PREFACE

This book explains, as simply as possible, how to shoot usable images on film or tape.

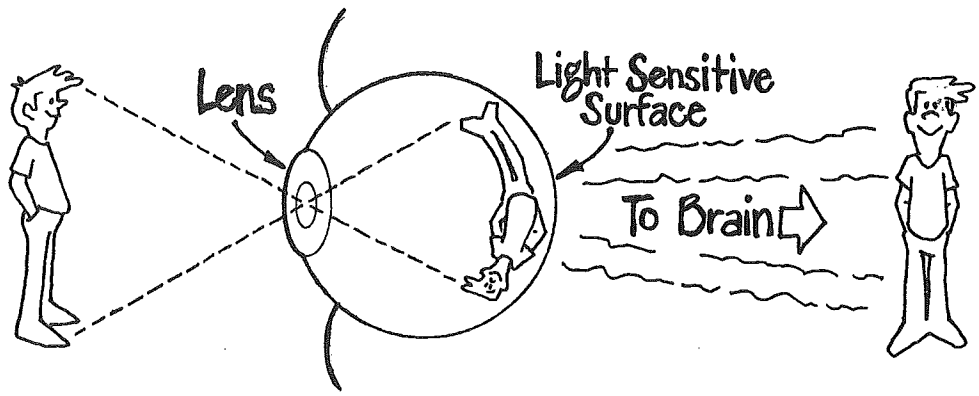
If you are, or plan to be, a cameraperson, I suggest you read your camera's operator's manual in addition to this book. When you understand both, you should be able to go out and shoot footage that works.

If you're not interested in becoming a cameraperson, but simply want to better understand how the camera is used, no additional reading is required. Just relax and enjoy the book.

1. Basics

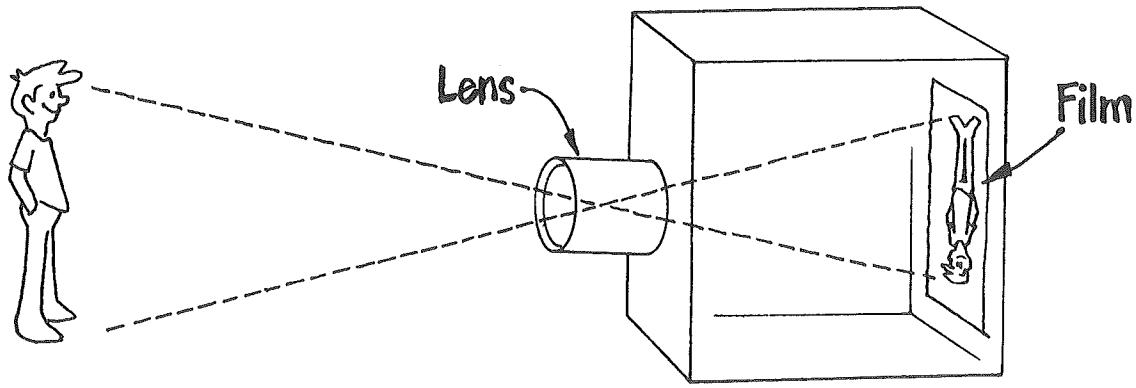
THE CAMERA - HOW IT WORKS

The camera is an imperfect imitation of the human eye. Like the eye, it sees by means of a lens which gathers light reflected off objects. The lens directs this light onto a surface which senses the pattern formed by the differences in brightness and color of the different parts of the scene. In the case of the eye, this surface at the back of the eye sends the pattern of light to the brain where it is translated into an image which we "see."



THE EYE GATHERS PATTERNS OF REFLECTED LIGHT WHICH THE BRAIN TRANSLATES INTO IMAGES WE SEE.

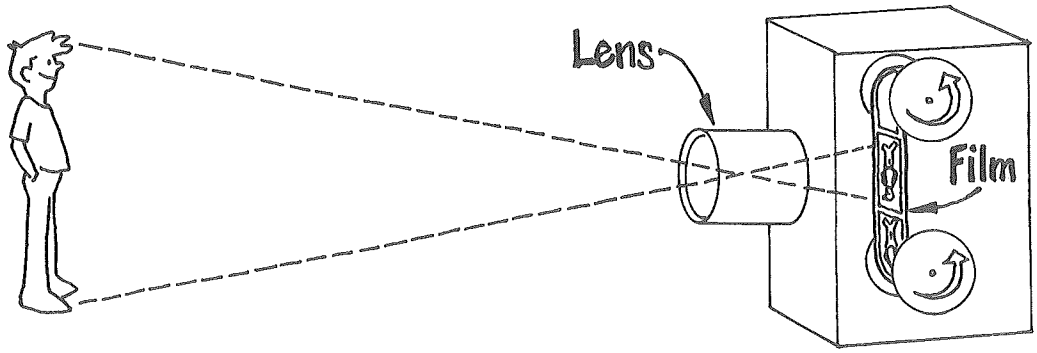
In the case of the camera, the lens directs the patterns of light onto a variety of sensitive surfaces. Still cameras record light patterns on film coated with light-sensitive chemicals. The chemicals react differently to different amounts and colors of light, forming a record, or image of the light pattern. After the film is processed in other chemicals, the image becomes visible.



STILL CAMERAS RECORD LIGHT PATTERNS ON FILM COATED WITH LIGHT-SENSITIVE CHEMICALS.

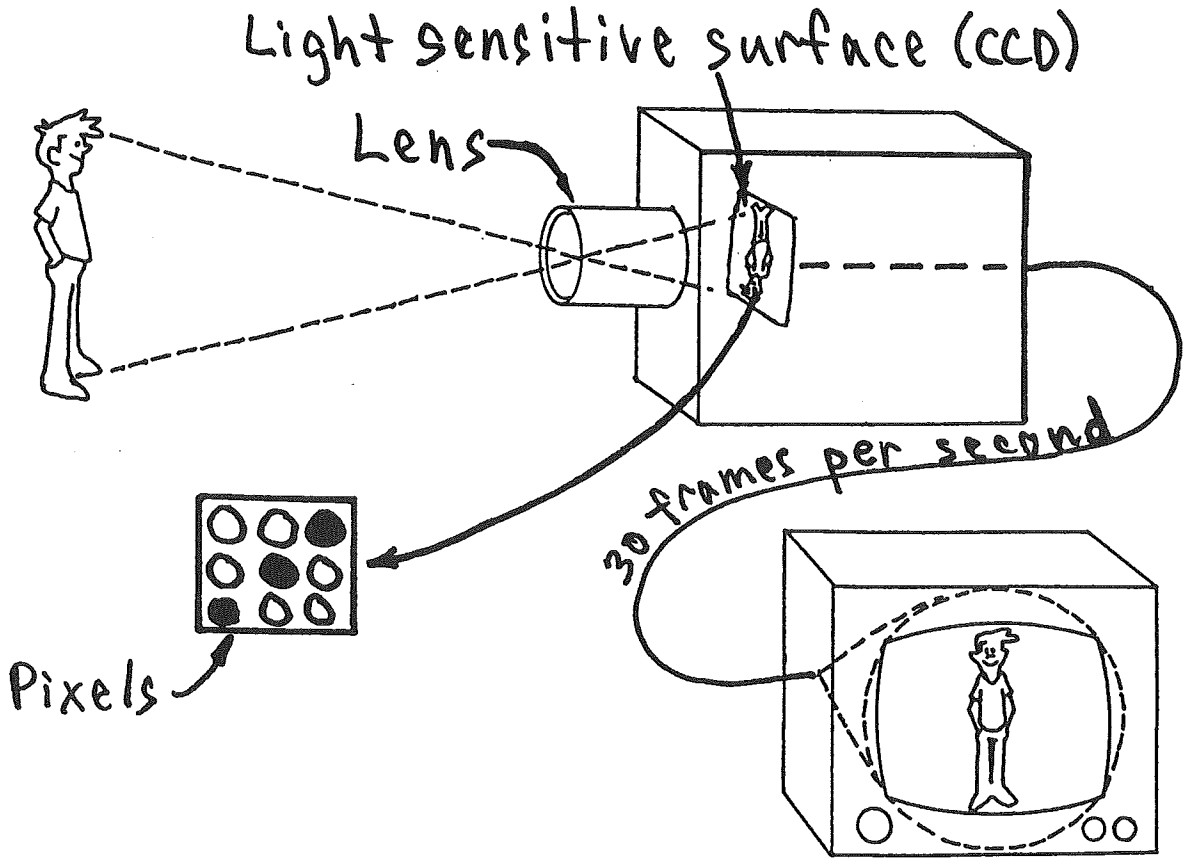
You'll notice that both the lens of the eye and the lens of the camera turn the light pattern upside down as it passes through. This is because they're both convex lenses, or lenses which curve outward. Because of their physical properties, convex lenses always invert images. In the brain, and in the camera viewfinder, the images are turned right side up again.

Movie cameras record images in the same way as still cameras, except they do it more often. Eight-millimeter movie cameras normally take 18 different pictures every second. Sixteen millimeter and thirty-five millimeter movie cameras normally take 24 pictures, or frames, per second. When these pictures are projected on a screen at the same fast rate, they give the illusion of continuous movement. The viewer's mind fills in the gaps between the individual frames, due to a physiological phenomenon known as persistence of vision.



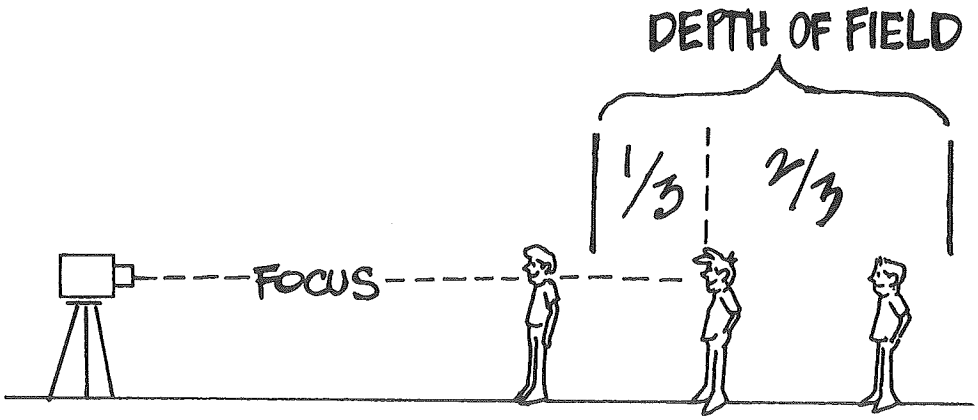
MOVIE CAMERAS TAKE MANY DIFFERENT PICTURES EVERY SECOND.

Like a movie camera, the lens of a television camera focuses light patterns onto a light-sensitive surface. In early TV cameras, this was an electronic tube. In most modern cameras, it consists of one or more CCDs-charge coupled devices-which are small flat chips. Each CCD chip is made up of thousands of tiny light-sensitive areas called picture elements, or pixels, which change according to the color and intensity of the light hitting them. The image formed by all the pixels taken together is electronically collected off the chip at a rate of thirty complete images per second, which can be recorded or broadcast.

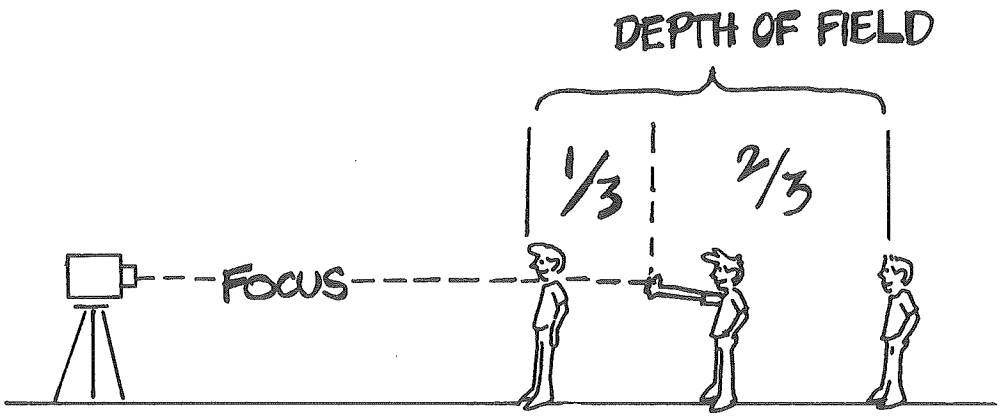


TV CAMERAS CONVERT LIGHT PATTERNS INTO ELECTRONIC IMAGES

At the TV set the process is reversed to recreate the original image. Persistence of vision causes the viewer to perceive the thirty separate pictures per second as continuous movement.



FOCUSING IN THE MIDDLE LEAVES THE FRONT MAN OUT OF FOCUS.

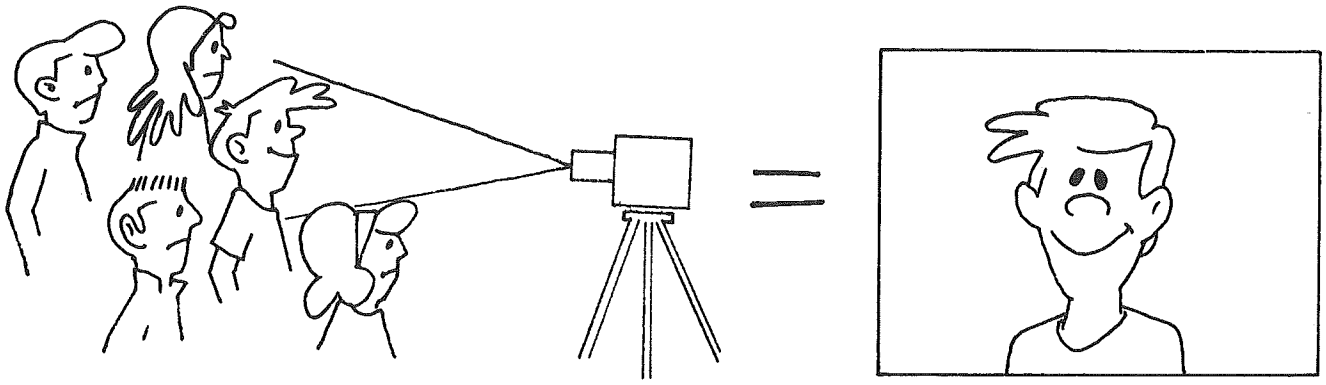


FOCUSING ON A POINT 1/3 OF THE WAY IN PUTS EVERYBODY IN FOCUS.

2. COMPOSITION

THE CAMERA - A TOOL FOR SELECTIVE VISION

The camera is a tool for looking at things in a special way. It's a window on the world which you control. Your viewer--the person who will look at the pictures you take--will see only what you decide to show him. This selectivity is the basis of all camerawork.



THE CAMERA IS SELECTIVE. YOU DECIDE WHAT THE VIEWER WILL SEE

Say you're shooting a program about a high school. The decisions you as a cameraperson make will shape the reality of the school as perceived by your viewer. Leave Student A out of your frame and for your viewer he will never exist. Include B, C, and D in a number of shots and they become important persons. Show E studying by himself and he becomes a loner. By choosing what to shoot and how to shoot it, you create your own selective version of the high school. How close your version comes to reality depends on your camera skills and how you use them.

USE A TRIPOD

To appreciate a good composition, the viewer must first see it without distractions. One of the most common distractions is camera jiggle caused by shaky handholding of the camera.

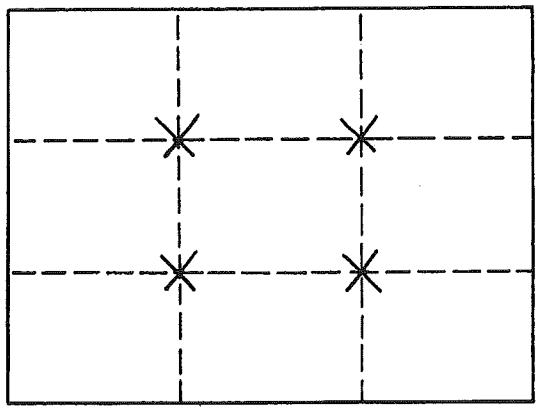
Shaky pictures are okay if you're shooting an earthquake; or if you're in the middle of a prison riot or some other precarious situation. Most of the time, though, shaky pictures are just plain annoying to the viewer. They make it harder for him to see what's happening and they remind him of the camera--they destroy the illusion that he's seeing the real thing.

In editing scenes together, the only thing more distracting than a shaky shot of a building inserted between two nice steady shots, is two different shaky shots one after the other, with one shaking up and down and the other shaking side to side. Where they come together, it looks like the cut was made with a chain saw.

So use a tripod whenever possible. A good tripod, preferably with a fluid head, will give you a steady frame, make your camera moves smoother, and keep your arms and the rest of your body from getting tired so quickly.

It's not that much trouble to use a tripod. With practice, most people can set up and level a tripod in less than 30 seconds. But, if you don't have a tripod, or you're someplace where a tripod would get in the way, or you're just moving too fast to bother with it, you can still try for tripod-like support. Use a monopod or shoulder brace. Lean against a wall, a chair, or your assistant. Try for at least three points of support for the camera. With a well-balanced news camera, these would be your shoulder, your hand on the grip, and the side of your head. If you can brace the elbow of your camera-supporting arm against your side, so much the better.

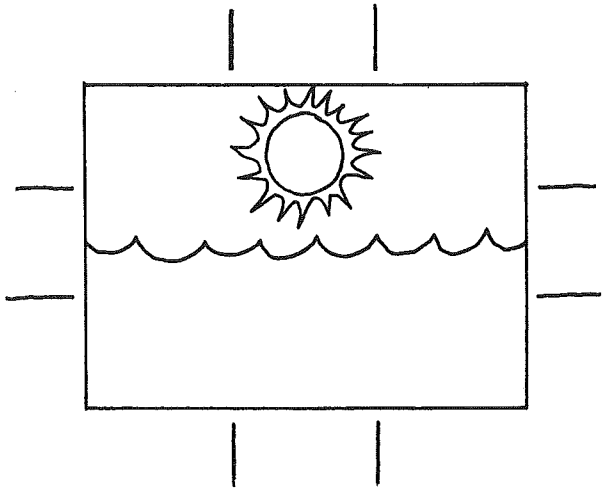
RULE OF THIRDS



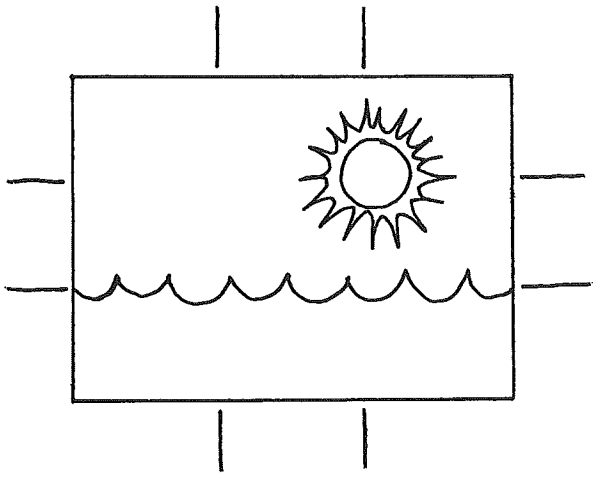
The rule of thirds is an old, old theory about composition that still works pretty well. It won't compose the picture for you, but it'll at least give you someplace to start.

The idea is to mentally divide the frame into thirds horizontally and vertically. Then you place your elements along the lines, preferably with the center of interest at one of the four points where the lines cross.

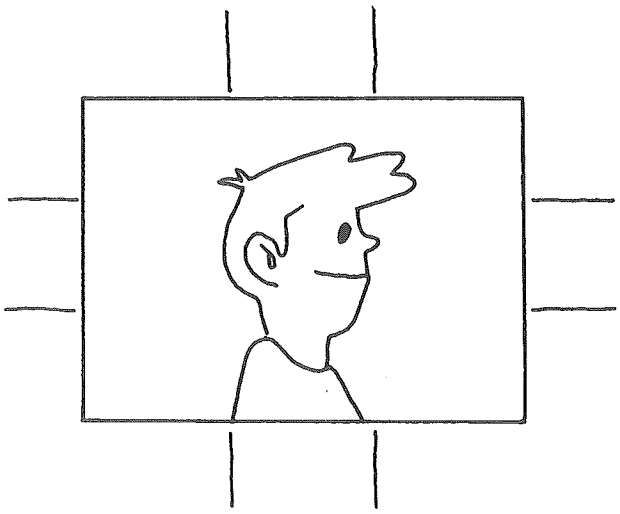
Here are some examples of compositions improved by using the rule of thirds:



WITHOUT RULE OF THIRDS



WITH RULE OF THIRDS



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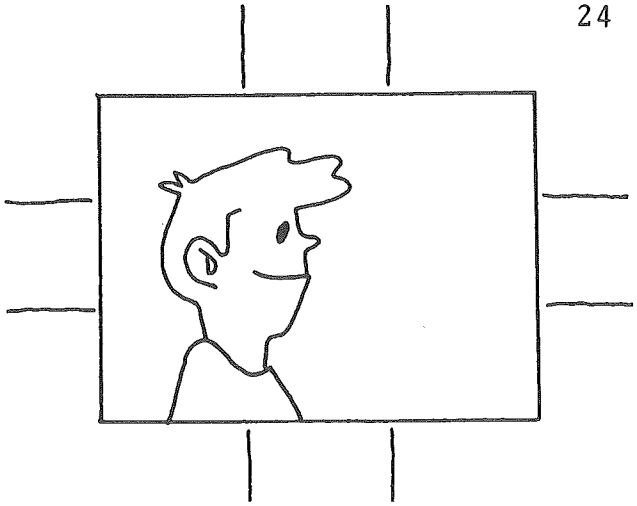

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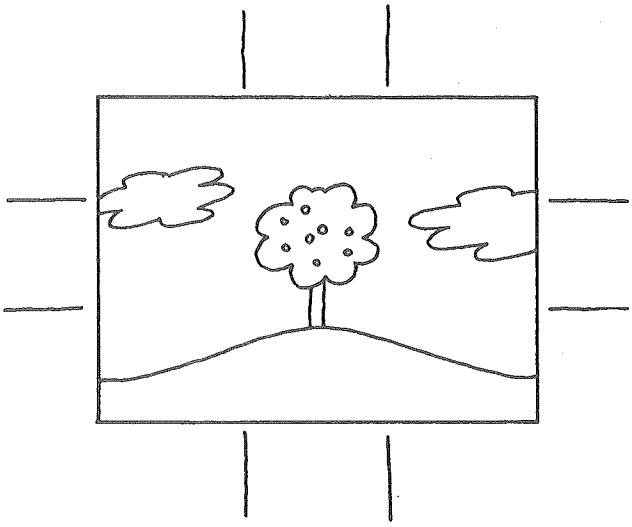

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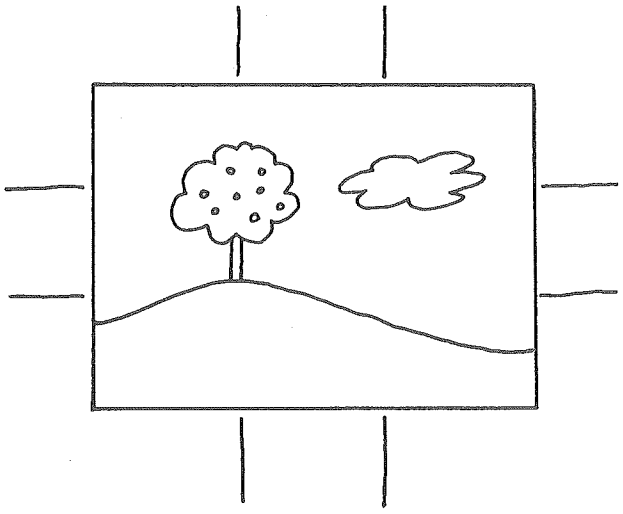

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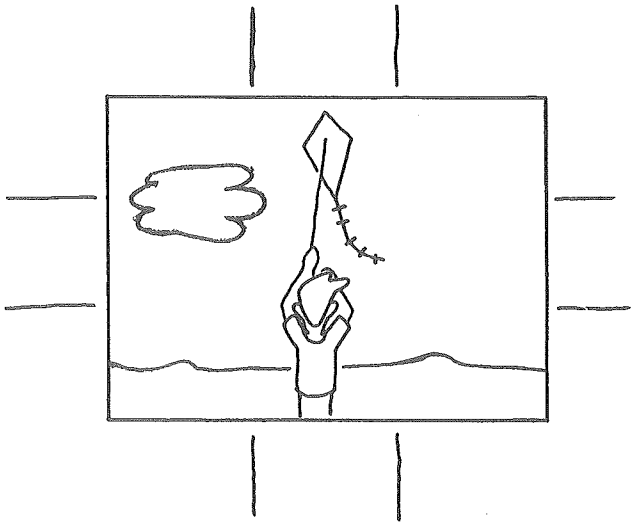

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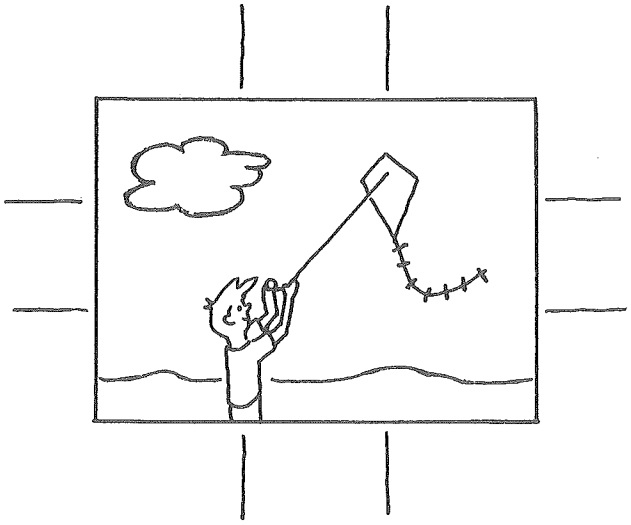

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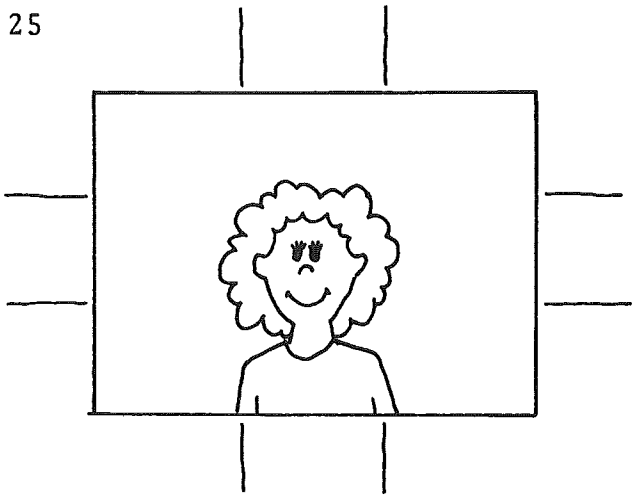

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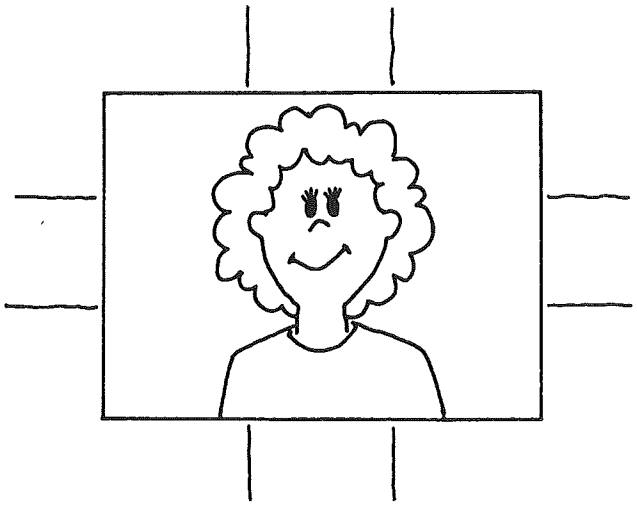


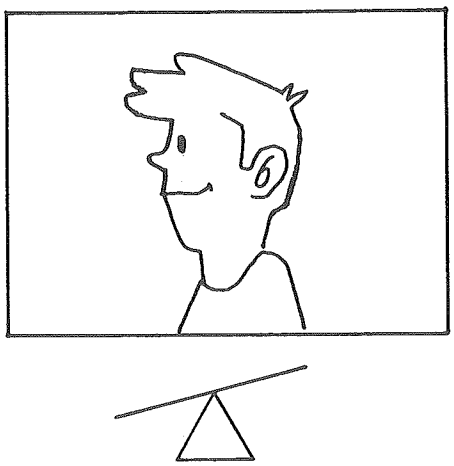
WITH RULE OF THIRDS
(Eyes on top 1/3 line)

In paintings, still photos and feature films, you'll see many interesting and good compositions that don't comply with the rule of thirds. But remember, such compositions, being more complicated, require more time from the viewer to comprehend. His eye will roam around more before he sees what you want him to see. If you can afford to leave an unusual composition on the screen 15 or 20 seconds or more, it can work--often quite nicely. But be sure you know what you're doing and why. For most documentary film and TV work, the rule of thirds is a good safe bet.

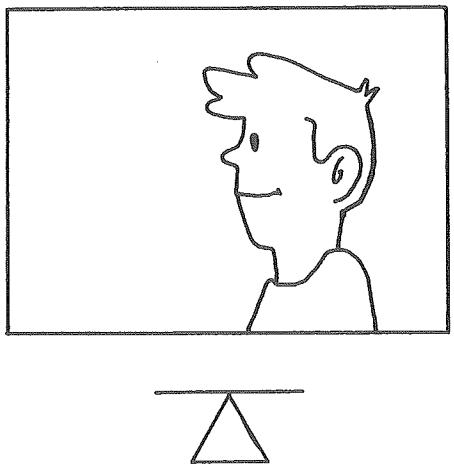
BALANCE - LEADING LOOKS

One of the most common errors among camerapersons everywhere is the failure to leave enough space in front of people's faces when they're looking to one side or the other.

A shot like this,

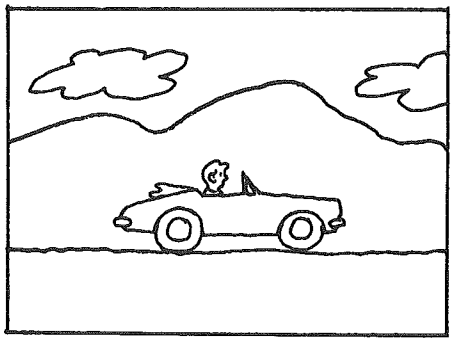


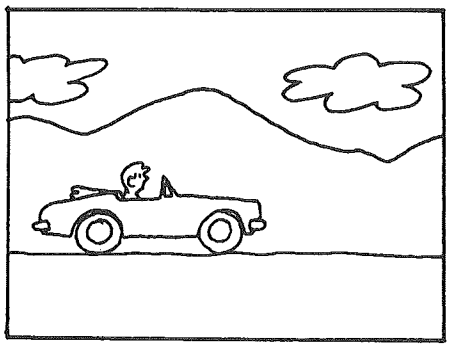
is annoying to look at. Psychologically, the viewer perceives the man as boxed in, with no place to go. By moving the frame just a little, like this,

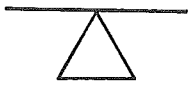


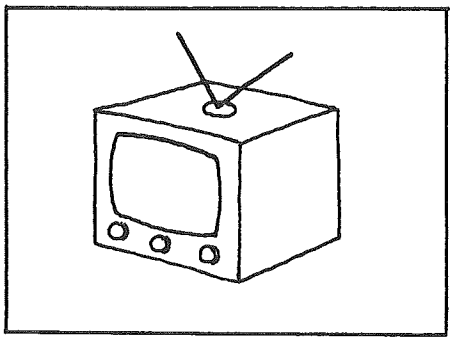
you get a more comfortable composition. You've allowed for the *compositional weight of the look.*

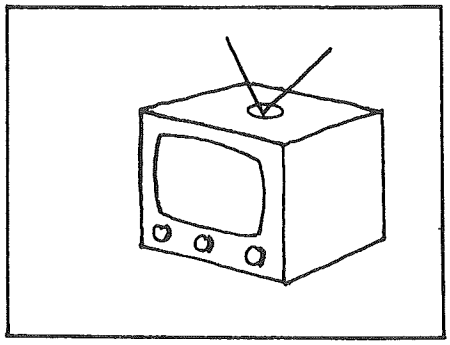
People aren't the only things that have looks. Almost everything has a look. Some examples follow on the next page.

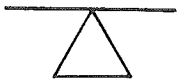


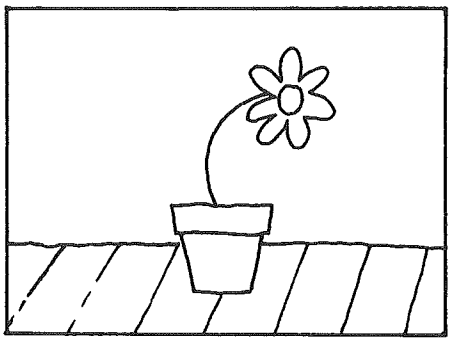


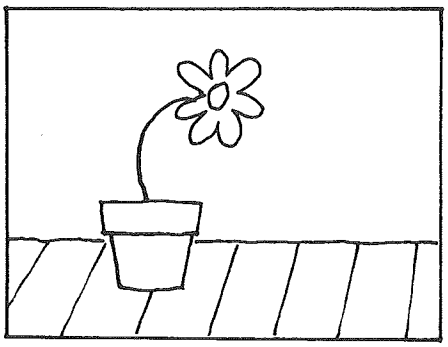












LEADING LOOKS - CONTINUED

UNBALANCED

BALANCED

UNBALANCED

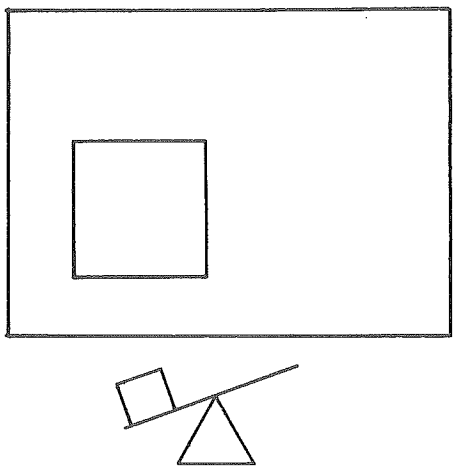
BALANCED

UNBALANCED

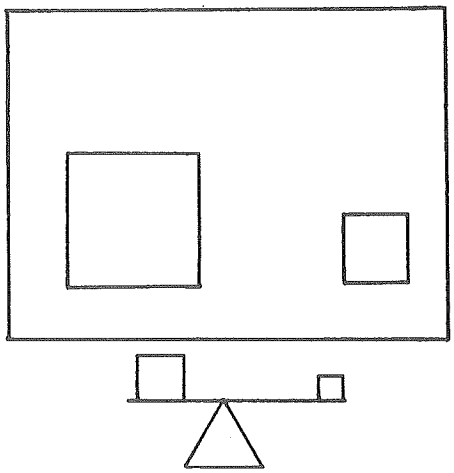
BALANCED

BALANCE - MASSES

Sometimes you see a scene with a large object on one side and nothing significant on the other side. Even though it doesn't look all that bad, you still feel a little uneasy about it. That's because it's off balance in terms of mass. This is most pleasantly corrected by placing a smaller object at some distance away within the frame. Visual leverage then balances the two nicely, like this:

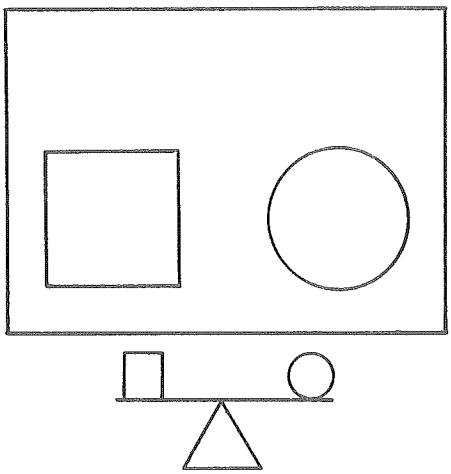


UNBALANCED



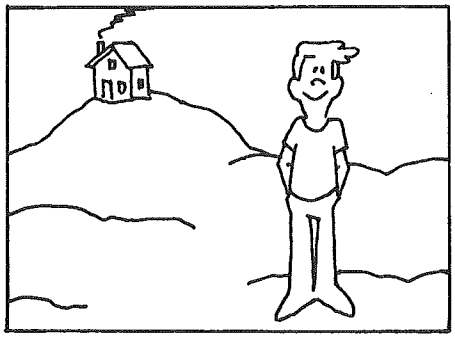
BALANCED

Of course you can balance out with another object the same size in the frame, but it usually ends up kind of static and unexciting:

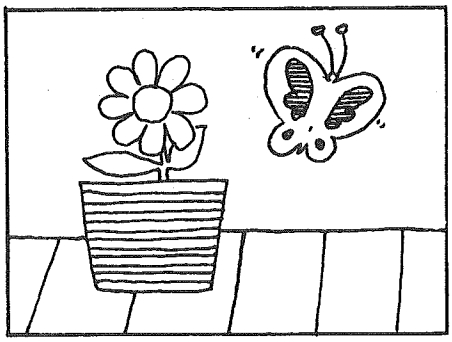


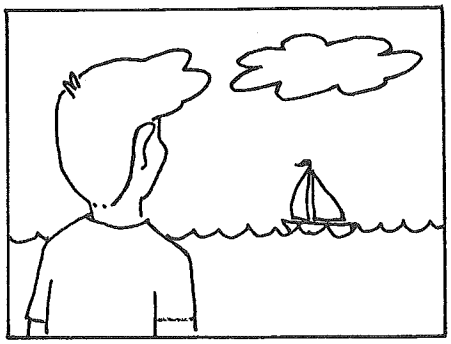
BALANCED

Remember, when we're balancing masses we're not concerned with the true size of things. All that matters is how big they look through the camera. Objects closer to the camera will always appear larger; those farther away will appear smaller. Depending on the camera angle, a house in the distance can balance out a man in the foreground:



Some other examples:

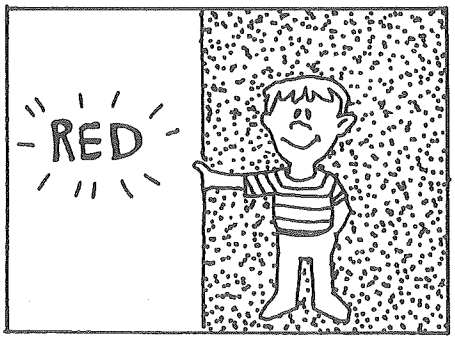




BALANCE - COLORS

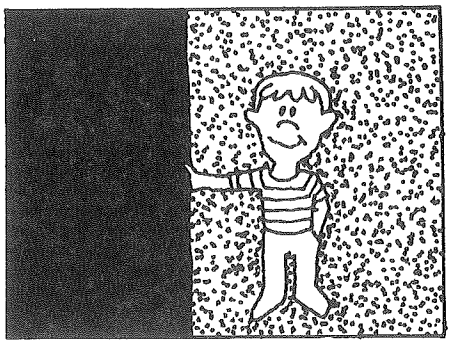
The most important thing to know about colors is that bright ones attract the viewer's eye. How often have you seen a TV interview on location somewhere and found yourself watching, not the interview, but some guy in a red shirt in the background? Your eye just naturally goes to white or brightly colored areas in the frame. Once you know this fact, you can use it to help your pictures.

First off, try to arrange your frame so that the brightest area is also the area you want the viewer to look at first. Consider the following example, where we want the viewer to look at the man:



NO GOOD

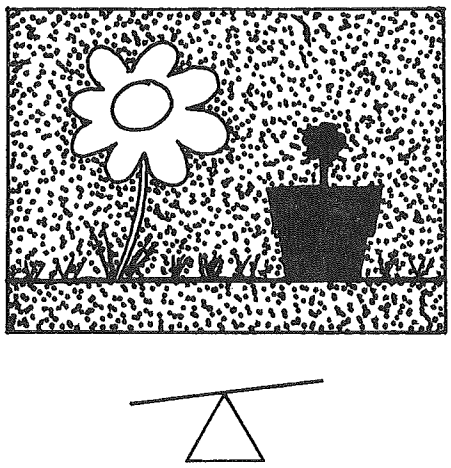
EYE GOES TO THE WALL INSTEAD OF THE MAN



BETTER

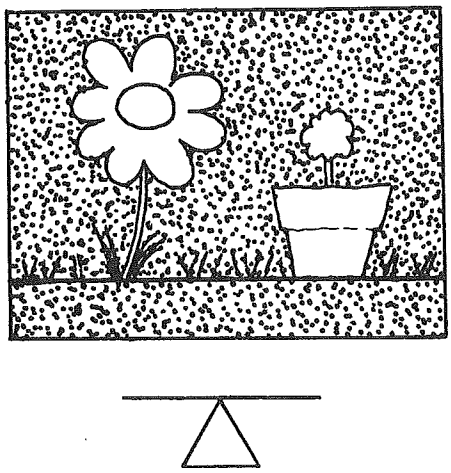
EYE GOES TO THE MAN

When you do include a bright object or area in your frame, remember that its brightness gives it extra weight in the composition--weight you have to balance out, either with another bright area, or with a larger mass.



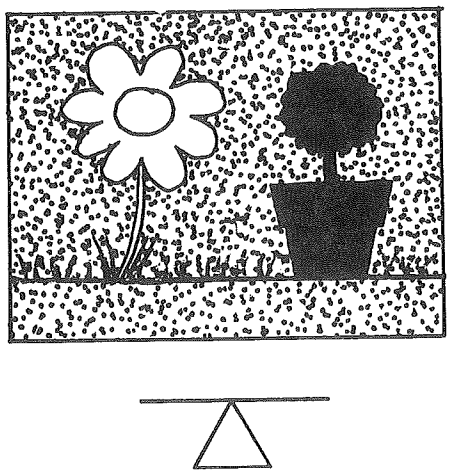
OFF-BALANCE

Although the masses of the flower and the pot balance out, the brightness of the flower pulls the composition to the left.



BALANCED

The brightness of the pot now balances out the brightness of the flower.

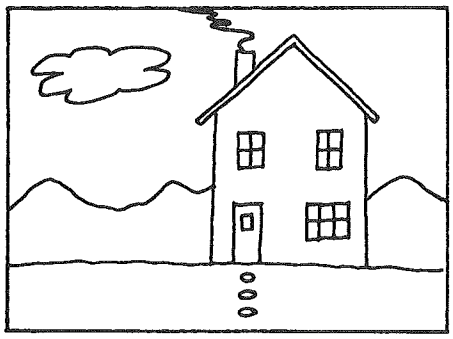


BALANCED

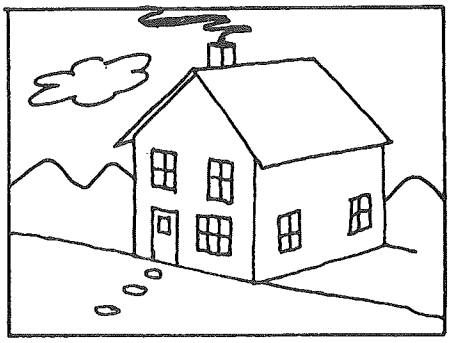
Here the brightness of the flower is balanced out by placing a larger mass on the other side of the frame.

ANGLES

Reality has three physical dimensions: height, width, and depth. In pictures we have only two dimensions: height and width. To give the illusion of depth, we show things at an angle, so we can at least see two sides.



FLAT

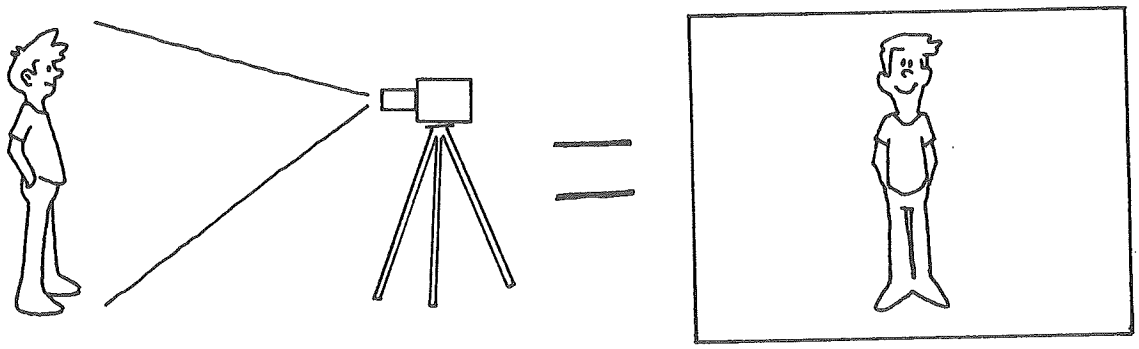


ANGLED

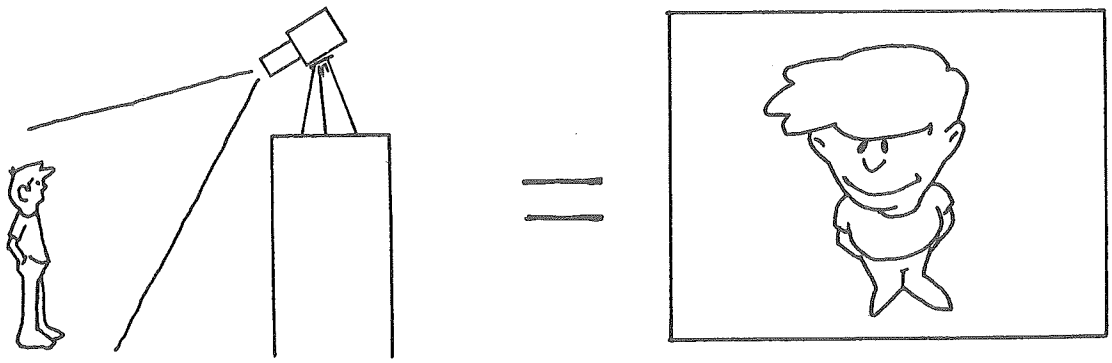
FLAT

ANGLED

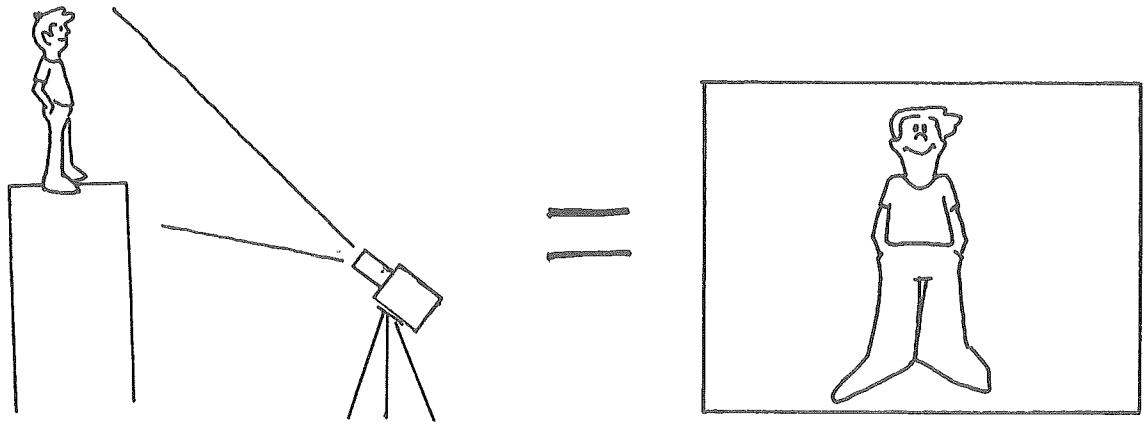
The angle created by the difference in height between the camera and the subject makes a definite impression on the viewer:



When the camera and the subject are at the same height, it gives the feeling that the viewer and the subject are of equal value.



When the camera is higher than the subject, it gives the feeling that the subject is inferior, smaller, less important.

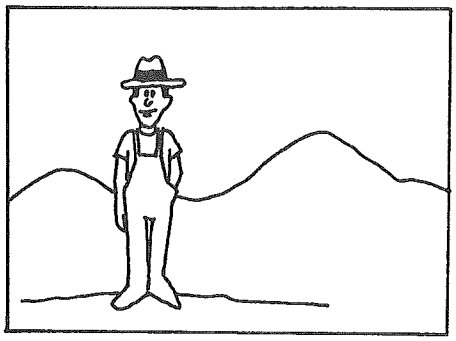


When the camera is lower than the subject, it gives the feeling that the subject is superior, larger, more important.

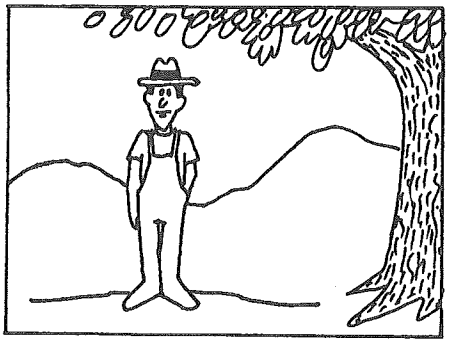
By raising or lowering your camera, you can subtly influence how your viewer will perceive your subject. This is used to great effect in horror films and political TV commercials.

FRAMES WITHIN THE FRAME

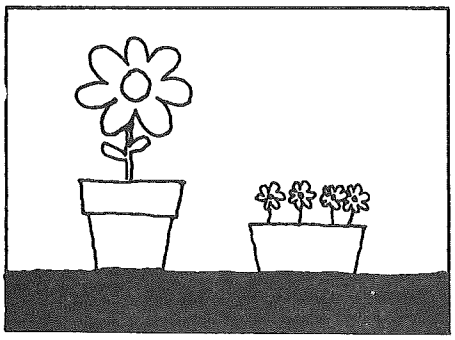
Often you can make a picture more interesting by using elements of your location to create full or partial frames within the camera frame.



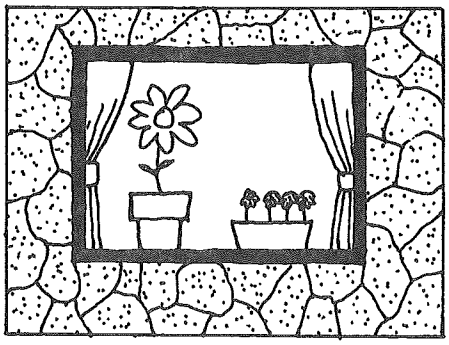
OKAY



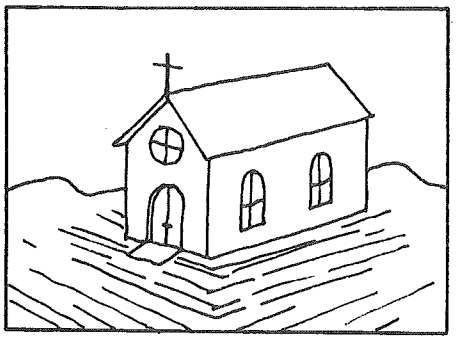
BETTER



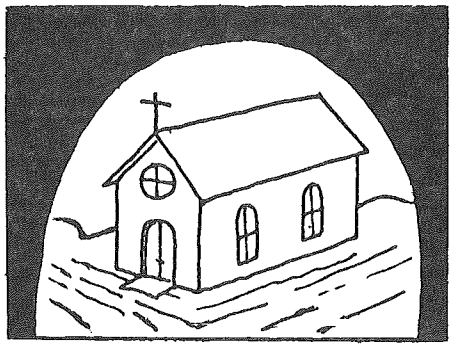
OKAY



BETTER

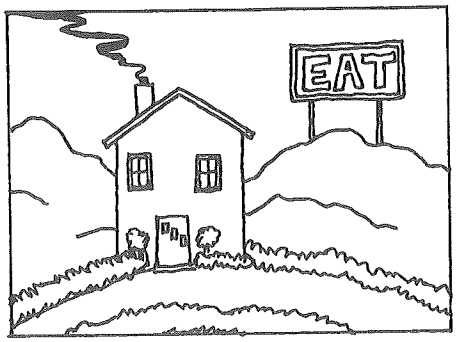


OKAY

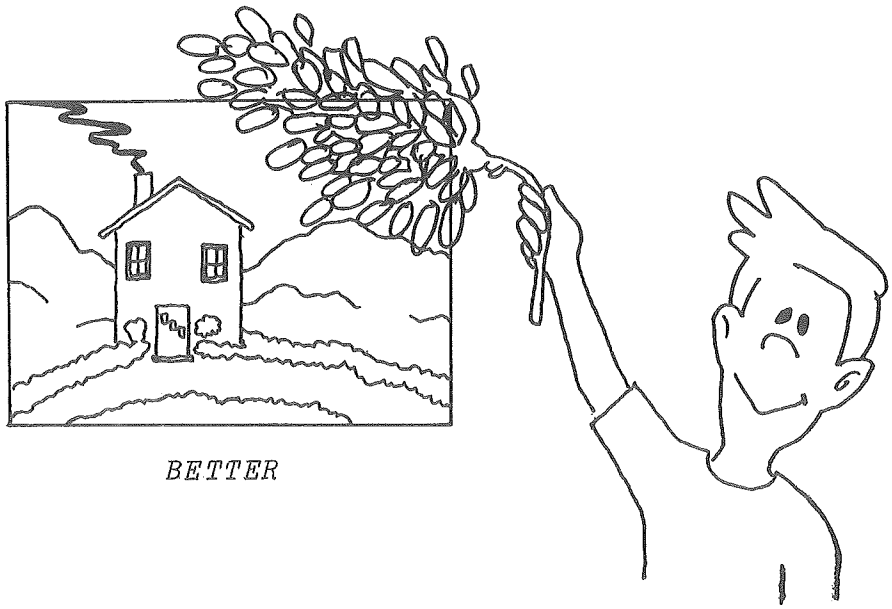


BETTER

This type of framing can also be used to hide or obstruct unwanted elements. For example, a cut tree branch held near the camera can cover up an ugly sky or a billboard in the background.



NO GOOD

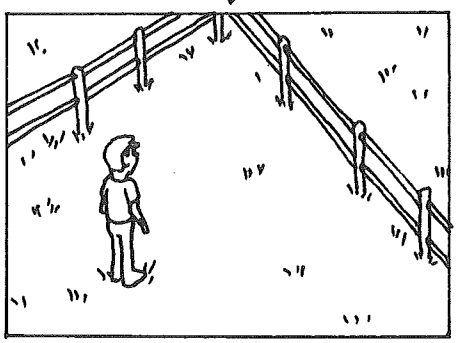


BETTER

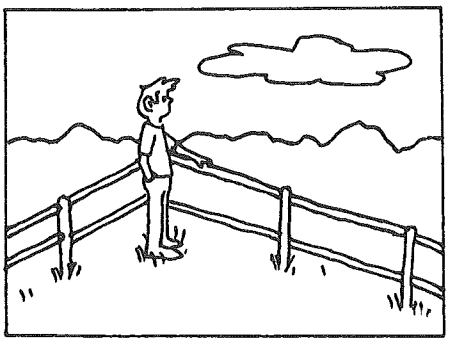
LEADING LINES

A nice way to direct the viewer's eye to your subject is through the use of leading lines. Here are some examples:

Viewer's eye is drawn here



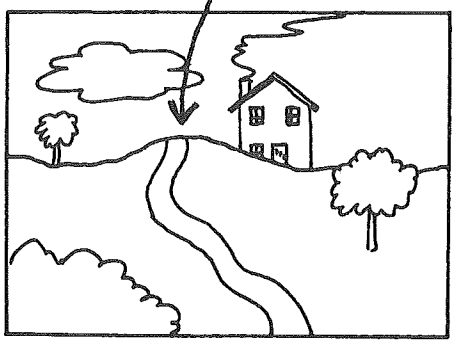
NOT VERY GOOD



BETTER

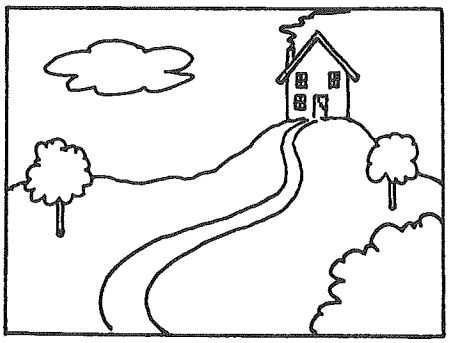
Lines of fence now lead to man.

Viewer's eye is drawn here



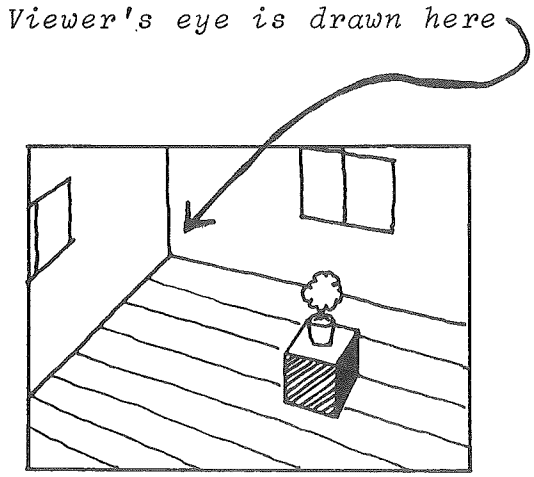
NOT VERY GOOD

From this angle, the path leads away from the house.



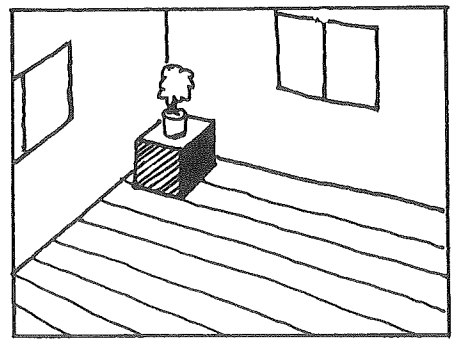
BETTER

From this angle, the path leads toward the house.



NOT VERY GOOD

The lines lead away from the flower on the table.

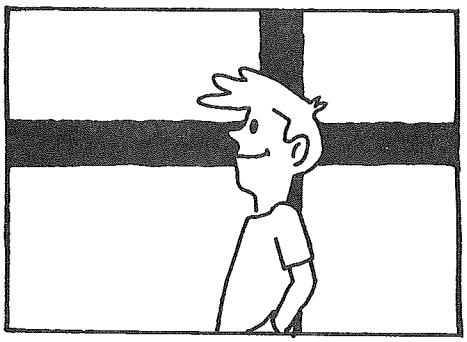


BETTER

All lines now lead to the flower on the table

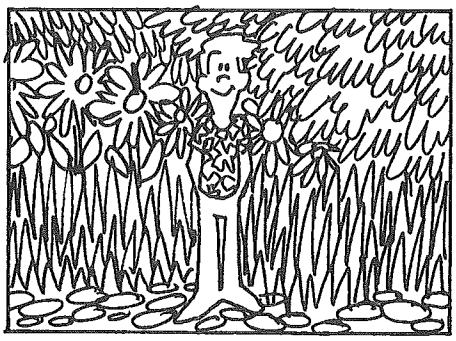
BACKGROUNDS

The best background is the one that stays where it belongs--in the background. Unfortunately, some types of backgrounds push forward and call attention away from your foreground subjects. Let's look at some of the more common distracting backgrounds and ways to avoid them:



PROBLEM: Door frames, window frames, trees, poles, etc., that grow out of people's heads.

SOLUTION: Move the camera, the subject, or both.

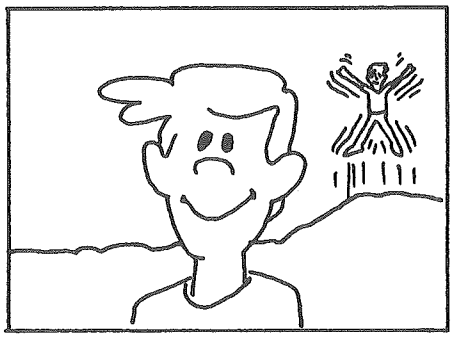


PROBLEM: Backgrounds that are too visually busy, so full of details and colors similar to those of the subject that the subject becomes buried in the background.

SOLUTION #1: Move the camera, the subject, or both.

SOLUTION #2: Move the camera far enough back from the subject

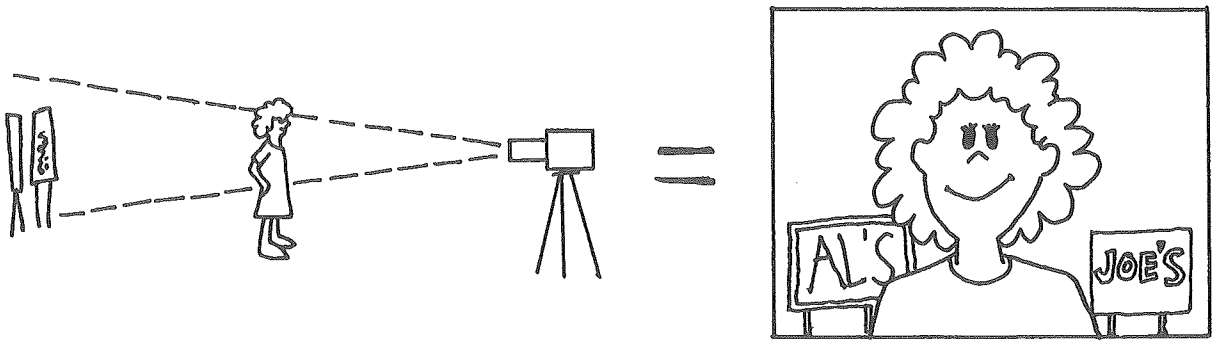
so you can use a telephoto focal length. This will give you a more shallow depth of field, throwing the background out of focus while leaving the subject sharp.



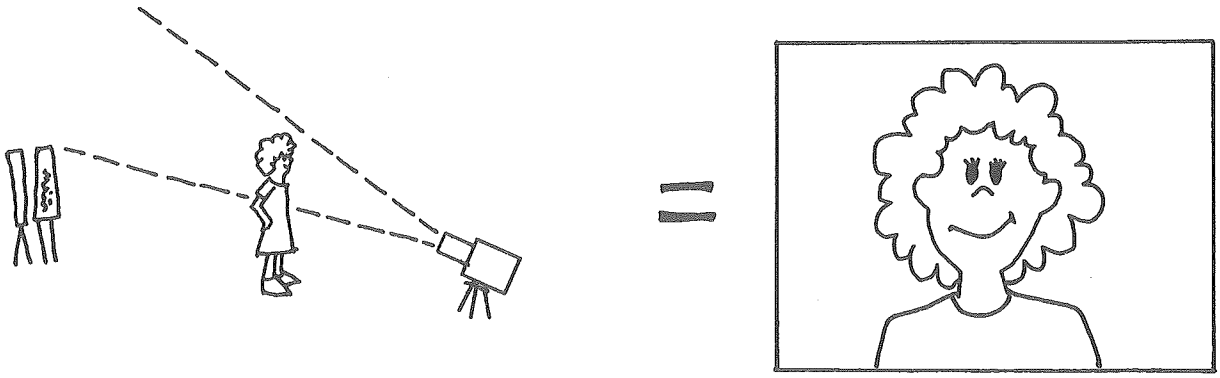
PROBLEM: Unusual or persistent movements in the background.

SOLUTION: Move the camera, the subject, or both.

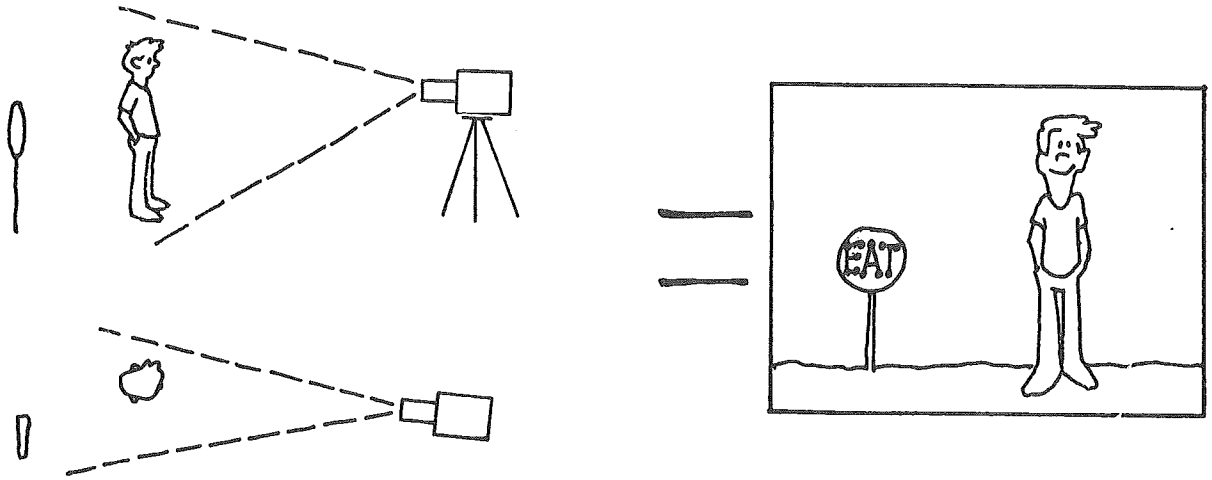
One quick way to remove a distracting background element from your frame is to move closer to your subject, drop the camera to a lower level, and shoot up:



A LOWER CAMERA ANGLE REMOVES DISTRACTING ELEMENTS

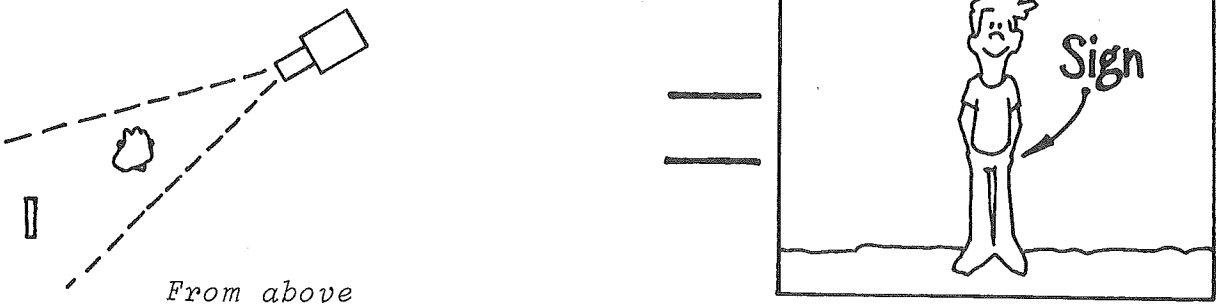


Another way to eliminate a distracting element in the background is to place either the subject or another object in the foreground to block the camera's view of the distracting element.



From above

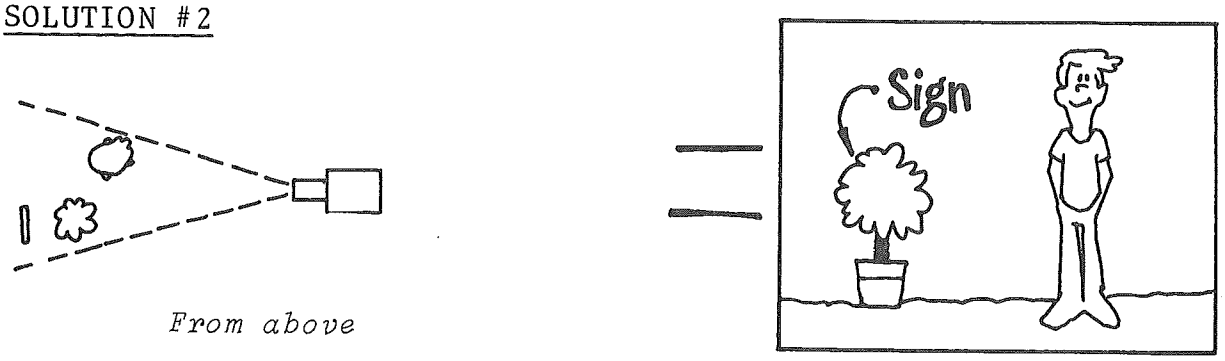
SOLUTION #1



From above

The camera is moved around so that the man's body hides the sign in the background.

SOLUTION #2



From above

A plant placed between the camera and the sign hides the sign.

IN SEARCH OF A GOOD COMPOSITION

A common mistake made by camerapersons everywhere is to arrive at a location, set up the camera in the first clear space that looks pretty good, and go from there. If you do this, you're short-changing yourself.

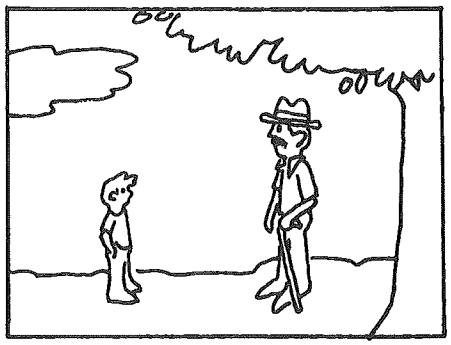
Sure, go ahead and set the camera down. But then take a quick walk around. As you walk, go up on your toes, squat down, lean from side to side. Find your best angle for framing, background, color, and balance. The whole operation could take less than a minute, and it's well worth your time. If you have trouble visualizing shots, carry the camera around with you and look through it to find your angle.

Remember, you don't have to accept the location exactly as you see it. If you've got a couple minutes, you can rearrange furniture, remove distracting elements, add interesting ones--do all kinds of things to improve your composition.

Look, then look again, as critically as you can. The human eye has a tendency to cancel out unimportant details, but the camera sees and records everything equally. Think back to that "perfect" shot of a wilderness sunset you took on vacation, only to discover when you picked up the prints that you had telephone wires running across the frame. When you learn to see the wires <u>before</u> you take the picture, <u>then</u> you can call yourself a cameraperson.

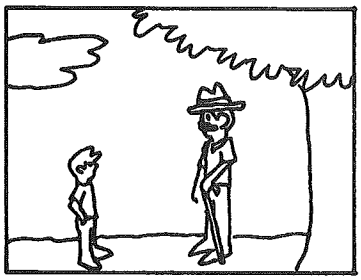
3. BASIC SEQUENCE

HOW A BASIC SEQUENCE WORKS



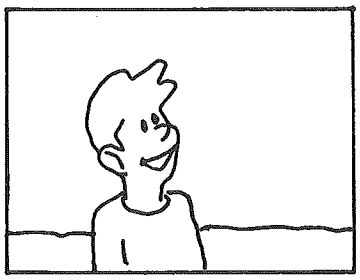
Look at this shot. Imagine that the man is talking to the boy. Let's say he talks for thirty seconds. Try looking at the picture while you count one-thousand-one, one-thousand-two, and so on, up to thirty seconds.

If you're normal, you won't get much past one-thousand-ten before your eyes start wandering. Now look at this sequence of shots. Count to one-thousand-five at each one before moving to the next.



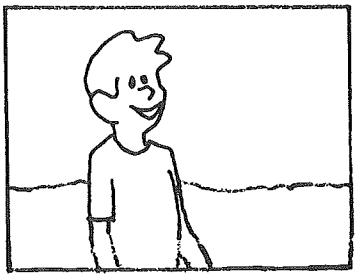
1

2

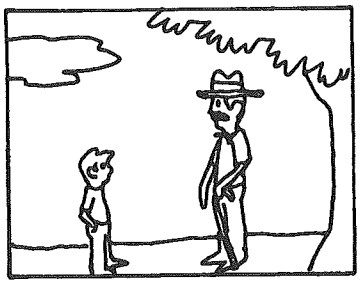


3

4

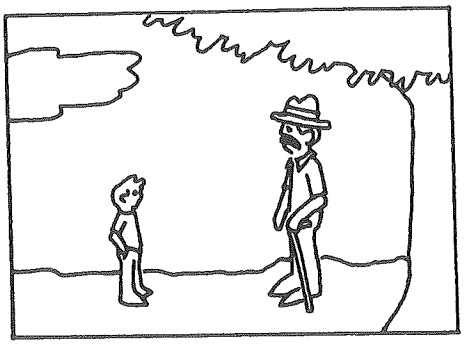


5



6

That was a lot easier, wasn't it? So what have we proved? We've proved that it's easier to look at six different images in 30 seconds than to look at one single image for the same time. That's the idea behind the basic sequence--to break up one long scene into several shorter scenes. This makes the story more interesting for the viewer. It also gives us the opportunity, in editing, to vary the length and emphasis of the story as we desire. Let's review the basic sequence we've just seen, shot by shot, and see how it works.



WIDE SHOT

A WIDE SHOT or ESTABLISHING SHOT is simply that--a shot that's wide enough to establish your subject in the mind of the viewer. In this particular case, we see the man, the boy, and enough of their surroundings to establish that they're in the great outdoors.

Remember, a WIDE SHOT doesn't have to show everything--just everything that's important. A WIDE SHOT of a mountain would be a landscape. A WIDE SHOT of a man typing might show only the man and his computer, eliminating from the shot the rest of his desk and the surrounding office. A WIDE SHOT of an ant would be a fraction of an inch across.

MEDIUM SHOT

CLOSE-UP

The MEDIUM SHOT and the CLOSE-UP are, like the WIDE SHOT, endlessly variable, depending on your subject and your own point of view.

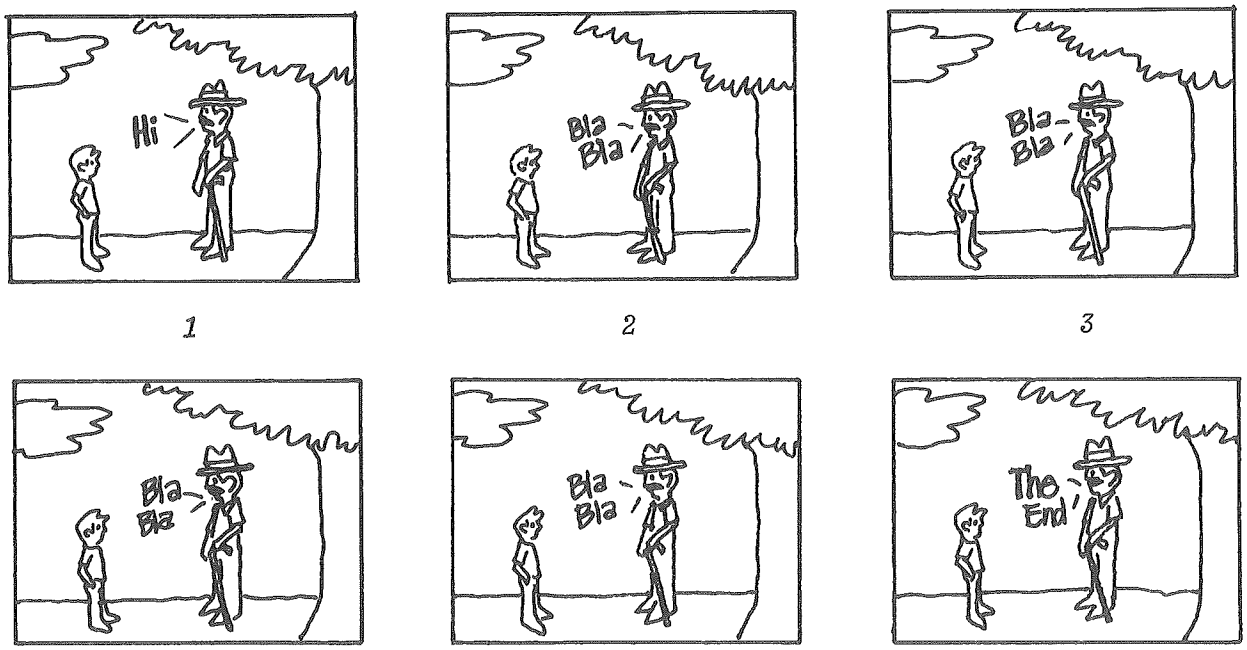
Essentially, the CLOSE-UP is the tightest, the closest you choose to be to your subject. In a person, it's usually a full head shot, as shown here. The MEDIUM SHOT falls somewhere in between the WIDE SHOT and the CLOSE-UP.

CUTAWAY

The CUTAWAY is the one shot that lets you easily change the length and/or order of your sequence. It's the shot most often forgotten by camerapersons and most often needed by editors.

In our sequence of the man and the boy, let's say that instead of talking for 30 seconds, the man talked for two minutes, the middle

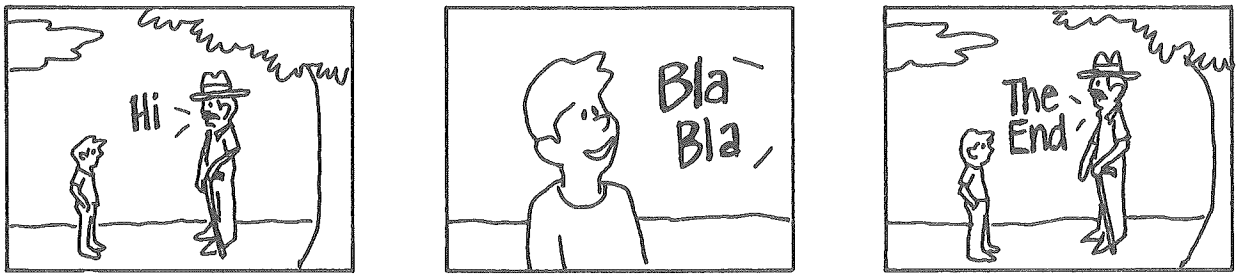
minute-and-a-half of which was boring. So, in editing, you let the man talk for the first 15 seconds, cut away to the boy listening, throw out the boring middle of the talk, then cut back to the man for the final 15 seconds. So instead of this:



1 2 3

4 5 6

we have this:



1 *CUTAWAY* 6

The splice in the sound track between Scenes 1 and 6 is covered by the cutaway of the boy listening.

The most common cutaway is the shot of the reporter listening in TV interviews. However, anything can serve as a cutaway, as long

as it's related to the main action. For example, a sequence of a man making toys can be shortened or rearranged by cutting away to shots of already completed toys on the shelves. Or the toymaker's face can serve as a cutaway from close-up actions of his hands carving.

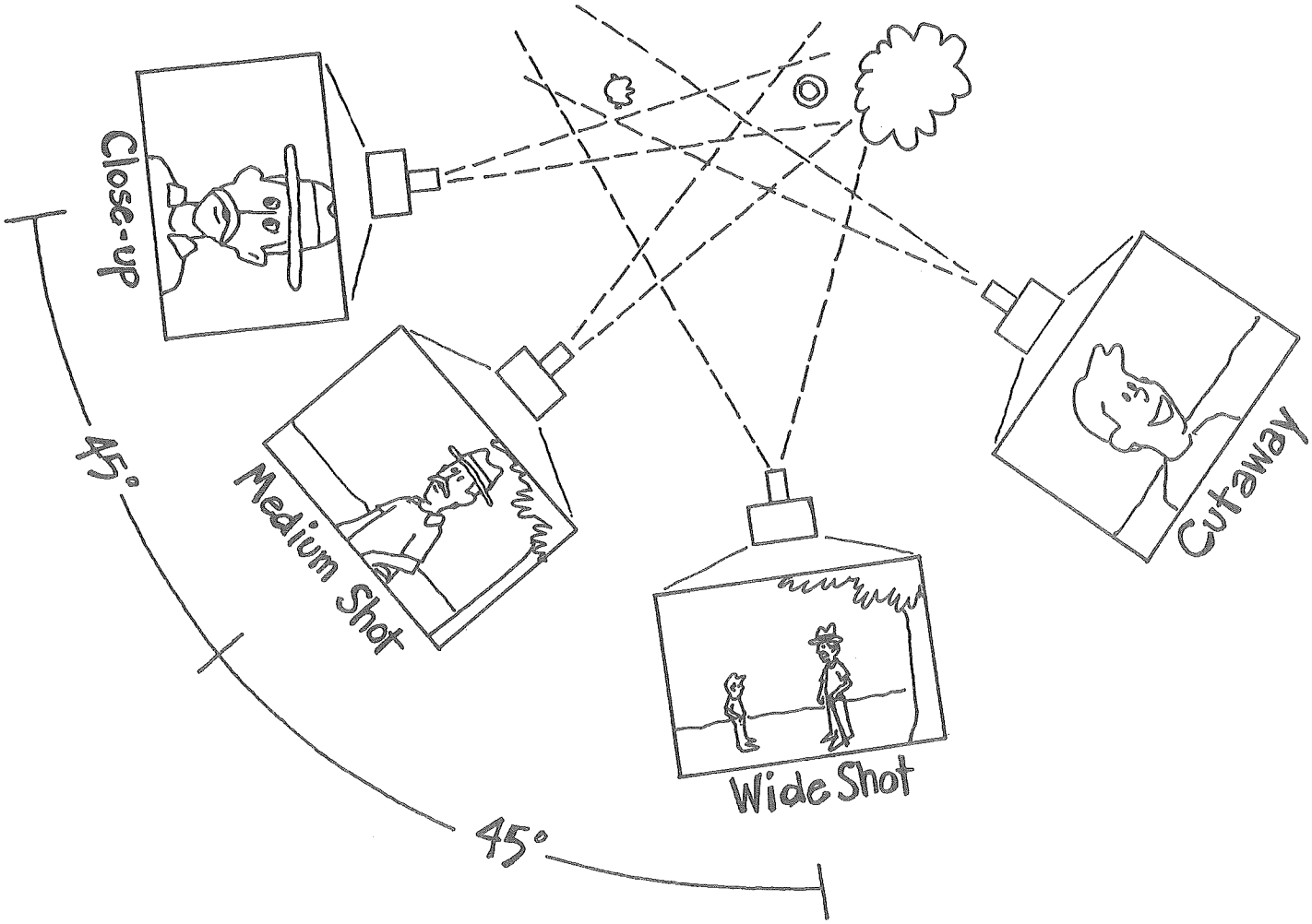
If you look hard enough, you can find a cutaway for just about any sequence you shoot. In an interview with an athlete, his photos and trophies are cutaways. If a man is just sitting talking to the camera, a close-up of his hands in his lap is a cutaway. An extreme wide shot, or a shot from behind, can also be cutaways.

Cutaways can serve to enhance the story. If a man is talking about how he won an auto race, you can cut away to footage of the race, while continuing his voice on the sound track. If an interviewee talks about a person who has helped him in his career, you can cut away to a shot of that person.

SHOOTING A BASIC SEQUENCE

The most important thing to remember in shooting a basic sequence is that EACH NEW SHOT SHOULD, IF AT ALL POSSIBLE, INVOLVE A CHANGE IN BOTH IMAGE SIZE AND CAMERA ANGLE. This not only makes the sequence more interesting but, as we'll see, it makes it much easier to cut back and forth between shots. On the following page is a diagram, from above, showing where I placed the camera for the sequence of the man talking to the boy.

CAMERA SET-UP - BASIC SEQUENCE



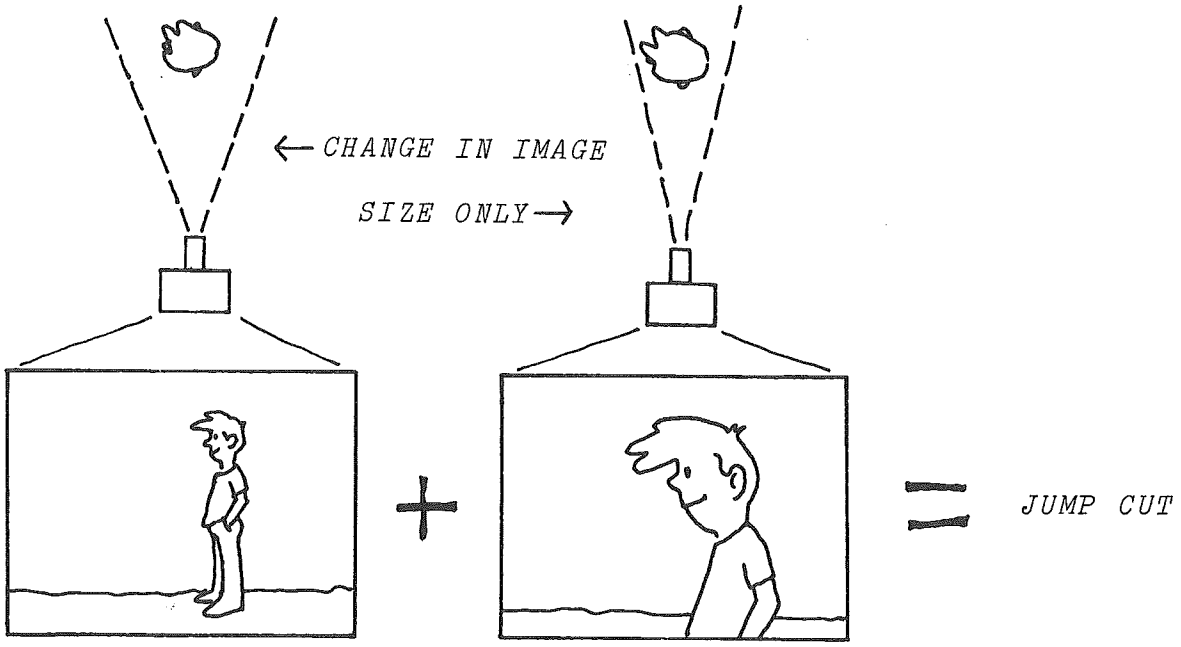
Notice that between WIDE SHOT, MEDIUM SHOT, and CLOSE-UP, I changed my camera angle by at least 45 degrees. You should always try to move your camera at least that much.

It's pretty obvious that a change in image size and angle between shots makes for a more interesting sequence. What's not quite so obvious is that it makes the transition from shot to shot smoother and easier to accomplish. With rare exceptions, most non-studio work is shot with a single camera. This means your subject has to repeat himself for the medium shots and close-ups. He's not always going to be able to remember and duplicate his actions exactly

for every take. So you might end up having to cut from a wide shot where he's looking straight ahead

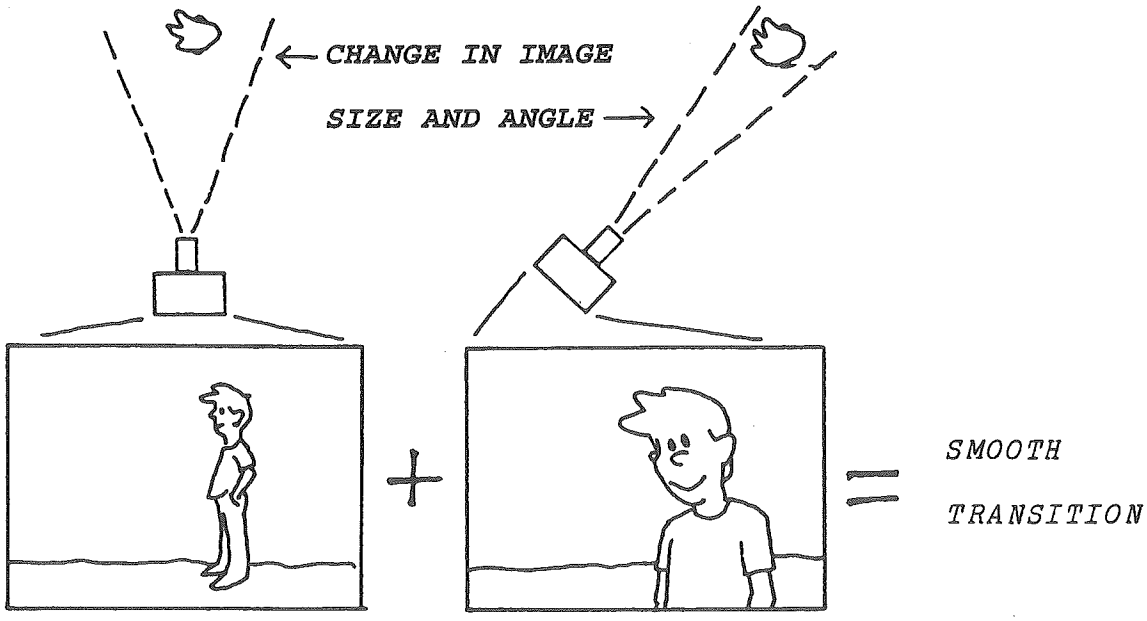
to a medium shot where his head is inclined slightly downward:

If you change image size and not camera angle, you'll see the man's head jerk down on the cut. This is called a jump cut.



But, if you change not only the image size but also the camera angle, you'll be home free. The combination of image change and angle change will alter the viewer's perspective just enough for

him not to notice the slight mismatch in head position.



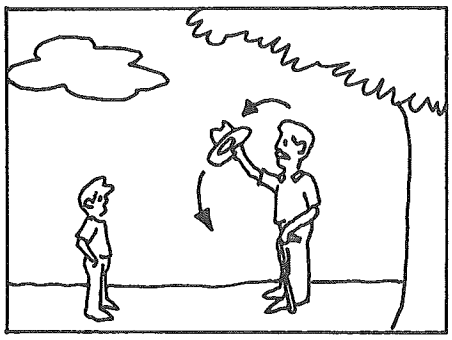
Often, you'll find that a change in image size and camera angle will cover even greater mismatches.

One special situation: When your subject is talking directly to the camera and you change camera angles, be sure to show the subject physically pivoting his body from one camera position to the other. Otherwise, the abrupt change in background will confuse the viewer. If you prefer, in the editing, you can cut on the action of the turn. They do this every night on your local news show when the anchor turns to a new camera and says "On the local scene...".

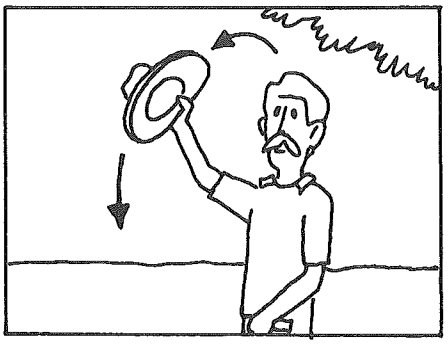
CUTTING ON THE ACTION

A good way to get smooth transitions between shots is to cut on the action. The viewer's eye naturally follows movement on the screen. If a movement begins in one shot and ends in the next, the viewer's eye will follow the action right across the cut, without paying much attention to anything else.

Let's say that the man in our original basic sequence takes off his hat. We shoot the wide shot down to the point where he completes the action of removing his hat. Then we set the camera up for the medium shot, and have him begin the medium shot by repeating the action of removing his hat.

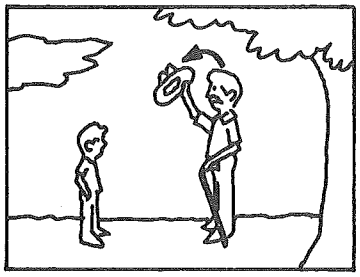


WIDE SHOT



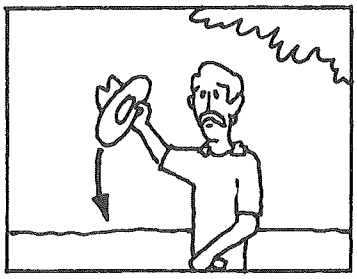
MEDIUM SHOT

Then, in the editing, we CUT ON THE ACTION, so that he starts removing his hat in the wide shot and completes the removal in the medium shot. Without even realizing it, the viewer is carried smoothly from one shot to the next.



WIDE SHOT

+



MEDIUM SHOT

=

CUTTING ON THE ACTION

There are lots of obvious situations where it's convenient to cut on the action. For example: opening doors, getting out of cars, sitting down, standing up, reaching for objects, walking, running, jumping--almost any kind of movement. The important thing to remember is that the last action of the first shot has to be repeated at the beginning of the second shot. So you have to shoot the same movement twice. This is called overlapping action.