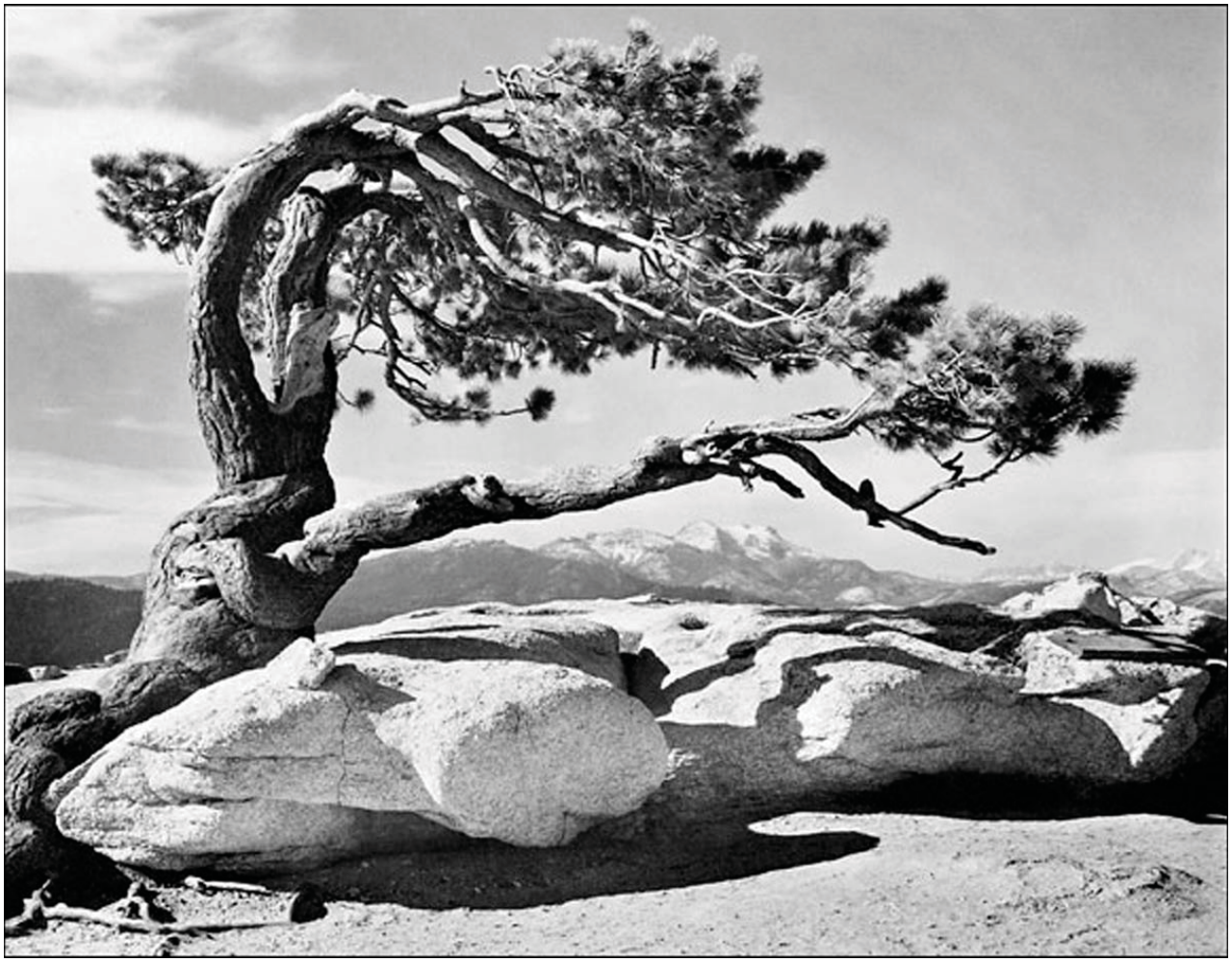
Photography

If Rembrandt were alive today he'd be using a Nikon or a Canon and living in New York City, working as a successful photographer. Yes, if Mr. Rembrandt were operating out of the Big Apple he would have a large photography studio, and would be known around the world for his portraits. You see Rembrandt was an artist, and in the mid-1600's he used the common artistic medium of his day—oil paint. Today's artist uses today's medium—a camera.

You probably own a camera too, and have certainly taken more than a few snapshots over the past few years, but you probably never thought of yourself as the next Rembrandt or Rubens of Rexburg, did you? But why couldn't, why shouldn't, *you* be an *artist*? Rubens started out just like everyone else. He put on his pants one leg at a time.

What makes an artist? If you own a camera (paint brush) and want to take a photo of your roommate then what makes the difference between what you take (a **snapshot***)* and some **portrait** done by a professional photographer? There's really very little. It's just that the pro follows a few rules and knows how to use his tools a little better than you.

One of the first things any new photographer learns is that just because she got a new camera for Christmas doesn't mean she will take photos that look any different/better from those she took with her old camera. And that's because it is the *person*, not the camera, which makes the difference. Ansel Adams, America's greatest landscape photographer, once had a friend who was constantly saying that if he could just use Ansel's expensive camera (and it *was* expensive) his photos would be wonderful too.



Ansel Adams

You can easily guess the rest: Ansel traded him cameras and they spent the afternoon taking pictures. When the film was processed the results were obvious: the friend's photos still looked like he had taken them, and Ansel's photos still looked like Ansel had taken them. Having the best equipment always helps, but the biggest difference is usually the person using the equipment.

A few years ago I would have included a section on how film works, but the world has turned 180 degrees and virtually all of us now use digital. A few years from now we'll all look back at the days of film in the same way we consider the world before cell phones (How did people live?) and it won't be long before your cell will be your only camera. It's almost true already.

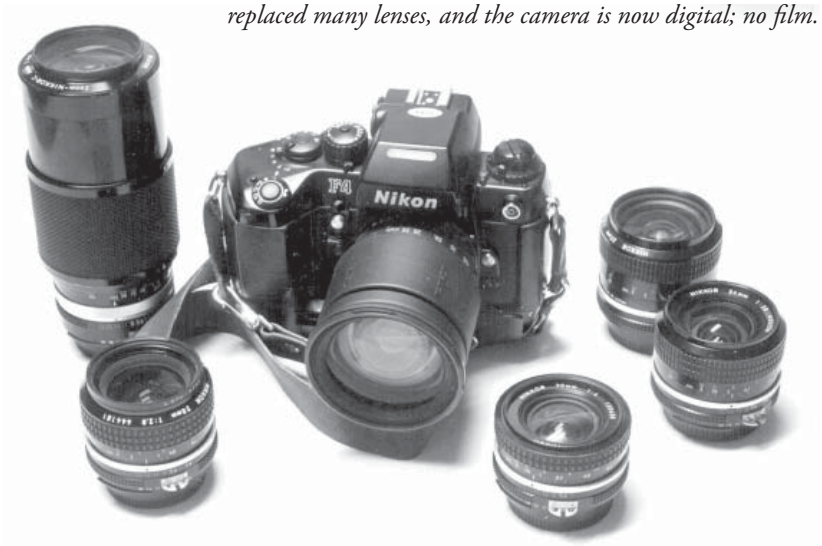
digital point-and-shoot camera that will fit in your shirt pocket

If you decide to purchase a camera you'll find they are basically two types: point-and-shoot and reflex.

The **point-and-shoot** variety is the most popular because they're small, easy to use, and cheap. They fit in

your pocket, are totally automatic, and thanks to a tiny computer chip inside, will focus for you, adjust the light and add flash if it's too dark, all at a single touch of the button. For most people it's all the camera they'll ever want.

The downside is that today's cameras are so automatic most people won't see the occasional need to override some features. What if you want to use a slow shutter speed to intentionally blur something, like a waterfall, or use a large lens opening to minimize your background? It's the same with cooking; beginners start with meals your can nuke, automatic if you will, but as your skills and tastes progress you start cooking from scratch, doing everything yourself, because the results are better.



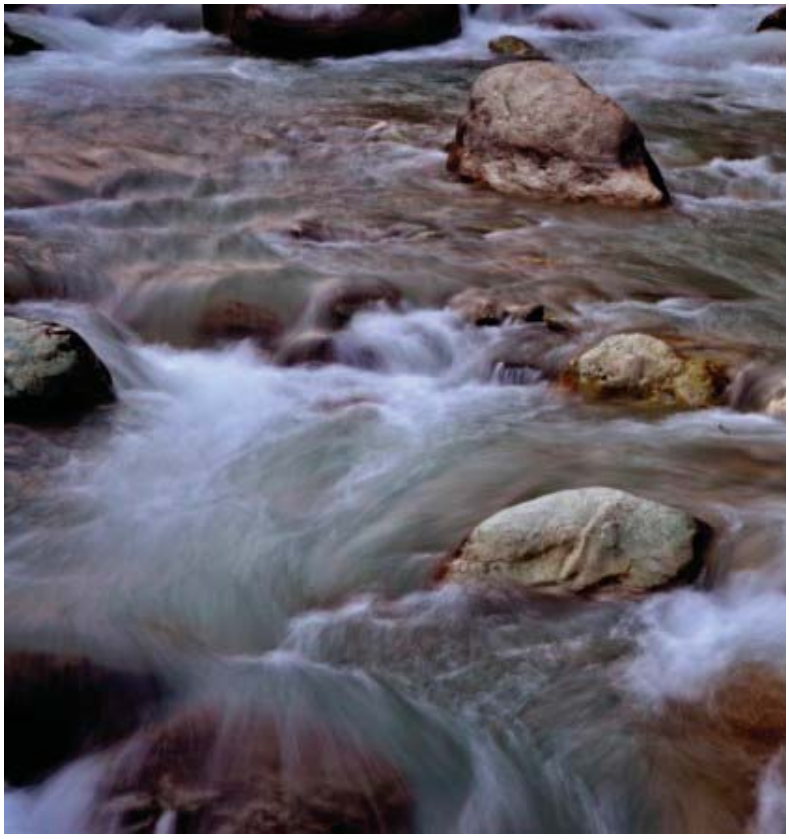
Reflex camera system: Nikon F4 with several lenses of various focal lengths; top of the line in the 1990's but obsolete now. Zooms have replaced many lenses, and the camera is now digital; no film.

Reflex cameras are expensive (usually over $1000, plus that much more for *each* additional lens) because they feature interchangeable parts, interchangeable lenses and manual overrides on every function they offer. When would I want to manually change the settings? Your camera's computer chip scans the image you are seeing and adjusts the aperture and shutter accordingly. All this is done when the built-in light meter measures the amount of reflected light—the light entering your camera. Normal scenes might include some grass or trees in the background. These reflect little light while the face of the person in the photo is lighter (and reflects more light). In the fraction of a second it takes to push the button your camera reads all these values and does a quick average, setting both the shutter speed and aperture.

The key here is "average." Average scenes produce average reflectance and these scenes will photograph normally. What happens when you encounter a "non-average" scene? Snow and sand are the most common examples. Both of these reflect far more light (you need your sunglasses far more on the slopes or the beach than when you're on a lawn). More reflected light enters the camera. The light meter adjusts, you take the photo, and when you get your print you often see that the snow is more gray than white, and that

the faces in the photo are often too dark (underexposed). This happened because your camera didn't know you were on the ski slopes. It read the color of the snow as gray, not white (it took an average of all values, from black to white). What to do? Get a camera that allows you to override some of the settings.

Have you ever seen a photo of a waterfall or stream where the water was soft and blurred, giving you the perfect visual image of moving water? How did they do it? With a slower-than-normal shutter speed (1/8th of a second usually works), and that's possible only with manual controls.



Slow shutter speed (1/8th second)

Professionals use a reflex so they can attach a huge telephoto lens to photograph objects that are far away or smaller lenses for closeups. They will carry several lenses in a bag so they can quickly cover any event, near or far.

All this comes at a price. Extra lenses can easily cost more than the camera (most of today's pro lenses are thousands each). That's why point-and-shoot cameras are so popular. Why drag around a bag with 20 pounds of gear when you can just toss that little camera in your pocket and run out the door?

Extra lenses? By now you're saying, "Duh! Get a zoom!" A zoom lens would seem to be the answer: one lens will take the place of three or four fixed-focus lenses. True, but the maximum aperture of any zoom is far smaller than that of a true fixed-length telephoto, and the resulting shallow depth-of-field will show it (more on this later). Most *Sports Illustrated* covers are not photographed with a zoom lens. Your digital has a great zoom, yes, and it's the perfect lens. Let's just say photos from your zoom look just fine—until

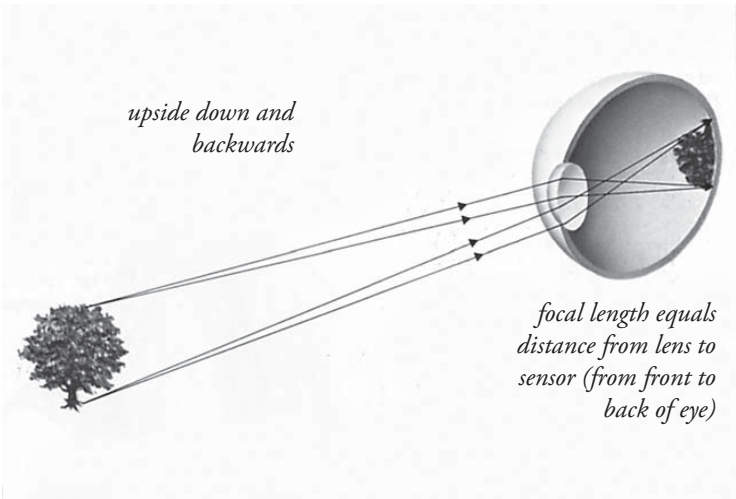
A prime lens with a large aperture and even larger price tag. (This one is $13,999.95, and that's without a camera. Why they don't just round up that extra nickel I don't understand.)

placed next to a photo taken with a prime lens. Then you'll see the difference.

THE EYE

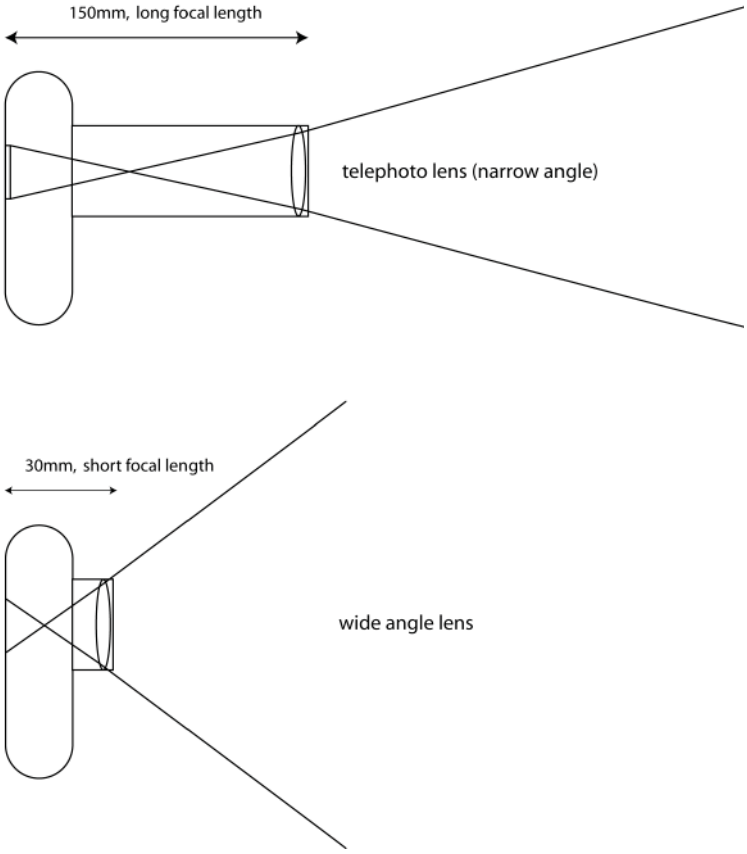
No matter how simple they may appear, we need to fully understand our tools before we can use them. To better understand how a camera works let's start with Mother's Nature's camera: your eye. I'm sure you already know that everything you see is upside down and backwards and that your brain reverses the image so that it makes sense. Cameras work the same way; the image which comes through the lens is upside down and backwards when it strikes the sensor. If you were to open the back of the camera and actually look through the lens things would look a little strange.

In great-grandma's day the viewfinder of the old box-type camera used a reversed image and people had to get used to seeing things backwards. That changed with the invention of the reflex camera which used a large prism to reverse and correct the image. Yet even today some of the most expensive studio cameras are still made the old way—yes, upside down and backwards. Sounds crazy, but you get used to it.



The normal lens attached to the front of the camera has a slightly wider-than-normal angle of view. Its job is to focus the image on the sensor at the rear of your camera. (Similarly, if you wear glasses it means the lens of your eye can't focus the image on the back of the eyeball. It usually falls sort. Your glasses adjust the focal length to focus on the back of your eye.) The focal length of the lens is the distance from the front element to the spot where the light converges. (50mm is *normal* view while shorter focal lengths like 35 or 28 are *wide-angle* – the smaller the number the wider the viewing angle and the more you see). Picture it this way: make a circle with your thumb and finger; now hold it close enough that your hand touches your nose. Notice what you can

see through the hole. Now move your hand out about a foot and notice how much you can see in the hole—less than before. This is how a lens works; the closer the lens to the sensor (back of your camera), the wider the lens angle, and the more you see, or the converse. That's why a small number like 28 means "only 28mm (about 1 inch) from the front of lens to the chip" while the focal length of a telephoto might be 600mm (24 inches). Ever noticed the photographers on the sidelines at a football game, guys with a lens the size of a baseball bat? Those are 1000mm or 2000mm telephotos.



DIGITAL

The computer world has now spilled over into photography too. The digital revolution is here, be it in HDTV, DVDs, the web, e-mail, MP3 files, photos, or loving your iPad. While early digital cameras were capable of giving us photos, they were crude at best, with images of 1 or 2 megapixels. That was then. Cameras giving images of 10 megapixels and more are now cheap enough for the average consumer, and, as with all computer-related items, they'll continue to get cheaper and smaller. At the end of the day you just connect a tiny cable from camera to computer, or beam them via Bluetooth, to move all your photos to your hard drive where you can review them all, email some to Grandma, and print your favorites. You can even show them on your TV.

Today's newspapers and magazines already use digital cameras exclusively. A photographer covering a hot story can take the photos, transfer them to his laptop or phone, then upload via satellite to the news office, all within a few minutes.

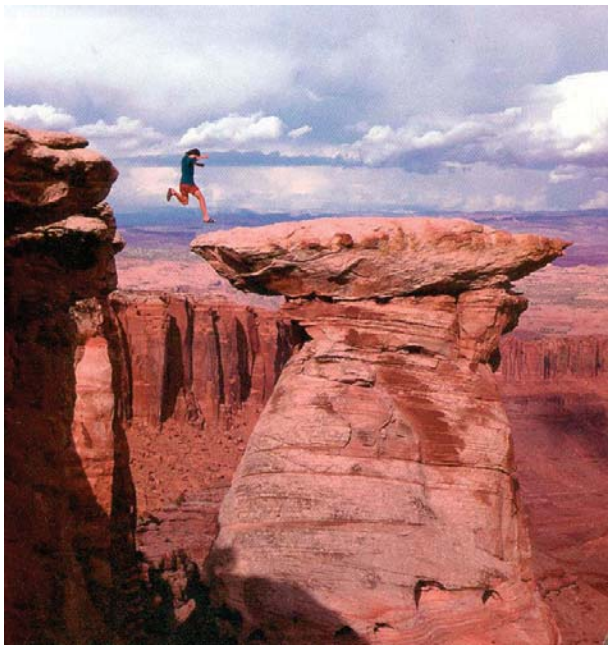
When digital first appeared it was assumed you already had a computer, a color printer, and an expensive software program to tweak your photos. No more. Seeing where the market was headed, industry quickly created kiosks at your local

Digital camera set to 1/4000 of a second at f/5.6, with 100 exposures remaining.

Wal-Mart or other similar venues where you can pull the chip from your camera, insert it in the machine, see all the images on your chip, and choose how many prints you would like of each. You can even crop or change the color (or choose sepia or B/W) and see the results immediately, then pick up your prints an hour later.

The next step was to allow you to download the images directly from your home computer to Wal-Mart, then pick them up an hour later. And the latest software—knowing that many out there are not comfortable with downloading, editing, and especially emailing photos as attachments—will do it all for you. Just select the photos and click. Lots of grandmas are becoming addicted to receiving emailed photos, or posting to Twitter or FaceBook and blogs.

Tweaking your images (like I did with the rock jumper) is where the fun really beings. Adobe *PhotoShop* continues to be the hottest program for such, although there are lots of others that are far less expensive which will give you most of the same features. Once you've seen how easy it is to change your photos you'll quickly understand how the cover of those supermarket tabloids can feature 20 pound newborn babies that look like Elvis, or why every cover model has absolutely flawless skin. In grandma's day a photo was legal evidence, usually all that was needed to prove a point, but since the advent of digital those days are over. Never believe a photo.



Do you really believe this photo?

COMPOSITION

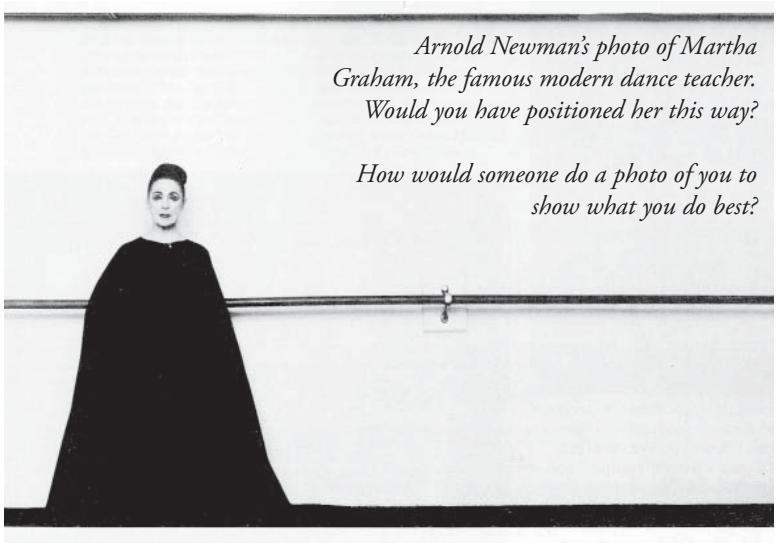
Great art is great art, and while the medium may vary, the rules of composition remain the same. The techniques used by Rembrandt or Gainsborough apply to photography as well.

One of the most common problems for amateurs is **bull's-eye** composition, where the subject's face is centered in the photo. This problem stems from the fact that we're usually looking at the subject's eyes and we tend to center them in our viewfinder. This is how we always see the world—the object of our attention is centered in our view. Using a camera requires us to modify that outlook, and view the *complete* image that will be our final photograph. You must learn to see the hands, feet, background, all—so that the subject is comfortably balanced in the photo. Your eye may see everything in front of you, but your

Bull's-eye composition

brain quickly removes all the clutter and lets you concentrate on just one thing. Your camera isn't that smart. It sees very well, but it's brain-dead. It remains to you, the photographer, to arrange the entire image so that all is balanced. Only then should you click the shutter.

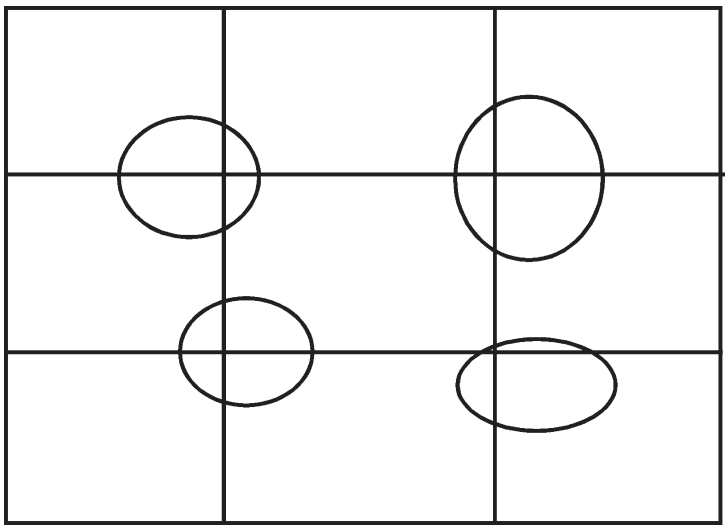
This same rule applies in all the arts, and a quick look at any famous painting will show you that good artists are very aware of visual balance. Rarely will you find the eyes in the center of a painting (i.e., *Mona Lisa*) for it leaves far too much extra space overhead.



Arnold Newman's photo of Martha Graham, the famous modern dance teacher. Would you have positioned her this way?

How would someone do a photo of you to show what you do best?

While there are many rules about how you can achieve good balance (composition) in a work of art (photograph), one simple trick is to divide your scene into thirds and then place the most important part of the scene near one of the intersecting points. It doesn't have to be exactly on the junction, just somewhere in the area. This Rule of Thirds is found everywhere, just flip through a magazine and analyze the photography.

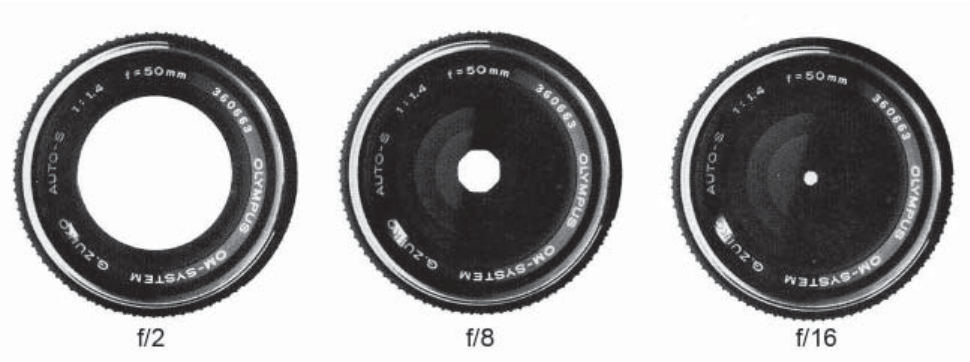


Rule of Thirds composition

APERTURE AND SHUTTER SPEED

A photo is the process of using the camera to allow a tiny bit of light to strike a chip in your camera. How much light gets there is controlled by two variables: aperture and shutter speed.

Aperture means simply "opening" or "hole" and in a camera it is the hole that lets in the light. The lens in any camera works just like your eye in that the aperture varies from a very large "opening" for low light (your pupils are dilated) to a very small opening for bright light (your pupils becomes tiny dots). The larger the opening, the more light

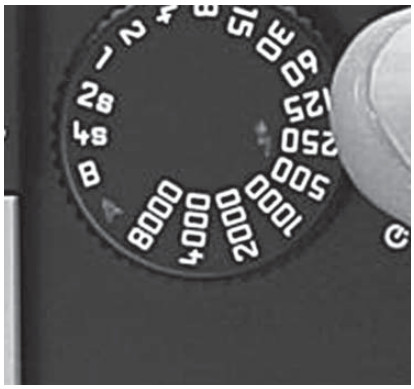


strikes the film.

The common term for aperture is *f/stop*, an abbreviation for the ratio of the focal length of the lens to its diameter. Since f/stop is a ratio it should be understood as a fraction, f/16 is a much smaller opening than f/2 (*see illustration*).

The second method of controlling light is the shutter, a small mechanical door that opens and closes in fractions of a second. Think of it as your eyelid. It can open or close quickly or slowly. Since today's films are very sensitive to light the shutter needs only a fraction of a second to record the scene. The markings of 8, 15, 30, 60, etc. on the camera dial are really fractions of a second, 1/8, 1/15, etc.

By using a combination of aperture and shutter speed you control the amount of light striking the film. For most outdoor photos a small opening, i.e., f/11 or f/16, combined with a short shutter speed of 1/125 or 1/250 will give a good exposure. But if you were to take a photo in a dark room you might need an f/stop of f/4 and a shutter speed of 1/8. Holding your camera still for 1/8 of a second is very difficult so we usually use flash, or a tripod.

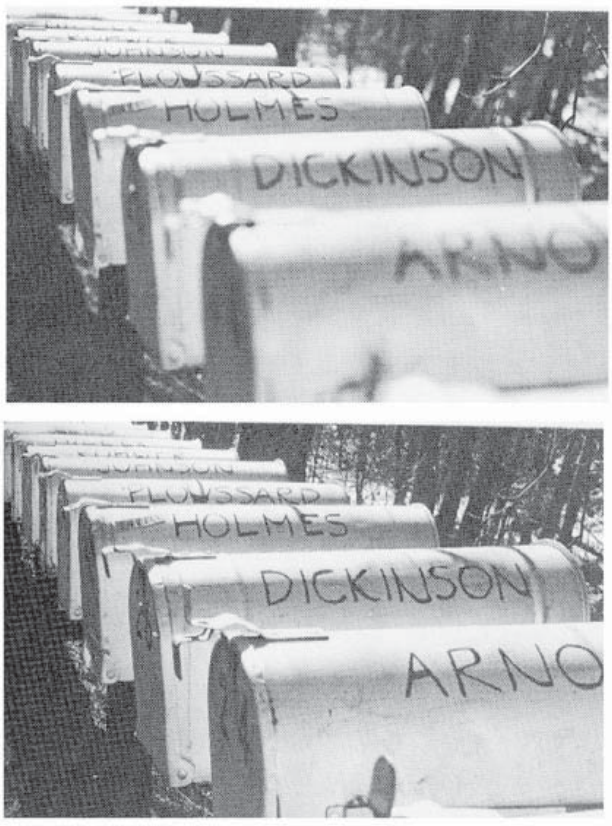


Shutter speeds are in fractions of a second. This camera is set at 4 seconds, but can go as high as 1/8000th. Note that each "click" doubles or halves the speed, which effectively doubles or halves the light coming in.

DEPTH OF FIELD

Depth of field refers to how much of your photo is in focus from front to back (from camera position to infinity). Initially that sentence strikes one as odd because we want the entire photo to be in focus, don't we? Yes, most of the time, but not always. For a group portrait of your family, for a scenic taken during your vacation, you want everything to be clear, in focus. But have you ever taken a close look at a clothing catalog and noticed that although the model was very much in focus the background was completely out of focus? This is intentional for it forces you to look at the model and not become distracted by what might be happening in the background. This ability to selectively focus on just one area is called *depth of field*.

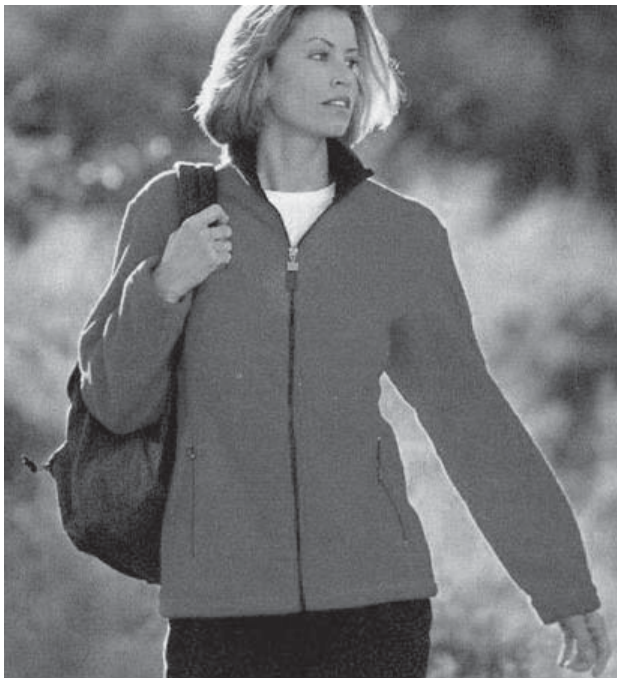
Depth of field is a function of aperture. It determines sharpness *before and behind the point of focus* (i.e., your model). If you were to focus on a model positioned 15 feet away from the camera and use a small opening like f/16, the *depth of field* would begin just a few feet in front of the camera



top photo taken at f/2
bottom photo taken at f/16
both were focused at 7' (Holmes)

and continue to infinity. The grass in front of the model would be in focus, and so would a building half a mile away. **Rule: The smaller the aperture, the greater the depth of field.**

The converse is also true. If you set your camera's aperture to a large opening, i.e., f/4 or f/2.8, the depth of field would decrease to just a few feet before and behind her. She would be in focus but the grass between you and her would be blurred, as would everything behind her, especially a building half a mile away. Without going into the physics of light lets just say that the larger the opening (aperture) the shorter/shallower the depth of field. This principle is constantly used by photographers who want to blur a background in a senior portrait or make a model's dress the center of your attention. Depth of field is probably the single hardest photographic concept to understand, yet once understood, your world will never again be the same.



To make your background go out of focus while still leaving the subject in focus, use a large lens opening, i.e., f/2.

One word of caution: most of today's digital cameras are so small (fit-in-your-pocket size) that the f/stop range of their tiny lens is extremely limited, often no more than f/5.6 - f/8, numbers right in the middle of the spectrum. Only large SLR's have lenses with a wide f/stop range, typically from f/2.8 - f/16. In layman's terms that means **with most point-and-shoot digital cameras you won't have the option of playing with depth of field** (you usually need f/2.8 to make the background disappear). You'll need a fancier camera to achieve this effect. Sorry if that ruined your day.

FRAMING

Three rules will make you a better photographer: (1) don't be afraid to turn your camera on end, (2) learn to see everything that is in the viewfinder, and (3) consider the horizon line.

Millions of people never turn their camera vertically, choosing instead to take a horizontal photo of a vertical object and then just mentally ignore the areas on each side. We do this because the eye is a very selective organ. Its peripheral capabilities allow you to see much more than just what you're concentrating on. Consider what you are doing right now: you're reading this page, yet at the same time you can see several feet in any direction. You are aware of what is on the desk next to you but you don't concentrate on it, you ignore

it. If you were to take a photo from this same position it would include everything, page and desk, but since we tend to look at *everything* in a photo we (the viewer) would conclude that there is far more there than you really wanted. Learn to see *only* what the camera sees; move from side to side, up or down, or come in closer until the viewfinder contains only what you want.

The last rule concerns where you place your horizon. Although that seems silly, a quick look at three views of the same bridge at Nîmes will give you an idea of what I mean. Which of the three views is best? Or, maybe a better question, what are you trying to show? The straight-on view, centered horizon, gives you a complete picture of the river, the bridge, and its size. But it lacks a little something, doesn't it?

The second approach, from the top, with a high horizon line, shows you a flat countryside with a seemingly deep canyon, across which reaches our bridge. It's big, and long, and impressive, and . . . Is something still missing?

The third approach is from below. I'm just a few feet above the water itself and my horizon line is very low when compared with the bridge. From this angle you get a sense of the huge size of it all, how deep the canyon is, how the bridge meets the canyon wall, and of what it must have taken to build something like this when all you had was some rocks and some slaves. When the Romans built this there were no cranes, no bulldozers, no trucks—just slaves and a few can-do Roman engineers. The low angle brings all this into focus, especially when you look closely at the flyspecks on the top and realize they are people. Choosing the right horizon line can change the message behind your photo.

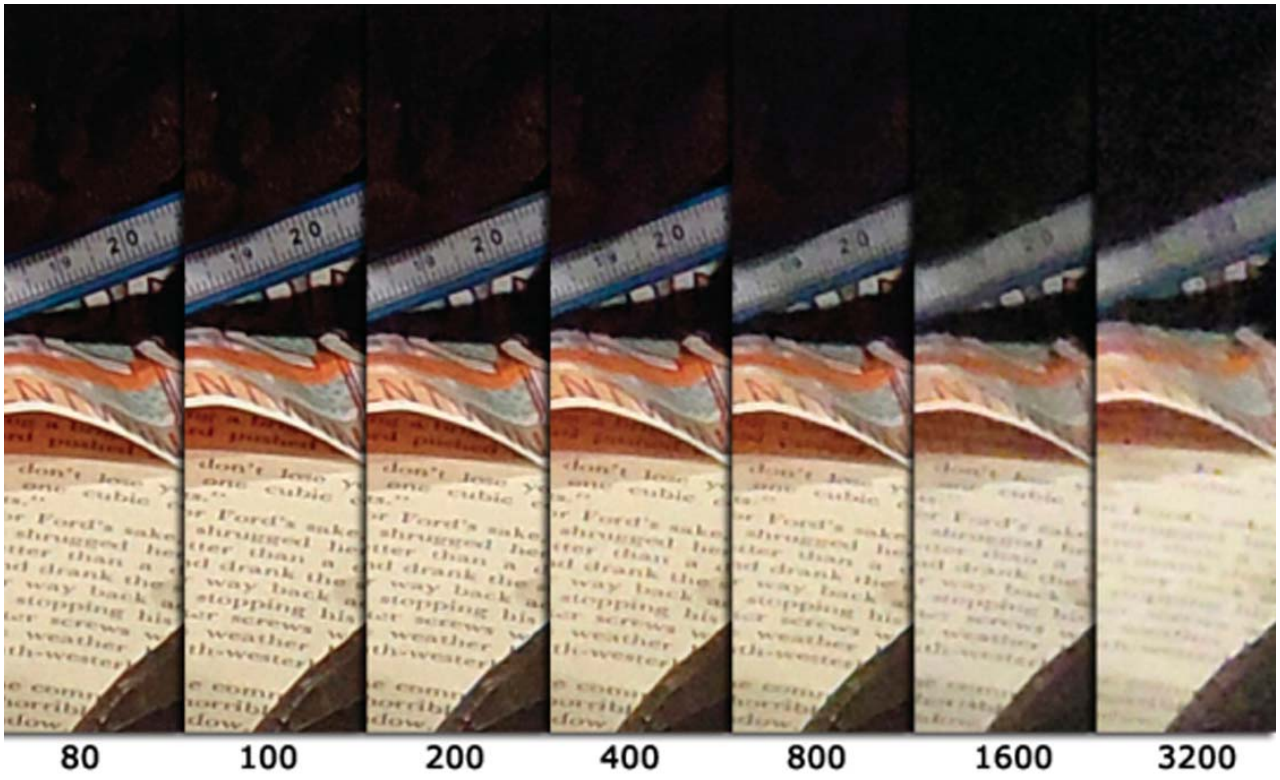
centered horizon

high horizon

low horizon view
Pont du Gard, Nimes, France

ISO: SENSITIVITY TO LIGHT

ISO is a number indicating sensitivity to light. In the days of film, each box of film was marked with an ISO (International Organization for Standardization) number, 64, 100, 200, 400, 800 etc. although in those days the common term was ASA (American Standards Association). The higher the number, the greater the sensitivity



ISO makes a huge difference; notice how clarity decreases as the ISO increases. AUTO ISO is not your friend.

of the camera's light sensor. Thus, a rating of 1600 says your camera's chip is more sensitive (needs less light to make a picture) than one of 200.

The ISO setting controls the degree of apparent image sensor sensitivity—apparent because the sensitivity of the camera's sensor doesn't really change. You're just adjusting the amplification of the electrical signal coming from the sensor, like turning up the volume of a radio. Keep in mind that when you amplify that signal, you also amplify the noise that's part of the signal. Noise is somewhat like looking through a dirty window—the higher the ISO, the dirtier the window. While it may be true that you can still see through the window, it would be better if you didn't have all those little spots all over it. All this leads to one conclusion: the *lower* the ISO setting, the better your photo.

Which setting is best?

If you set the camera to AUTO (normally the green setting) it will usually set the sensor to its highest level, i.e., 800. This is unfortunate because it gives you the worst photo of your scene; lots of noise. However, if you set the ISO manually, and to a lower number, you'll see a difference.

Most consumer cameras have an ISO rating of 200-1600, while high end professional models offer better chips and electronic enhancement of the

sensor's sensitivity, pushing it up to 12,800 ISO. That means they can take a photo in four times less light than required for a cheaper, normal camera, but also remember, they rarely use such settings. Even the big boys use 200 or 400 ISO for most photos.

SUN AND SHADE

Did you know that there are good and bad times of the day to take your pictures? Just because the sun is out doesn't mean the light is good. Light makes all the difference, and since you can't move the sun, you have to move instead, be it where you stand or the time of day you chose.

The best way to see the direction of the light is to *study the shadows*. Which way are they pointing? Where is the light? Consider how different things look at different times of the day. Look again at the photos in this chapter. My first model (first page of this chapter) has almost no shadow because I took her in the studio and could control the light. There's still some shadow under her chin and under her hat brim, but it's very light. Where's the light? Low and to the side. Had I been outside with a normal, overhead sun, she would have had strong, deep shadows everywhere (wrinkles!!).

The second model, by the car, was taken in open shade. Once again, there are very few shadows. Even under the car, especially behind the tire, the shadows are not pure black. Some of the most flattering light for portraits is on an overcast day. Because there is no strong light you don't squint, nor do you have strong black shadows for eyes, and your skin looks smoother. Rule: Soft portrait lighting can be achieved by using open shade. Move both yourself and your subject to the shaded side of the house (background needs to be in shade too or it will be overexposed); you'll like the results.

Try this test: take five different views of your home, all from exactly the same location, with light being the only variable. Of course that means you have to take each photo at a different time of day, or year! Monet did this with the cathedral at Rouen. He did over a dozen paintings, all from exactly the same location, the only difference being the *light*. What a difference! One painting is in direct, harsh, midday sun; another is in fog; another in early morning. Back

open shade; no harsh shadows

full sun, deep shadows with no detail

to your house. If you were running an ad, trying to sell your home, you'd try to place your home "in the best light" and after you take a few photos you will see that there some very good times to take a photo, and others which are not good at all.

Conclusion: light at midday is the most harsh, and is usually the *least* preferred because it's coming from above, rather than from the side. This gives you harsh shadows.

In order to get the best lighting on a face, professional photographers place their studio lights slightly above and to the side. When you're outside you don't have too many options about moving the sun, so you must choose the time of day that has the sun where you want it. Did you know that most outdoor model photos are taken either at sunrise or sunset? That strong side light opens the eyes, and gives a completely different look than a noonday sun with the light directly above.

Indoor light is usually weak, and highly directional, and if your subject is standing next to an overhead light you'll really see what I mean. People standing close to the center of the room will have one level of intensity while those in the corner will be far less intense, making them underexposed and dark. Adding flash just makes things harsh, and adds an ugly black halo behind every head. Still, for most of us "indoors" means flash, ugly shadows and all. Try a high ISO; I know, it will be grainy, but that still might be better than black halos.

No one ever said you couldn't use the background in a creative way.

BACKGROUNDS

Artists who use a brush never worry about their backgrounds because they can change them with a flick of the wrist, adding or deleting any item they choose. Using a camera doesn't allow that privilege, so often you must move yourself to one side or the other in order to find the best view point for your subject while you remove something distracting in the background.

If your subject is a friend try to keep telephone poles or trees from growing from their head. Train yourself to look at what is really there, to see *all* the elements of the scene. We've all got our prints back only to have a good laugh at what we didn't see at the time but is plainly obvious now.

The other side of backgrounds is shown here

with a creative student doing her thing with one of the fountains. Look around and you'll see some very, very interesting possibilities.

FLASH

Almost all cameras have a built-in flash. It's automatic; you don't have to worry about a thing, but far too often we believe that little squirt can light up the universe.

The standard built-in flash is adequate (barely) to cover a "room"—your average kitchen, bedroom, living room; places where most photos are taken. The flash works because there are walls nearby and a ceiling just overhead, all of which reflect the light and make your flash adequate. The corollary means that if you attend a basketball game and are sitting on the 43rd row you shouldn't rely too heavily on your flash to capture something at center court. Objects beyond about 25 feet will be dark.

Another problem with a small camera's built-in flash is **red-eye**. We've all seen photos where the subject looks like something out of a werewolf movie. Red-eye is caused by the flash bouncing off the rear of your eyeball. Since blood vessels are found there your photo shows them—nice and red. And since you're in a dark room (that's why you needed flash) your pupils are wide open, trying to let in all the light they can. That makes it even easier to see those vessels in the back of your eye. Three factors combine to cause red-eye: dark rooms, open pupils, and on-camera flash.

Here's the rule: *the closer the flash to your camera's lens, the* ***greater*** *your chance for red-eye*. For most of us it's a moot issue because your flash is built in; you can't change its position. Professionals get around this by being able to remove the flash from the camera and hold it high and to one side. That's their secret.

Some manufacturers have tried to solve red-eye by having a first/second flash sequence: the first is supposed to make your eye close slightly, than the photo is taken during the second flash. However, this method isn't having too much success. Too many people blink with the first flash, and have their eyes half closed when the second flash goes off. A second approach, being seen more and more on high-end models, is for the camera's flash to pop up high, an inch or two *above* the lens, minimizing your chance

of red-eye.

BACKLIGHTING

One of the most common problems in photography, backlighting occurs anytime the background is lighter than the subject. This is especially true when skiing or at the beach. Since the camera's meter is programmed to expose for the overall scene (background), the subject is often too dark, and may even appear as a silhouette.

fill-flash icon

Most newer cameras, even the point and shoot variety, now have several flash modes, including normal (for a dark room) and *fill* (for backlighting). On the ski slopes, or beach, your mind would tell you that you have more than enough light for a good photo and the last thing you would need is a flash. In fact, you almost have too much if you want a good balance between areas in direct sun (the snow) and those in shadow (your friend's face). Using the *fill* or *daylight flash* button will tell your camera to use its flash in spite of all the light. Put the sun *behind* your subject, then add flash. This will "fill" the shadows on the person's face and balance it with the bright areas (snow) in the background. This same situation happens inside when you have a couch in front of a large window. Standing in the middle of the room and pointing your camera toward the couch/window will cause your meter to set the exposure for what it sees outside behind the couch. To solve your problem just move to the side and take your photo from the end of the couch, or use flash (be careful to not have the flash reflect off the window—like a mirror—and back to you, because you can ruin your photograph).

Backlighting: I took these two photos only seconds apart, trusting the camera's "auto" setting for the one on the left, but I used the fill-flash setting for the one on the right. Notice that the background exposure of the snow, building, trees, is identical in each.

Look for a button similar to the one shown here, but if your camera doesn't have such (and some don't) you can always just turn on the flash manually. Most of today's cameras are smart enough to give you a balanced photo using both flash and the

existing sunlight. Experiment (it's digital; it doesn't cost you a cent) by taking a picture normally, then do it again and add flash. You might decide there are many times when adding that little bit of flash makes all the difference.

PRINTS

By now you have probably learned that not all processing labs are created equal. Some do a wonderful job—every time—while others seem to have trouble giving you good color. Here is a little-known fact: a well-exposed digital image will *not* be printed the same by every lab. In other words, just because *you* did everything correctly when you took the picture does not mean that the *lab* will do its part in handing you a beautiful print.

When some of your prints look muddy or have spots, etc. most people assume it's their fault, and sometimes it is. But other times it's the lab's fault. Yes. Just as not everyone keeps a clean house, not all labs are clean either, and shoddy or careless workmanship in the lab will give you, the customer, poor prints. If you ever see crazy colors, it's a safe bet that your lab did it, and a good reason to find a new one.

Did you know that with the spin of a dial a lab can make your skin green or pink? Most labs use a standard image (of a seated model, using perfect studio lighting) to calibrate their equipment and then simply match the face and skin tones of the model to the people in your photo. But not all labs are concerned with good color—and many customers can't see the difference either. Slightly higher lab fees usually mean better color in your prints. You usually get what you pay for.

Modern technology has gone far to eliminate most problems, and good equipment is now available in most 1-hour labs. Most people are happy with the local Wal-Mart-type photo lab; the color isn't perfect, but it's close. Just keep in mind that you've only seen one print color—the one in your hand. Were you to send the photo to a different lab you might see different colors. You'll never know the difference unless you print the same photo at two or more labs (but that's more trouble than most people want to take).

One common alternative is to process your own prints. Today's home printers are capable of

With a spin of the dial your camera can give you any one of these (color, sepia, B/W). Try a few photos like this and you might begin to see things in a completely different way.

delivering fantastic print quality, every bit as good as what can be achieved commercially but it also comes at a stiff price. Most of us don't want to spend all that extra money to buy high quality paper and ink cartridges (average cost is more than $1/print); it's lots easier to spend 10 cents a print at Wal-Mart. So use the best of both. Use software to tweak the colors or crop things a bit tighter than what you saw in your original photo then email the file to Wal-Mart.

Nothing beats the fun you can have playing with an image. No artist ever had it as good as what you have with today's digital world. Your mind is the only limiting factor (scary thought!).

PIXELS

Always keep in mind the number of pixels you're working with. PhotoShop is only as good as the original digital file produced by your camera, and the more pixels the better, but there is a point of diminishing return. Advertising would have you believe that a 12Meg camera is better than 6Meg, and numerically it is, but will you be able to *see* the difference in your final print? Most people won't. Anything above 12Meg is wasted on the average consumer, and today's software (*Genuine Fractals* or *Blowup*) is going a long way in making it possible to make the photo from a 8Meg file look like it came from a 20Meg file—so why pay the big bucks for that type of camera? For most people a 4x6 print from a 8Meg file looks just the same as one from a 20Meg file. At that size the resolution difference doesn't matter. And remember, 20Meg files will fill up your expensive memory card at three times the rate of 8Meg files.

Cellphone photos are the latest rage but so far they are very limited in resolution (The iPhone 4 is 5M, less than half the resolution of a good camera, yet still very good for a phone.). You can't take a snapshot with your cellphone and enlarge it to an 8x10 without getting some reduction in

quality. Like all digital cameras, cellphone photos are limited by the number of megapixels in their chip, and today's cellphone photos are commonly a mere 72dpi (dots per inch). That's OK for a small screen but good prints require at least 300dpi and many printers can reproduce 2400dpi, a long way from 72dpi. In other words, what seems OK on a small cellphone screen doesn't always work when enlarged to a large print.

For now a cellphone photo will never be as sharp as one from a good camera, but even as I write this the market is moving toward the elimination of mid-level digital cameras as a separate item; they're being merged into your cell. Why carry two items when one will do it all? Or why carry an iPod when you can just plug in your buds and listen to the music stored on your cell? Or why even the need to plug something in? Bluetooth and WiFi, or something like them, will soon take over and eliminate all cords. Everything is moving to a single, hand-held item. You've got to love our digital world.