thus, when you've focused the image on the focusing screen, it also will be in focus on the film.

With most SLRs, the focusing screen is nonremovable, but in some advanced cameras you can choose from a variety of screen types. There are screens that are brighter than others for easier viewing and focusing; screens with a split-image circle or other features to help focus; screens with grid lines, used by architectural photographers and others who want a guide for precise composition; and various other types.

Image Orientation



When light from the subject passes through the lens, it gets turned upside down and laterally reversed; the top of the subject is on the bottom of the frame and words read backwards (left).

The reflex mirror reflects the image up to a focusing screen, where it appears right side up but still laterally reversed (center). Looking through the viewfinder, you see the image reflecting from a pentaprism that reverses the orientation, making it read correctly (right).

Pentaprism. The hump on the top of the camera body incorporates a **pentaprism,** which is a prism or mirror system that reflects and directs the image from the focusing screen to a viewfinder. It also allows you to hold your camera at eye level for viewing. Without a pentaprism you would have to look down at the focusing screen to view and focus. By reflecting and directing the image, the pentaprism also corrects the image's lateral reversal, so it matches the original subject—the left side of the subject is now on the left and the right side is on the right.

The pentaprism also is usually integrated with the camera's through-the-lens meter and exposure controls, and reflects the displays of f-stop, shutter speed, and other meter settings and markers you see when looking through the viewfinder.

SLRs are available for different film formats. Most models are 35mm, but there also are many medium-format SLRs, as well as digital SLRs. One reason SLRs

are so popular is that they accept a wide variety of accessories, such as interchangeable lenses and close-up equipment. With many other camera types your choice of accessories is far more limited or nonexistent.

Rangefinder

A **rangefinder camera** has a single lens like an SLR, but you don't view and focus through it. Instead, you compose your picture by looking through a viewfinder usually located above the lens and to the right (as you look at the front of the camera), and then focus using a rangefinder, a measuring device that links the viewfinder and lens.

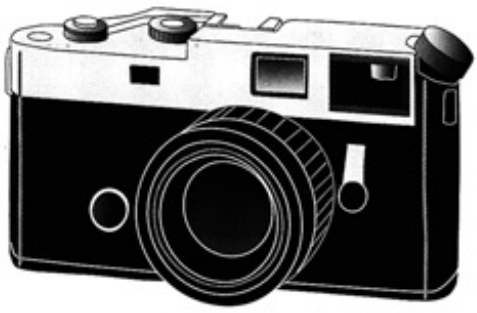
The rangefinder works with a prism behind a window located on the opposite side of the lens from the viewfinder (on the top left as you look at the front of the camera). As you turn your lens to focus the subject, the prism rotates and bounces light sideways to a mirror in the viewfinder. This produces a double image of the subject—one from the viewfinder and one from the prism. The double image appears as a translucent rectangular or square patch floating in the middle of the viewfinder. The image from the prism moves as you focus the lens; when the two images superimpose, the subject is in exact focus.

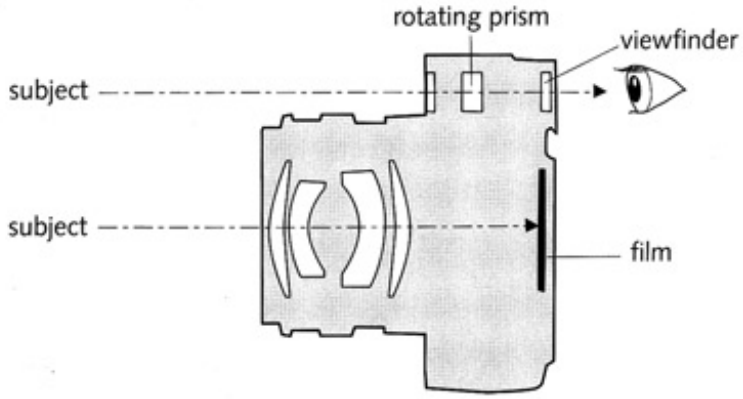
One advantage of rangefinder focusing is that the viewfinder is bright and always visible. With SLRs, when the reflex mirror flips up to expose the film, the viewfinder blacks out briefly. Rangefinder cameras have no reflex mirrors, which allows you to maintain sight of your subject at all times.

Steadying the camera: page 66

The lack of a mirror also makes a rangefinder quiet and easy to hold steady when using slow shutter speeds. You may even be able to handhold your camera at shutter speeds as slow as 1/8 of a second, or even 1/4 under some circumstances, and still get sharp results, unlike SLRs which cannot usually be safely

Rangefinder Camera





In a rangefinder, you view and focus your subject through a viewfinder that's separate from the lens. Light from a prism behind a second window is reflected to the viewfinder, creating a patch with a double image. When you turn the lens and superimpose the two images, the subject is in focus.

handheld at shutter speeds slower than 1/60 or 1/30. The lack of mirror and pentaprism also makes a rangefinder camera compact. This is good for 35mm models, but especially advantageous with medium format; medium-format rangefinder cameras can be handheld more easily and at slower shutter speeds than most medium-format SLRs.

Medium format: pages 28–29

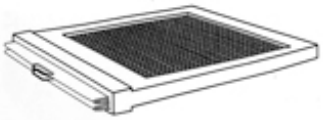
The biggest disadvantage of rangefinder cameras is that they don't permit through-the-lens viewing. Viewing the subject through a separate viewfinder, rather than through a lens, means that you may need a different viewfinder for every lens you use. Good rangefinder cameras do offer adjustable or accessory viewfinders or markings in the viewfinder that show what different lenses see. But none of these solutions is as precise as seeing directly through the lens. Thus rangefinder cameras do not offer as many different types of lenses and other accessories as SLRs.

The lack of through-the-lens viewing also may lead to **parallax error,** the difference between what you see through the viewfinder and what the lens sees (and the film records). This is because the viewfinder is usually a little higher and to the left of where the lens points. When your subject is far away, parallax error is usually not a factor; what you see through the viewfinder is pretty much what you will get on film. But parallax error becomes increasingly evident the closer you get to your subject. Some viewfinders adjust for parallax error automatically or include parallax-compensation lines that guide you as you adjust your composition manually. In general, to compensate for parallax error, you have to aim the rangefinder up a little and to the left.

See **bw-photography.net** for more on parallax error.

View Camera

A **view camera** is like a camera from the early days of photography. Using one takes practice, but its design is simple enough. It has a lens mounted on a **front standard** to capture the scene and a slot on a **rear standard** to hold the film. Between the front and rear standards is a collapsible **bellows,** a light-tight accordion-like tube made of cloth, leather, or some other material. A view camera takes large-format sheets of film or a high-quality digital back, making it capable of producing finely detailed, sharp photographs.



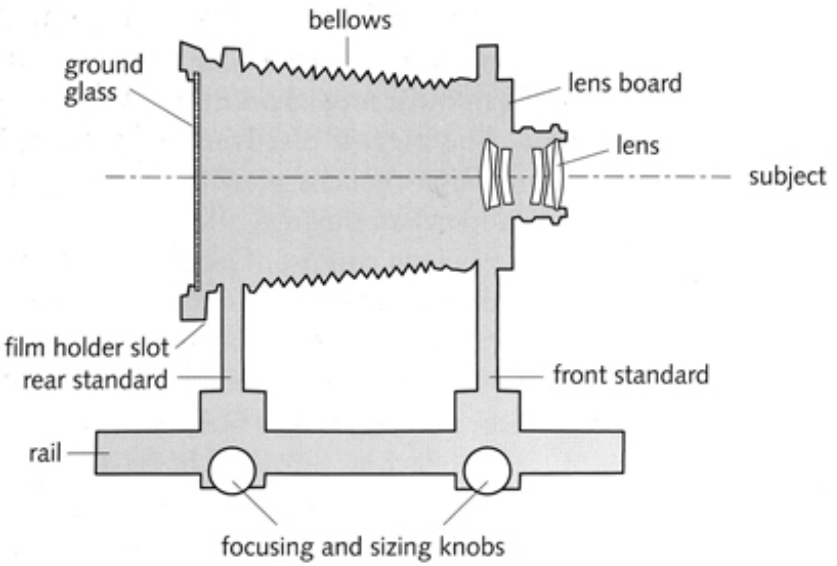
4" x 5" film holder

The view camera lens is mounted on a **lens board,** and in the rear there is a focusing screen called a **ground glass.** A **film holder,** a removable accessory that contains the film or digital back, is inserted between the bellows and the ground glass. The bellows sits on a rail (or a platform); you turn a knob on the front or back of the camera and the bellows collapses or expands to achieve focus.

When focusing with a view camera, you must use a dark focusing cloth.

You view and focus the subject on the ground glass, which is positioned behind the lens and bellows; the image forms upside down and laterally reversed. Ambient light makes the image hard to see, so you must cover your head and the ground glass with a dark **focusing cloth** to keep extraneous light

View Camera



In a view camera, you view and focus your subject through the lens as the image projects on a ground glass. Then you slide a film holder in the back of the camera to take the picture. A view camera is relatively large and bulky and must be used on a tripod for steadying. View cameras are made for different film formats, but most commonly 4 x 5.

out. When your subject is in focus, you slip a film holder or digital back between the ground glass and the bellows, or replace the ground glass with a digital back, remove the **dark slide** that covers the film on one side of the holder, and take your picture.

See bw-photography.net for more on view camera movements.

A view camera offers more control over the image than any other camera type. The front and rear standards move independently and tilt and swing in a variety of directions, which gives you very precise control over focus, as well as the ability to correct or distort perspective, such as straightening converging lines when you're pointing the camera up at a tall building. The view camera also accepts a wide array of accessories, lenses, and film formats.

On the other hand, a view camera is large and cumbersome, and must be used on a tripod. It is not practical for making candid and spontaneous pictures. It also may be expensive, though view cameras are available for a wide range of prices.

Field cameras and press cameras are more portable versions of the view camera.

A popular variation of the view camera is the **field camera,** which is a good choice for landscape photography because it is light and folds into a neat package for easy portability. It delivers many of the benefits of the view camera, including high image quality. A field camera is not as versatile as a view camera, however; it doesn't take as many accessories and has fewer front and rear controls for adjusting focus or perspective.

Field camera

Other Camera Types

There are other types of cameras available for a wide variety of basic to specialized uses. Some are designed to take snapshots, but also can be used for advanced and even professional photography. Others are made for a specific way of working. The viewing and focusing systems used on these models also vary, from simple to complex—and it follows that some are cheap and others are quite expensive. The camera types described below include point-and-shoot, twin-lens-reflex, and digital.

Point-and-shoot. The point-and-shoot category covers a lot of territory, from cheap disposable cameras to costly high-end models. What all types share, however, is ease of use and either automatic or fixed focus, making them very convenient for times when you cannot or do not want to think about adjusting focus or other camera controls manually. Most point-and-shoots take 35mm film or are digital.

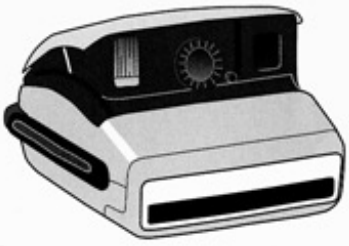
Point-and-shoot cameras are a good choice for working simply and quickly for spontaneous results.

With the most inexpensive point-and-shoot cameras, you compose your subject through an open window located on the top left or center of the camera back. The viewfinder shows approximately what the final photograph will look like. With such cameras no focus is necessary, because the lens is designed and preset by the manufacturer to produce a sharp image from a distance that ranges from about 4 or 5 feet away from your subject to infinity.

Point-and-shoot camera

While some point-and-shoot cameras are simple and allow limited or no focusing, many models come with a zoom lens, built-in flash, and sophisticated automatic focus and exposure. On a typical point-and-shoot, you have to hold the shutter button halfway down to activate and achieve focus, and the camera sets the exposure settings (f-stop and shutter speed) for you.

Some point-and-shoot cameras are quite sophisticated—and expensive—offering excellent quality lenses and some measure of focus or exposure control. Many advanced and professional photographers use such point-and-shoot models for subjects that call for a casual and spontaneous approach.



Instant camera

The **instant camera** is a special type of point-and-shoot camera. Most instant cameras take Polaroid brand films that self-develop in a matter of minutes. Over the years, there have been sophisticated SLR and rangefinder instant cameras—and there are film backs that take instant film for professional cameras—but the most familiar models use a simple viewfinder for composing the picture and either focus automatically or require no focusing at all.

Twin-lens-reflex (TLR). A **twin-lens-reflex (TLR) camera** has two lenses stacked one over the other. On top is the **viewing lens,** through which you compose and focus your subject; on the bottom is the **taking lens,** through which you expose the film to light.

The Holga

In recent years, a number of simple, plastic "toy" cameras have become surprisingly popular among fine-art and professional photographers, who embrace them for their flaws rather than their technical quality. There have been several models of such cameras, such as the Lomo and the Diana, but the most popular is the Holga.

The crudely-made Holga will cost you no more than a few rolls of film. It has a cheap plastic lens that doesn't distribute light evenly to the film and a body prone to light leaks. It does take relatively large-size 120 medium-format film (pages 28–29), which means that you can enlarge Holga negatives with less quality loss than with 35mm negatives. However, because the lens is so poorly made, image sharpness falls off drastically at the edges and corners, which are likely to be quite soft, distorted, and even vignetted (darkened around the edges)—all part of the characteristically quirky Holga look. Some photographers even like the random streaks of light caused by unwanted exposure from light leaks in the camera.

Another part of the Holga look is that it produces 2¼" x 2¼" square images (though it comes with an insert for rectangular results); while many good medium-format cameras produce square pictures, most cameras produce rectangular pictures. But for Holga users this is another positive feature; they are drawn to the camera in great part because it is not like every other camera.

To some degree photographing with a Holga is a hit-or-miss affair. Results are hard to control or predict, so it's best to just go with your instincts and take more pictures than you normally would, with the understanding that even your best efforts might be ruined because of inadequate light, poor lens quality, or excessive light leaks. Still there are a few things you can do to increase your chances of success. Here are a few tips:

- Holgas need fairly bright light to produce well-exposed negatives. You also should use fast film (ISO 400), because the lens has a small lens aperture (which you can adjust for sunny and cloudy days). Some Holga models have a primitive flash unit built in that provides decent illumination when you're photographing in low light, close to the subject.
- Because Holgas leak light, load your film in low light or even in the dark, if possible. After loading, immediately seal potential sources of light leaks, such as the camera's seams, joints, and the red-filtered window used for counting exposures, with black electrician's tape.
- Although 120 films use a tightly wound paper backing with the film to keep light out, Holgas often don't wind the paper (or the film) tightly enough. When you remove film from the camera, it's a good idea to immediately wrap it in aluminum foil or some other opaque material for protection.
- The Holga records a lot more of the subject than its viewfinder shows, so get closer to the subject than you normally would when composing your picture.

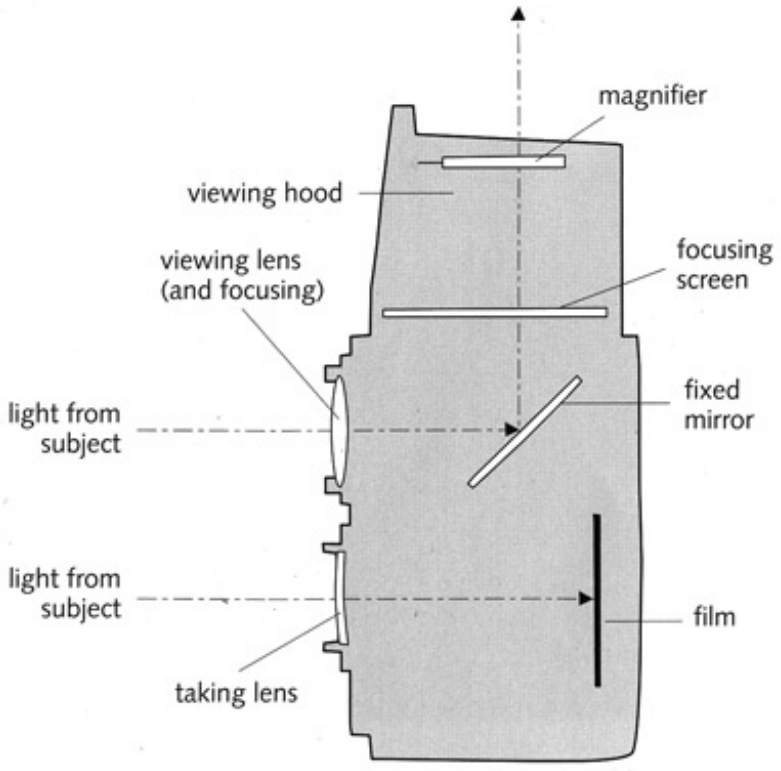
A twin-lens-reflex camera has two lenses, one stacked on top of the other; you view and focus your subject with the top lens and expose film through the bottom lens.

A fixed mirror, positioned behind the viewing lens at a 45-degree angle to the film, reflects light up to a focusing screen, so you can see the subject. The film is positioned behind the taking lens. The two lenses are mechanically linked, and as you focus the viewing lens (generally using a knob on the camera body), both lenses move simultaneously. Thus, when the image on the focusing screen is sharp, the image on the film also will be sharp.

Although not as popular as they once were, TLRs are still available, mostly used. Almost all TLRs take medium-format film and with a few exceptions have a nonremovable lens.

Unlike most camera types, TLRs don't offer eye-level viewing. Instead, you view your subject at waist or chest level, looking down at the focusing screen to view, compose, and focus your subject. Ambient light can make the focusing screen difficult to see, so a small pop-up viewing hood fits around the screen to shade it from extraneous light and help make the image on the screen more visible. There is usually a spring-mounted magnifier built into the hood for critical focusing.

Twin-Lens-Reflex Camera



A twin-lens-reflex camera has two lenses—one on top of the other. Looking down onto a focusing screen, you view and focus your subject through the top lens. But when you press the shutter button, the bottom lens takes the picture. Twin-lens-reflex cameras take medium-format 120 roll film.

TLRs can be awkward when composing and focusing your subject, because you see a laterally reversed image when you look down at the focusing screen. This takes some getting used to when making adjustments to your composition. A very few TLRs take an accessory prism viewfinder that fits on top of the ground glass. It corrects the lateral reversal and offers eye-level viewing.

Since you don't see through the taking lens as you do with an SLR, TLRs must be parallax-corrected to allow the viewing lens to show what the taking lens records. Some cameras have parallax compensation built in, but with others you must correct parallax error manually.

Memory cards

Digital. A digital camera works a lot like a film camera, except it uses an electronic sensor rather than film to capture light. Light from the subject passes through the lens and falls on the sensor; the pattern of light recorded by the sensor is stored as a digital file of the image either in the camera or on a removable memory card. The digital image files can then be downloaded to a computer or to a portable hard drive.

Most simple digital cameras function like sophisticated point-and-shoot models. You view and compose the image either by looking through a viewfinder window or, more commonly, seeing what the lens sees displayed on a small LCD screen on the camera back. Most digital cameras offer a variety of programmed exposure modes and a built-in flash, but otherwise the camera determines focus and exposure automatically. There are digital SLRs that allow through-the-lens viewing and focusing, and **digital backs** that attach to medium-format and large-format cameras. These are mostly for advanced and professional photographers.


Digital point-and-shoot camera

Digital cameras offer a lot of advantages. There are no film and processing expenses, because memory cards can be used over and over again. Moreover you can see the results immediately and delete any pictures you don't like. You can make prints either by downloading files to a computer and printing with a desktop printer, or taking a memory card to a camera store or consumer lab for high-quality hard copies from a special digital printer. You don't even have to make a print; the image files are easy to view on a computer monitor, burn to a CD or other media, e-mail to a friend, or post on a Web site.

Keep in mind that there are still considerations after you take the shot with a digital camera. The image files may need to be adjusted and manipulated in an image editing application, such as Adobe Photoshop, and this can be time-consuming. Also, for best results, you must fine-tune the color consistency between your camera, computer monitor, and printer, a process called **color management**; managing black-and-white results is a little easier, but still must be done.