Film development is a little harder to judge than exposure because highlight density is inevitably affected by film exposure. Underexposed negatives will have both thin shadows and thin highlights; overexposed negatives will have both dense shadows and dense highlights. So if a negative is either underexposed or overexposed, it is harder to tell whether it has been correctly developed.

The judgment of what constitutes good shadow and highlight density takes experience. Use the accompanying illustrations as a guide, and continue to check and evaluate negatives on a regular basis.

It is worth repeating that a good negative is critical for a good print. Film exposure is the most important factor, but film development is also important. Sometimes exposure and development should be altered to obtain the best possible negative. After all, the better the negative, the better the print. It is well worth the extra care needed to understand and use the controls available to reach that end.

CHAPTER 8 MAKING THE PRINT

Equipment Needed

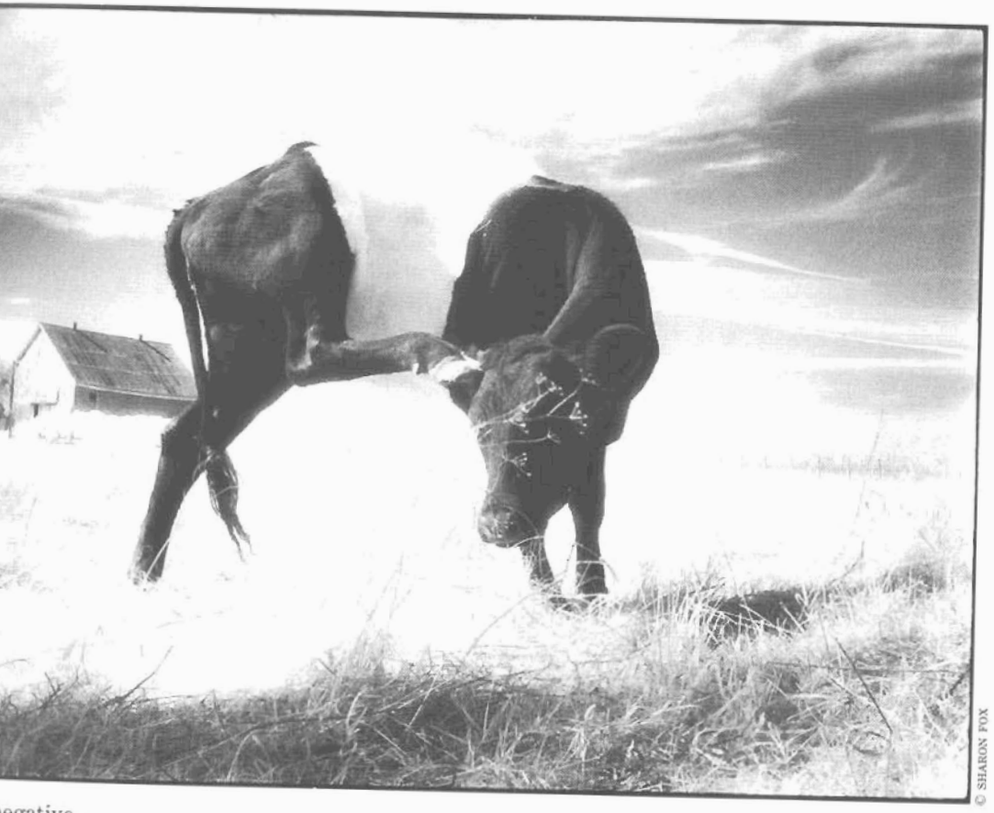
Prints are made from negatives in a darkroom. However, making prints requires a larger and more expensive investment in equipment and materials than developing film. Here is a list of both necessary and useful tools for printing:

enlarger
enlarging lens
enlarging timer
focusing magnifier
processing trays
print tongs
safelights
easel
brush or air blower
film cleaner and soft cloth
print washer
print drier
paper safe (optional)
paper trimmer
graduates, funnels, and storage bottles
print squeegee
piece of glass
towel

Enlarger. An enlarger makes prints from negatives in sizes greater than the negative size. For example, a 35-millimeter negative measures approximately 1″ × 1½″, yet it may be "enlarged" to a print measuring 5″ × 7″, 8″ × 10″, or larger.

Enlargers are available to handle different size negatives. If an enlarger uses negatives as large as 4″ × 5″, it is referred to as a "4″ × 5″ enlarger," but it can handle smaller formats as well. A "35-millimeter enlarger" can handle that size and smaller negatives.

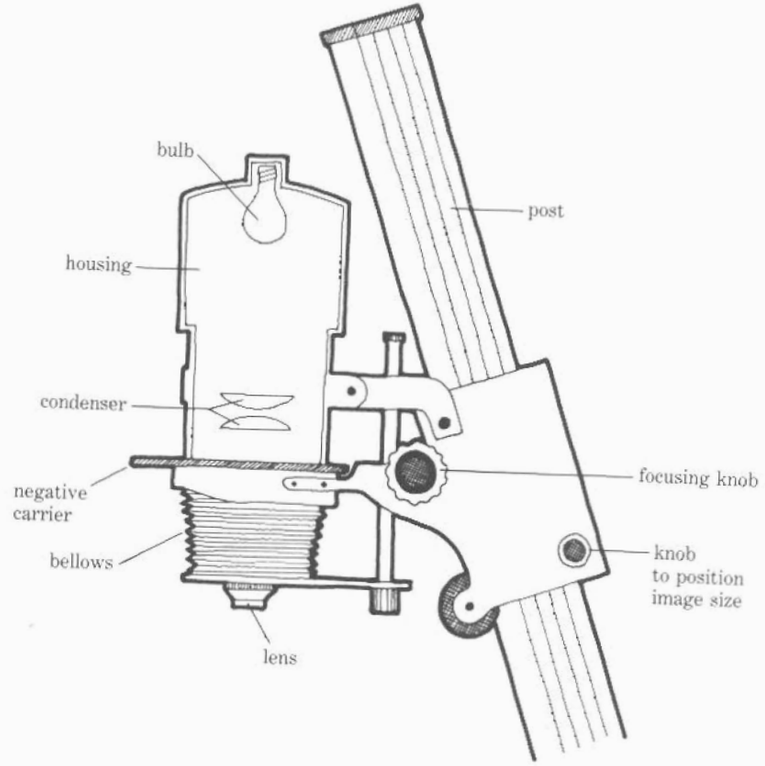
Enlargers can be formidable in appearance, but are simple to operate. A long post holds the *enlarger housing*, which in turn holds a light bulb, condenser (or diffuser), negative carrier, bellows, and lens. At its bottom, the post is attached to a baseboard.



© SHARON FOX

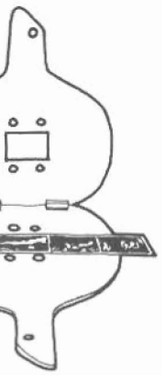
egative.

Parts of an enlarger



Light from the bulb travels through the condenser, negative, and lens to project the image of the negative onto the baseboard. Light bulbs have a "hot spot" in the center; that is, the projected light is brighter in the center than on the outside of the bulb. To spread the light evenly before it reaches the negative, a *condenser* (a glass lens) or a *diffuser* (a translucent piece of glass or plastic) is located between the light source and the negative. Condensers produce a higher-contrast print than diffusers.

The negative is positioned in a *negative carrier,* which fits into the enlarger below the condenser or diffuser. Most carriers are two pieces of metal or plastic that hold either a full strip of negatives or a single negative, flat and in place. The carrier has a cut-out the size of a negative. Each negative format used requires its own carrier. Some



ier holds the nega-
place.

carriers have glass covering the negative while others are "glassless." Glass carriers must be handled with care, cleaned constantly, and kept from being scratched.

A bellows is located under the negative carrier. It is used to focus the image. As the bellows is expanded or contracted, the lens moves closer to or farther from the baseboard until the image is sharp.

As the enlarger housing is moved up the post away from the baseboard, the projected image size is increased. As it moves down, the image becomes smaller.

Enlargers can be locked in place once the projected image is of the size and sharpness desired. Depending on the enlarger used, cranks, knobs, or dials are positioned next to the housing and the bellows, and are turned to adjust the projected image and lock it in place.

Enlarging lens. An enlarging lens works somewhat like a camera lens to focus the image and control the light. Sometimes a lens is packaged with an enlarger, and sometimes it must be bought separately.

The lens must be matched to the size of the negative being enlarged. The recommended focal length for an enlarging lens is the same as the focal length of the normal lens on the camera used. For a 35-millimeter negative, use a 50-millimeter enlarging lens. For a 2¼″ × 2¼″ negative, use an 80-millimeter enlarging lens; and for a 4″ × 5″ negative use a 150-millimeter lens.

All camera and enlarging lenses have a certain *covering power*, that is, the amount of even illumination that a lens projects. In general, the longer the focal length of a lens, the greater its covering power. A 50-millimeter lens is too short to project enough covering power to enlarge a 4″ × 5″ negative; the corners and edges of the negative will receive too little illumination and will be "cut off." An 80-millimeter lens will "cover" a 2¼″ × 2¼″ negative, and it will also "cover" smaller negative sizes, such as 35-millimeter. (However, the projected image size from a long lens will be smaller than that from a shorter lens, so shorter lenses are best for making large prints. For example, an 80-millimeter lens cannot make as large a print from a 35-millimeter negative as a 50-millimeter lens can.)

Like camera lenses, enlarging lenses are classified according to their maximum aperture. An f 4 enlarging lens allows more light through it than an f 5.6 enlarging lens. More light means that the projected image will be easier to see and focus, and that the exposure time can be shorter. (More on printing exposure later on.)

Enlarging timer. A timer is needed to regulate the amount of time for which a print is exposed. Any clock or watch with a second hand

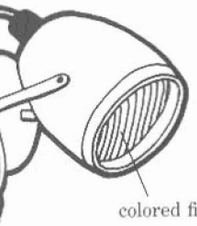
Covering power

This print was made from a 2¼″ × 2¼″ negative with a 50-millimeter lens. The lens did not project enough even illumination for that size negative, so the corners of the print are "cut off."

can be used, but special enlarging timers are more accurate and convenient.

These timers connect directly to the enlarger. When set and activated, they automatically turn the enlarger on and off. Repeating timers are the best kind. They repeat the preset exposure, unless changed, over and over, thus providing consistency from print to print.

Focusing magnifier. A magnifier enlarges the projected image to facilitate more accurate focusing. The image can be focused without a magnifier, but the results are less likely to be sharp. A *grain magnifier* enlarges the grain patterns of the projected negative, allowing even easier accurate focusing.



t illuminates the

holds printing paper flat
ace under the enlarger.

Processing trays. Trays hold the chemicals for print processing. At least four trays are needed. The size should be chosen according to the anticipated print size. Standard tray sizes are: 5″ × 7″, 8″ × 10″, 11″ × 14″, and 16″ × 20″.

Print tongs. Tongs should be used instead of bare fingers to handle wet enlarging paper and carry it from tray to tray. Separate tongs should be used for each tray of chemicals, so at least three tongs are needed.

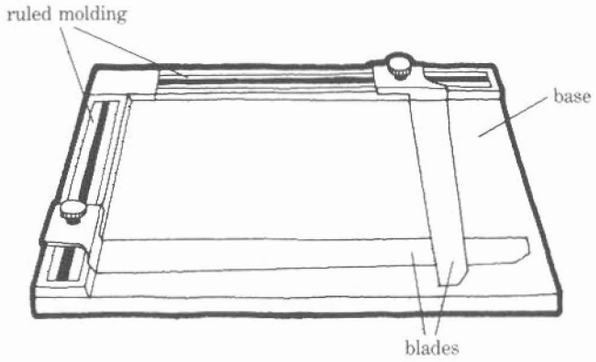
The main purpose of tongs is to minimize chemical contact with skin, thus eliminating contamination. Fingers wet with one chemical may cause print staining when dipped into a second chemical, or when touching clothes, negatives, and equipment. In addition, some people develop skin allergies to the chemicals.

Safelights. Enlarging paper is sensitive to most colors of light, so special colored *safelights* are used to illuminate the darkroom. Most safelights are simple 15- to 25-watt light bulbs, protected by a housing, and covered by a colored filter, usually red or amber.

Safelights should be positioned at least 3 or 4 feet away from the enlarger and developer tray. In a small darkroom, one safelight should be sufficient; a larger room may require two or more.

Easel. An easel holds printing paper flat and in place under the enlarger. It consists of two parts: a base on which the paper is laid and positioned, and a hinged top piece with crossing metal "blades" to hold the paper flat. The desired image size of the print is set by adjusting the metal blades along a ruled molding on the edges of the top piece of the easel.

Easels are available in many sizes according to the largest size printing paper they will accommodate. An 8″ × 10″ easel holds



8″ × 10″ or smaller paper. For most purposes an 8″ × 10″ or 11″ × 14″ easel is adequate. Some easels are made for one size only; others hold several sizes but are not adjustable. Most easels produce white borders on all four edges, but some create prints without borders.

The best (and most expensive) easels have four adjustable blades. They allow a wider variety of centering and border possibilities than less expensive models.

Brush or air blower. Dust that accumulates on negatives should be cleaned off before beginning the printing process. Otherwise, the dust will show up on the final print. There are several inexpensive tools available to eliminate dust, such as a soft, wide brush, a rubber squeeze blower, or a simple ear syringe. Canned air under pressure is popular and effective for removing dust, but it is expensive, and needs periodic replacement.

Film cleaner and soft cloth. Dirty negatives may require a serious cleaning. Film can be rewashed in water, but chemical film cleaners are quicker and easier to use. A soft wipe, such as a chamois cloth, antistatic cloth, or lens tissue, should be used with the cleaning solution.

Print washer. A tray or washer must be used for print washing. Specially made print washers are available in a variety of models. A simple processing tray, preferably a large one with a special *tray siphon* (described later), will also do the job.

Print drier. Prints can be dried electrically or by air. Large, expensive driers are highly efficient, but most people working on their own need a less costly solution. Some options include a portable electric drier, a blotter book, a clothesline and clothespins, or a homemade drying screen (plastic screening material stretched taut over a wood frame).

Paper safe. A paper safe is a light-tight box that holds and allows easy access to unexposed printing paper. It is a nice convenience, but not a necessity.

Paper trimmer. Printing paper sometimes needs cutting. Special paper trimmers cut squarely and accurately. If necessary, a pair of scissors or a utility knife and straightedge will do the job.

Graduates, funnels, and storage bottles. Similar equipment to that used for film developing is necessary for measuring and storing chemicals. Extra bottles are needed to store used chemicals separately — those used for prints from those used for film.

Print squeegee. A flat, rubber blade or rubber roller, called a *squeegee*, is needed to squeeze excess water from a washed print to facilitate drying. A soft, rubber sponge can also be used.

Piece of glass. Two pieces of glass are needed: one for contact printing (explained later) and the other for holding the print while it is being squeegeed. Each piece should be larger than the largest size printing paper used. Plexiglas may also be used when squeegeeing prints.

Towel. Clean, cloth towels or rolls of paper towels are needed to keep hands dry during the printing process. Hands should be rinsed off and dried regularly to minimize chemical contact with skin.

Printing Papers

Like film, printing paper consists of a light-sensitive silver-halide emulsion on a base or support material. Film uses a base of clear plastic, while printing paper uses a base of white paper.

Common printing paper sizes are: 5″ × 7″, 8″ × 10″, 11″ × 14″, and 16″ × 20″. A box of paper may contain 10, 25, 50, 100, 250, or 500 sheets of one size and type. The greater the quantity, the lower the per-sheet cost.

The major considerations in choosing from the wide variety of printing papers made are as follows:

base type
weight
tone
surface
contrast

Check at camera stores for samples of prints made on the various paper types.

Base type. Printing papers are available in fiber and resin-coated bases. *Resin-coated* (*RC*) papers are coated on both sides of the paper base with a thin layer of clear plastic.

RC papers are more convenient to use than fiber-based papers. They expose more quickly than fiber-based, and they take far less time to process, wash, and dry. Upon drying, RC papers tend to curl less than fiber-based papers.

The convenience of RC papers makes them particularly tempting for the beginner or the person who has little time to work in the darkroom. More advanced workers should try out different types of paper, and may end up preferring fiber-based paper.

Weight. Printing papers are classified according to the thickness of their base, either as single, medium, or double weight. RC papers are usually medium weight; fiber-based papers are either single or double weight.

All weight paper produces the same image, but heavier papers

crease and damage less easily and dry flatter, with less wrinkling or curling. However, double-weight paper is significantly more expensive than single-weight paper.

Tone. Tone refers to the color bias of the printing paper. Some papers are *warm tone*, tending toward brown, while others are *cold tone*, more neutral black. Some warm-tone papers literally produce prints of brown and white tones. Cold-tone papers usually have a purer, cleaner white base; warm-tone papers have a creamier, off-white base. For practical purposes, the difference between many cold- and warm-tone papers is subtle.

Print developers also affect the tone of the print, so for maximum effect they should complement the type of printing paper used. While most all print developers work with all printing papers, try to process cold-tone papers in a cold-tone developing solution. Use a warmer developer for warm-tone papers.

Surface. Most papers are available in a wide variety of surfaces, most commonly: glossy, lustre, semi-matte, and matte. The glossier the surface, the sharper the appearance of the image.

Contrast. Contrast refers to the difference between the light and dark tones in a print. Low-contrast (soft or flat) prints are gray, with few bright or dark areas; high-contrast (hard) prints are mostly light and dark, with fewer gray areas.

Most brands of paper are available in many different grades of contrast. To a great extent, the contrast of the final print is controlled by the grade of paper used.

Each paper manufacturer has its own system of grading papers, but in all cases low numbers represent lower contrast than high numbers. Here is a typical scale of paper grades:

#1 = low contrast
#2 = average contrast
#3 = slightly high contrast
#4 = high contrast
#5 = very high contrast

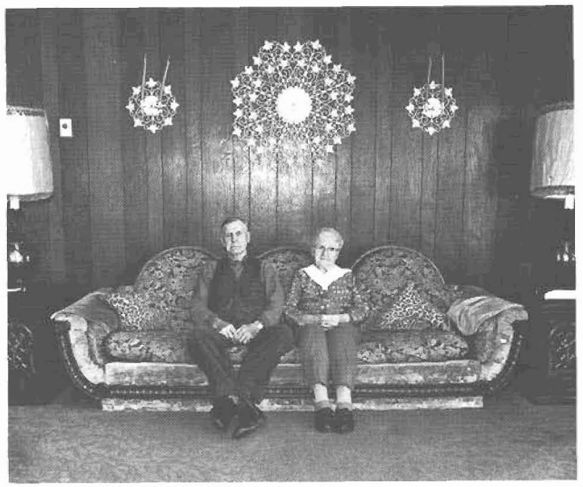
Some paper brands offer a #0 (very low contrast) and some offer a #6 (extremely high contrast).

Variable-contrast papers change contrast grade when exposed under the enlarger with special filters. These papers are economical since only one batch of paper and one set of filters need be purchased to achieve a wide range of contrast, usually from #1 to #4 grade. Half grades are also available (#1½, #2½, and #3½), providing still finer contrast control. When used without a filter, a variable-contrast

trast

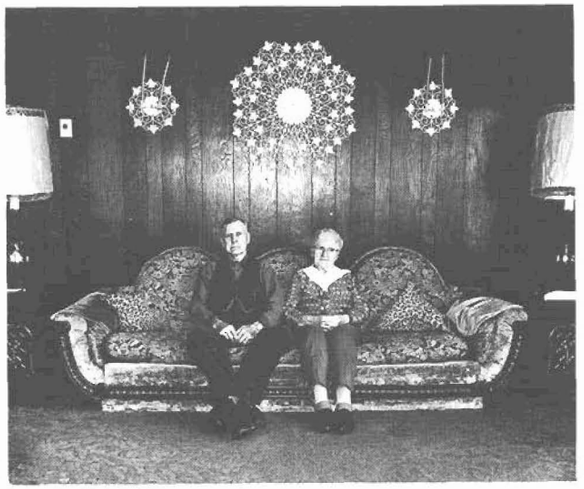
rast can be controlled by using graded papers or filters (with vari-
ast papers): the higher the number the greater the contrast.

ade on a #1-grade print-



A print made from the same negative on a #2-grade printing paper has increased contrast.

a #3-grade paper has
er contrast.



A print on a #4-grade paper produces the greatest contrast.

paper is approximately the equivalent of an average-contrast-grade paper.

Filters are available in complete sets or as individual squares of colored gelatins. Once purchased, they can be reused almost indefinitely. Some enlargers incorporate a place to position the filters between the light source and the negative; otherwise the filters must be positioned under the enlarging lens with a filter holder.

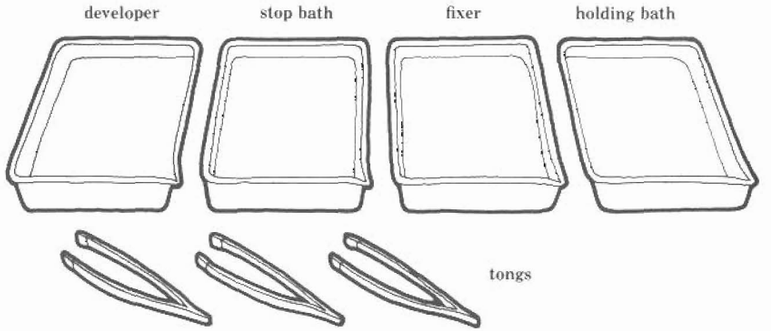
Although it can be controlled by paper grade (or filters), print contrast can ultimately be affected by a number of other factors. Some of these factors are: negative contrast, type of print developer, dilution of print developer, and developing time. More on these factors later on.

Printing Chemicals

Processing chemicals for prints are basically the same as those used for processing film. The one exception is the developer. Film and paper developer perform the same function (developing the latent image), but their chemical composition is slightly different so it is necessary to buy separate film and paper developers.

Stop bath, fixer, and fixer remover are all the same for film and for paper. Dilutions and times may vary, so be sure to check package instructions. When storing these chemicals, differentiate between processing solutions used for film and those used for paper.

Set up four trays for the printing process. If the darkroom has a large enough counter (or sink) space, position the trays in a line, and work from left to right with developer, stop bath, fixer, and water, in that order. The trays should be filled to approximately one-half capacity. For an average work session, fill a 5″ × 7″ tray with about 16 ounces of solution; an 8″ × 10″ tray with 32 ounces; an 11″ × 14″ tray with 64 ounces; a 16″ × 20″ tray with 1 gallon; and so forth. For a short printing session, use less solution to save money.



Four trays set up for printing with print tongs.

Chemicals deteriorate at different rates depending on many factors, such as the brand used, the freshness of the solution, and the number and size of the prints processed. As a very general guideline, process no more than the equivalent of twenty to twenty-five 8″ × 10″ prints (forty to fifty 5″ × 7″ prints; and so forth) in each quart of working solution of every chemical, except for fixer remover. Process approximately half as many prints in the fixer remover — ten to fifteen 8″ × 10″ prints.

Diluted developer and stop bath, once used, should not be stored for reuse; developer exhausts too rapidly, and stop bath, though it will keep, is cheap and should be used fresh to help extend the capacity of the fixer, which is significantly more expensive. Diluted fixer and some fixer removers can be reused, if they have not processed too many prints, and if they have been stored in tightly capped bottles. Fixer check can be used to determine whether the used fixer is exhausted.

All solutions should be mixed and diluted according to the manufacturers' instructions. These can vary widely.

Always use an acid bath for processing fiber-based prints. The acid should be diluted to a mild solution, the same as for film developing. A plain water stop bath is adequate for resin-coated papers.

Some fixers require a lot of dilution, while others are used undiluted. A hardener is incorporated into some types of fixer, and must be added separately to others. RC papers, like film, scratch easily, so a hardened fix is required to protect the emulsion. Fiber-based papers are more scratch-resistant, and can be processed safely with or without a hardener. Prints that are not hardened dry flatter and are easier to wash thoroughly and spot (touch up) than hardened prints. Also, prints that are to be subjected to heat (in the process of drying or mounting) should be hardened for protection.

Some photographers use a two-bath fixing system for processing prints. Two trays of fixer are set up, rather than one. Fixer from the first tray exhausts more rapidly than fixer from the second, so when it is discarded, the second fixer is used as the first, and a new second fixer solution is mixed. Two-bath fixers are a good method to guarantee efficient print fixing, since the second bath will always remain fresh, even when the first bath is exhausted.

The fourth tray, called a *holding bath*, consists of plain water. After fixing, fiber-based prints are held in water until the end of the printing session (or until the tray fills up), at which point the accumulated prints are washed together. The water in the holding bath needs changing every half hour or so to minimize the accumulation of fixer

in the water. Resin-coated prints should be washed soon after they have been fixed.

Chemicals should be mixed to be approximately 70°. In time, solutions will become room temperature, so the processing temperature is not as easily controllable for prints as for film (unless the room is temperature controlled). However, try not to work in either an extremely cold or hot room.

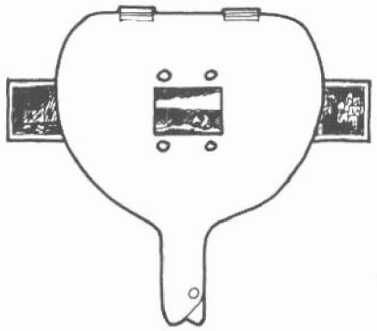
The Printing Process

Making a print requires a variety of judgments and interpretations, much more so than when developing a roll of film. What follows are the basic printing steps, along with discussion of some of the judgment areas.

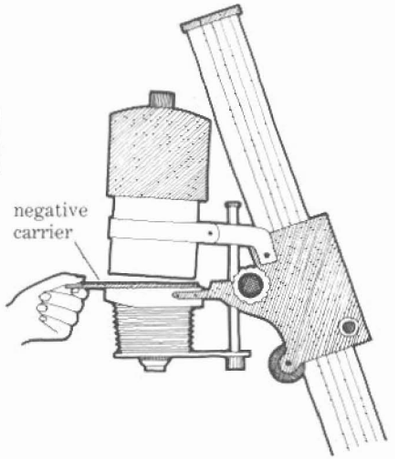
Setting Up the Negative

1. *Put a strip of negatives in the negative carrier*, with the negative to be printed framed by the cut-out section. The negative needs to be positioned with its emulsion side (the dull surface) down or the print will have the wrong orientation — the left side of the subject will be rendered on the right side of the print; words will read backward; and so forth. Handle negatives with care, touching them only by the edges, since they scratch and smudge easily.
2. *Then use a blower or a brush to remove dust* that might have accumulated on either side of the negative.
3. *Close the carrier, and fit it tightly in place* in the enlarger housing.
4. *Set the easel for the approximate image size* for the print. The image size is the size of the printing paper minus the borders. For example, a 7½″ × 9½″ size image on an 8″ × 10″ sheet of paper has a 1/4″ border all around. The easel has size scales on its top, bottom, or sides for setting the image size. The blades of the easel are positioned with the aid of the scales so that whatever falls within the area framed by the blades will make up the desired image size. Some easels are nonadjustable and offer only one standard image size.
5. *Place the easel on the base of the enlarger.*
6. *Turn on the safelights, and turn off the room lights.*
7. *Then turn on the enlarger.* The enlarger will project the negative image down to the easel.
8. *Open the aperture of the enlarging lens to its widest f-stop* in order to project enough light to see the image clearly. Now the size of the image must be set and the negative focused.

Setting up the negative



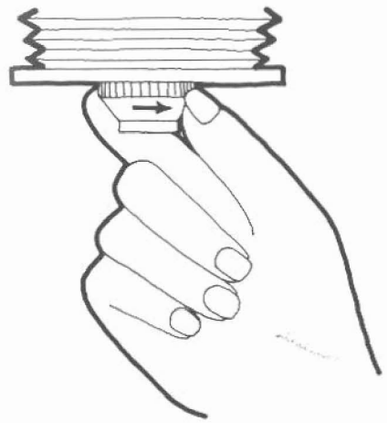
Put a strip of negatives in the negative carrier.



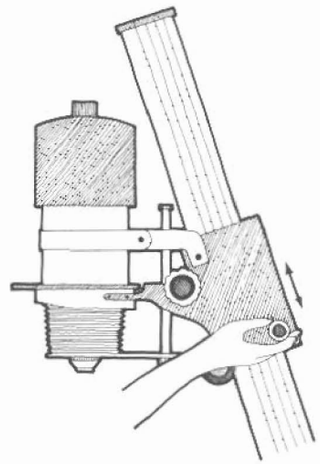
Put the negative carrier in the enlarger so the emulsion (dull) side of the negative faces down.

9. *To set the image size, move the enlarger housing up and down on its post.* The position of the easel on the enlarger base will need to be adjusted until the projected image is framed tightly by the easel blades. As the housing moves up the post, the projected image becomes larger; as it moves down, the image becomes smaller. Once the desired image size is set, lock the housing in place on the enlarger post.

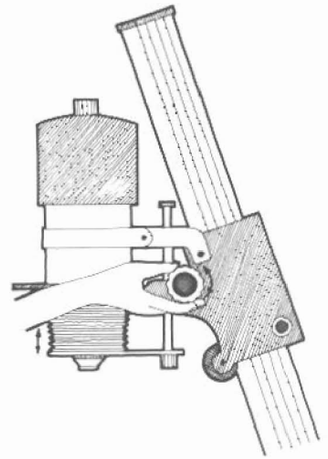
It is not necessary to print the full negative each time. When only a section of the negative is printed, that negative is said to be *cropped*. For example, if the negative is a portrait of a man from his head to his waist, the enlarger housing can be moved up on the post to project an image of only his head and shoulders. A cropped print may have less sharpness and show coarser grain because of the extra enlargement it requires, but it might result in a more satisfactorily composed photograph.



Open the lens to its maximum aperture.



To set the image size, move the enlarger housing up and down the post.



Focus the negative by turning the focusing knob to expand or contract the bellows.

10. *Once the image size is set, focus the negative* by turning the focusing knob to expand or contract the bellows. The image size will need minor adjustment at this point, and the easel may need to be moved around. Adjust the size first, then the focus and easel location. Keep readjusting until the projected image is the correct size and in focus.

For fine focusing, place a sheet of printing paper (the thickness of the paper to be used) in the easel, and focus the image onto that paper through a magnifier. The paper is necessary for focusing on the exact same plane as the print (the easel surface is slightly lower than the plane of the paper). A magnifier makes the projected image larger so helps make the focusing more accurate.

ade from a full negative.

A cropped print made from a section of that negative.

Understanding Print Exposure

When printing paper is exposed to light projected through a negative, it forms a latent image. Like film, this image is not visible until developed chemically. The more light that strikes the paper, the darker the printed image.

More light passes through the shadow (thin) areas of a negative than through its highlight (dense) areas. Thus more light reaches the printing paper to render shadows than highlights, so when developed, shadows are dark and highlights are light on the print. In effect, the printing process reproduces the light, gray, and dark areas much as in the original subject.

Just how much light (exposure) is needed to make a print depends on the density of the negative. The denser the negative, the greater the amount of exposure needed.

There are two primary factors in controlling print exposure:

aperture of the enlarging lens
print exposure time

These correspond roughly to the controllers of film exposure: the aperture of the camera lens and the shutter. The same relationship exists. If one is increased, the other must be decreased equally for the exposure to remain constant. A print exposure of f 11 at 20 seconds gives the same result as an exposure of f 8 at 10 seconds. The time is cut in half, but twice as much light travels through the lens.

In a camera, correct film exposure is figured with the help of a light meter. In a print, exposure is determined with the help of a test strip. (Exposure meters for prints are available but rarely used.)

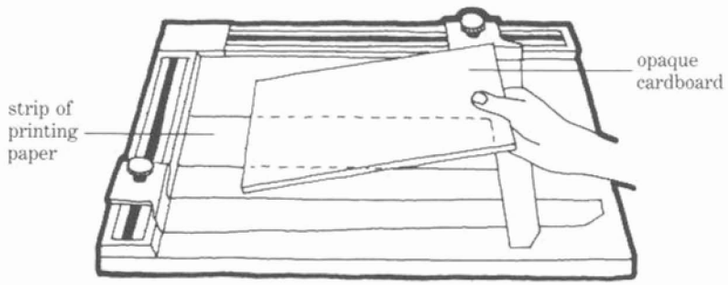
Making a Test Strip

A *test strip* is a section of printing paper with several different exposures made from a single negative. It is simple to make, and can save much time and money on wasted printing paper and chemicals. To make a test strip:

1. *Close down the lens aperture* from its wide-open position. Any f-stop can be used for printing, but the middle stops — f 8 or f 11 — are suggested starting points. In the dark, f-stop markings on the lens are hard to see, but most lenses have "click stops," so turn the lens until it clicks to the desired opening. If the maximum f-stop of a lens is f 4, three clicks "closed" down is f 11: f 5.6 → f 8 → f 11.

a test strip

wn the aperture to a
-stop, say f 8 or f 11.



Cover most of the strip of printing paper with an opaque piece of cardboard.

2. *Take out a sheet of printing paper* from its box or from a paper safe. When opening the box of printing paper, be sure that no light (other than safelight) strikes the paper. Even slightly exposed (or *fogged*) paper will turn gray or black upon development. When closing up the box, be sure the paper is packed with its protective wrapping tightly around it. A paper safe allows easy access to printing paper without having to pack and repack the box over and over.

3. *Cut the sheet of printing paper into three strips.* Only one strip of paper is needed at this point, so put the others safely away for future tests.

4. *Lay the strip of paper in the easel, emulsion side up.* The emulsion is the shiny side of most printing papers.

5. *Use an opaque piece of cardboard to cover most of the strip* of paper — about 80% of it. Cover the strip either horizontally or vertically, depending on which orientation will provide the most information regarding the specific image to be printed. The best strips give good detail in each exposure segment for both light and dark areas of the negative.

6. *Set the enlarging timer* for 3 seconds. Three seconds represents an arbitrary starting point; actual exposure times can vary widely.

7. *Switch on the timer to expose the uncovered area of the strip* for that time. If an enlarging timer is not available, use the second hand of a clock or watch, and switch the enlarger on and off manually. This will work, but it will provide less consistent exposure times than an enlarging timer.

8. *Move the cardboard,* taking care not to move the strip of paper along with it. Leave another 20% or so of the strip uncovered, and expose this and the first section of the strip for 3 seconds. The first section has now received a total exposure of 6 seconds; the second section, 3 seconds.

9. *Move the cardboard two more times,* uncovering and exposing each section of the strip 3 seconds each time. Previously exposed sections will continue to receive additional amounts of exposure.

10. *Remove the cardboard* altogether and expose the entire strip for a final 3 seconds. Now the strip has a latent image with five different sections representing five different exposure times: 15, 12, 9, 6, and 3 seconds. Once developed, the test strip should provide a good guide to the required print exposure for that particular negative.

Developing the Test Strip

The print-developing process is the same for both test strips and for final prints. Average processing times are suggested here, but they vary with different materials and solutions. Refer to the instruction sheets for the printing paper and processing solutions being used for specific recommendations. Processing temperatures are not as critical for prints as for film. Use 68° to 70° if possible, but a range of 65° to 75° is permissible.

1. *Slip the exposed test strip, emulsion side down, into the tray of developer, and agitate it* by rocking the tray gently. Develop RC papers for approximately 1 minute and fiber-based papers for 1 to 3 minutes, agitating for the entire time.

When handling the print, use tongs and grab the paper at its edges. Do not touch the image surface. For the first 20 seconds or so, keep the paper emulsion side down in the tray to ensure that it thoroughly soaks up the developer. Agitate the paper constantly, then turn it over and watch the image form.

Be sure to keep the strip in the developer for the entire recommended time, even if it begins to look a bit dark. Exposure is difficult to judge under safelight illumination. The image appears almost fully after 30 seconds or so, but continues to develop more subtly after that

ary: Print Processing*

	Time	Comments	Capacity**
veloper	**1 to 3 minutes** for fiber-based papers; **1 minute** for RC papers.	Agitate constantly; dilute according to manufacturers' instructions; develop for at least the minimum recommended time.	Twenty to twenty-five 8″ × 10″ prints (or equivalent) per quart of working solution.
p bath	**15 to 20 seconds** for fiber-based papers; **5 to 10 seconds** for RC papers.	Agitate constantly; use mild acetic acid bath for fiber-based papers; plain water bath for RC papers.	Twenty to twenty-five 8″ × 10″ prints (or equivalent) per quart of working solution.
er	**5 to 10 minutes** for fiber-based papers; **2 minutes** for RC papers. Rapid fixers require less time.	Agitate constantly; if a two-bath fixer is used, fix for half the time in the first bath and the other half in the second, then discard the first bath when exhausted, use the second bath for a first bath, and mix a fresh second bath.	Twenty to twenty-five 8″ × 10″ prints (or equivalent) per quart of working solution.
ter rinse	**2 minutes**	Optional	—
er remover	**2 to 4 minutes**	Optional, but highly recommended with fiber-based papers; do not use with RC papers; agitate constantly.	Ten to fifteen 8″ × 10″ prints (or equivalent) per quart of working solution.
sh	**5 to 15 minutes** for fiber-based papers if treated first in fixer remover; **1 hour** for fiber-based papers if not treated in fixer remover; **4 minutes** for RC papers.	Agitate; make sure wash water is changing constantly; do not wash more than 10 to 15 prints at a time.	—

se times and capacities are intended as guidelines. They vary according to the brands used and the conditions of use. to manufacturers' instructions before proceeding.
e following are approximately equivalent to twenty 8″ × 10″ prints: forty 5″ × 7″ prints; ten 11″ × 14″ prints; five 20″ prints.

time. Also, for an accurate test strip, developing time as well as exposure time should be a known and consistent factor.

2. *Lift the fully developed test strip out of the developer* with tongs at one corner of the paper. For a few seconds let the excess developer drain off the bottom corner of the strip.

3. *Put the test strip in the stop bath* for 5 to 10 seconds, if using RC paper, or 15 to 20 seconds, if using fiber-based paper. Agitate it for the entire time. The stop bath neutralizes the developing activity, and produces no visible change in the image.

4. *Remove the test strip from the stop bath* with print tongs, and let the excess solution drain off.

5. *Place the test strip in the fixer.* The fixing time depends on the type of paper used and the freshness of the solution. With resin-coated paper use a time of 2 minutes; with fiber-based paper, use 5 to 10 minutes. Rapid fixers require even less time. Agitate for at least half the fixing time by rocking the fixer tray.

The fixer clears the printing paper of its unexposed silver, and allows the test strip to be viewed under room light. A strip or a print can be looked at after it has been in the fixer for about 30 seconds; if the strip or print is to be saved, it must then be returned to the fixer for the full remaining fixing time. (Before turning on the room lights, be sure all unexposed printing paper is safely stored away.)

6. *Remove the test strip from the fixer* with tongs, and let the excess solution drain off.

7. *Put the test strip in the holding bath* — a tray of plain water — until it is ready to be washed. (Print washing is described in full later in this chapter.) The test strip does not need to be saved; it can be left in the holding bath for reference until the final print from that negative is made, then thrown away.

To view a test strip (or a final print), remove the print from the fixer or water and put it in a clean tray. Turn on an overhead light. For the best viewing, use a 60- to 75-watt incandescent light bulb, not fluorescent. For convenience, the bulb should be positioned above the processing trays. View the print with the tray placed at an angle to, and about 3 feet away from, the light source. The brightness of the light and the angle at which it strikes the print can make a big difference in how the print looks.

The finished test strip will have a range of five exposures; some may be light and some dark. If all five exposures are either too light or too dark, make another test strip. The ideal strip is dark on one end and light on the other.

If the entire strip is too dark, cut back the exposure. Either close

15 seconds

12 seconds

9 seconds

6 seconds

3 seconds

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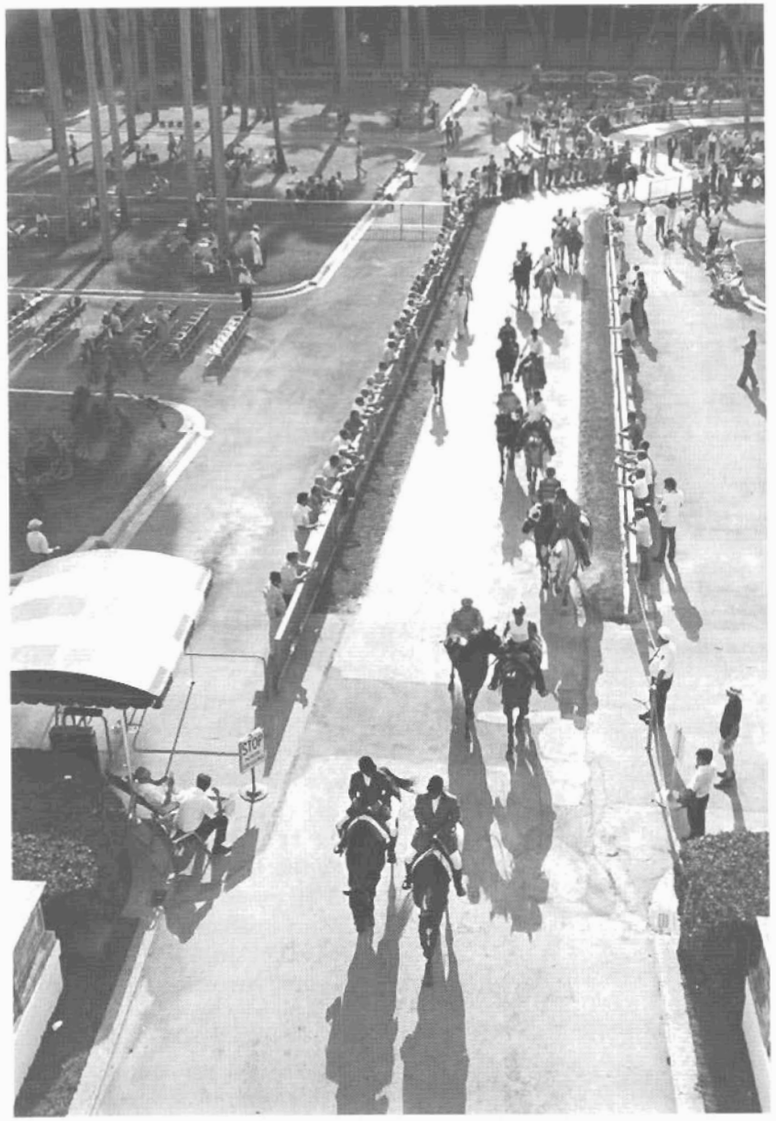

down the lens — try f 16 instead of f 11 — or shorten the amount of exposure time — use 2-second increments instead of 3.

If the test strip is too light, increase the exposure. Open up the lens — say to f 8 instead of f 11 — or extend the exposure time — perhaps using 5-second increments instead of 3.

The Final Print

Once a good test strip is made, examine it carefully and choose the exposure that looks best. If in doubt, look for important highlight and shadow areas of the image — for example, Caucasian skin or bluejeans — and see if those areas look right. Caucasian skin should be light but not washed out; jeans should be dark, but retain detail.

Sometimes the correct exposure is somewhere between two sections of the test strip. If the 6-second exposure looks too light and the 9-second exposure looks too dark, choose 7 or 8 seconds instead.

Place a fresh, full sheet of printing paper in the easel, and expose it for the time chosen. Do not change the f-stop setting. Develop, stop, and fix the exposed paper in the same way as the test strip. If the two-bath fixing system is used, fix the print for half the recommended time in the first fixer bath, and the other half in the second bath.

In evaluating the quality of this print, consider these factors:

brightness
contrast
burning and dodging

Brightness. Print exposure determines the overall brightness of a print. Too much exposure results in both shadows and highlights being dark; too little exposure leaves shadows and highlights too light.

Brightness is determined by a good test strip. Once an initial print from that strip is made, it may need slight adjustments. If the print is too bright at a 10-second exposure, make a second print at 12 seconds. If it is too dark at 10 seconds, try a print at 7 seconds. Keep adjusting the exposure time, making new prints until the overall brightness seems right.

Contrast. After determining the exposure needed for good print brightness, examine the print contrast and make adjustments if necessary. Contrast refers to the difference between shadows and highlights. High-contrast prints have mostly dark shadows and light highlights, while low-contrast prints are mostly gray, with few solid blacks or whites.

In general, a good print should have both dark and light areas and

is too light, having re-
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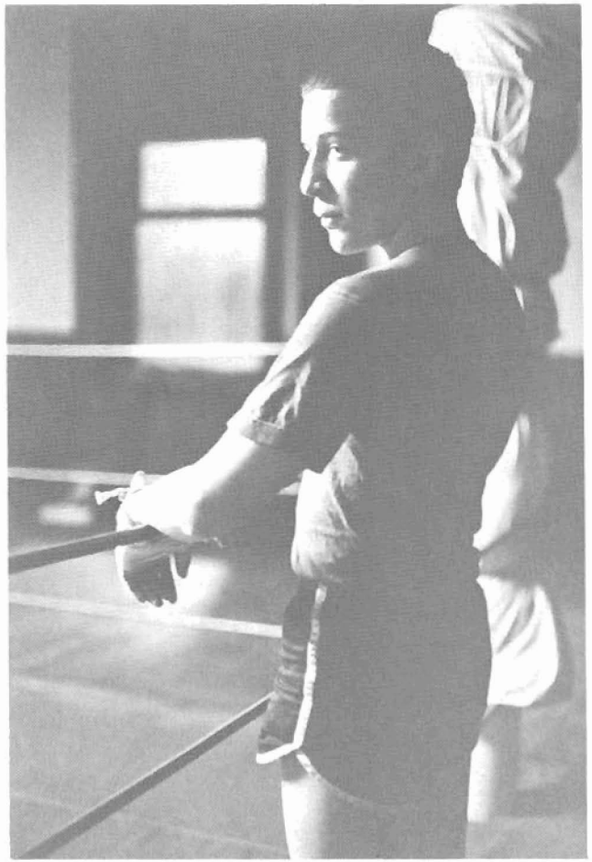
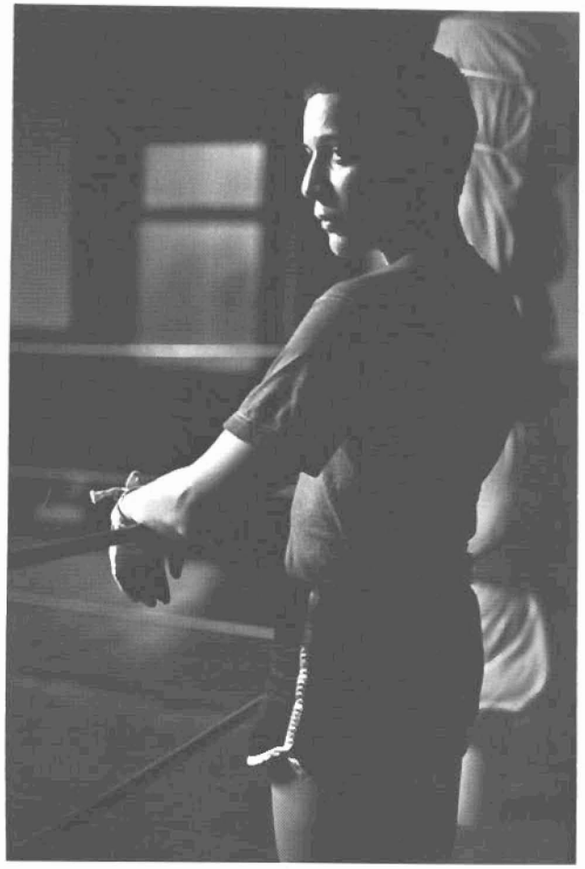


a lot of grays in between. Most dark areas of the print should retain some detail, so as not to become a solid black mass; most light areas should also render detail, and not be a solid white. However, each print bears interpretation. Some prints look best when printed *hard* (with high contrast), and some look best when printed *flat* or *soft* (with low contrast).

Each negative has its own contrast range, which is dependent on several factors, such as subject lighting, exposure and developing time, and the type of film used. In the print, this contrast can be adjusted in any one of several ways.



The primary control for print contrast is paper grade. This factor has been discussed earlier in the chapter, but it bears repeating. Most printing papers are rated according to their ability to render contrast. A #1-grade paper produces a significantly lower-contrast print than a #5-grade paper. A #2 or a #3 represents average contrast with most brands of paper.

Variable-contrast printing papers produce prints of different contrast when exposed through different filters in the enlarger. A #1 filter with variable-contrast paper produces a relatively low-contrast print much as a #1-grade paper does. Used without a filter, variable-

ast

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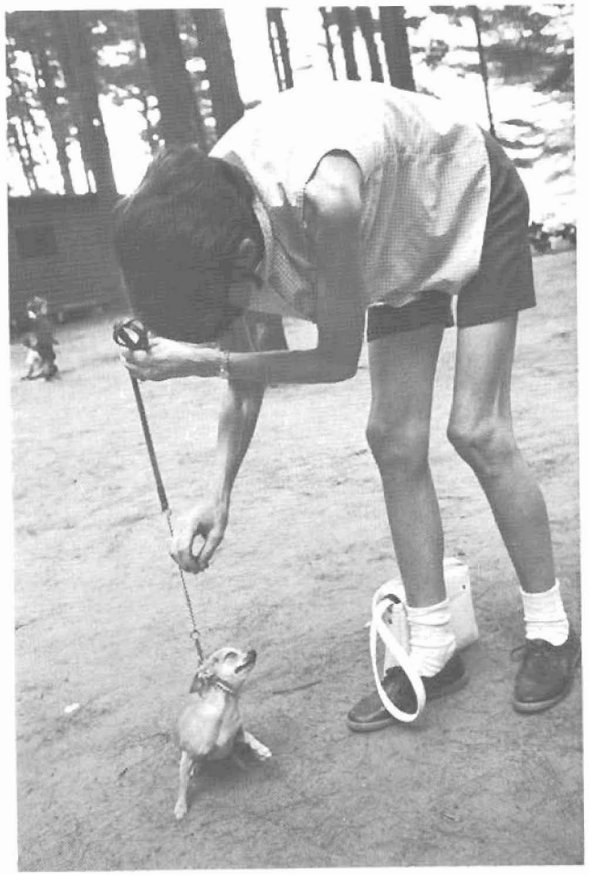
dark areas with detail, light
with detail, and plenty of
in between.



contrast papers print as approximately a #2 contrast. Filters are available in half-grades, such as #1½, #2½, and #3½, for fine contrast control.

Contrast grades vary with the paper brand used. A #2 Kodak paper will be different from a #2 Agfa or #2 Ilford paper. However, the grading principle is the same. The higher the number, the greater the contrast.

Note that the amount of contrast achieved from various paper grades is relative to the contrast of the negative to be printed. A negative of average contrast will provide an average-contrast print on a #2- or #3-grade paper. A high-contrast negative may produce a high-contrast print even on #1 paper; a low-contrast negative may need a #5 paper to produce a print of average contrast. However, a

higher paper grade will always produce a print of more contrast from a given negative than a lower paper grade.

Different graded papers and filters can affect print exposure time. With some brands, a #1 paper is more light-sensitive than a #5 paper, so requires less exposure. A #4 filter is darker than a #1 filter, so holds back more light, and requires a longer exposure time.

One sure way to determine the exposure change with different paper grades or filters is to make a separate test strip each time a different contrast filter or paper is used. This may seem like a waste of time, but it is the best and quickest way to determine what the new exposure time should be.

There are factors other than paper grade and negative contrast that affect print contrast. The greater the enlargement, the lower the print contrast. A negative enlarged to 11″ × 14″ produces a print of less contrast than the same negative enlarged to 5″ × 7″

Print contrast can be altered somewhat by making changes in the print developer. For example, some developers, such as Kodak Selectol Soft, produce prints of less contrast than others. And each developer can be used differently to provide more or less contrast. For greater print contrast, use a less-diluted developer (perhaps a stock solution rather than a diluted solution), develop for a longer period of time, or heat up the developing solution. For less contrast, use a more heavily diluted developer or a shorter developing time.

Burning and dodging. A print may have good overall exposure and contrast, but still have areas that are either too bright or too dark. *Burning* is a technique used to selectively add exposure to darken an area of a print. *Dodging* is holding back exposure to lighten an area of a print.

To understand burning, imagine a well-exposed print made at f 11 at 10 seconds. Once developed, the print may look right except for a corner that is too light. That corner can be made darker without affecting the overall brightness of the rest of the print by making another print and adding exposure only to the area that needs darkening.

To "burn in" a section of a print:

1. *Place a fresh sheet of printing paper in the easel, and expose it for the time needed to produce a good overall print;* in the above example, f 11 at 10 seconds.

2. *After the paper has been exposed, place an opaque piece of cardboard just under the lens.* Do not use paper since it will transmit light. Also, do not move the easel or the exposed printing paper in any way.

Burning

A print with good overall exposure at f 8 at 12 seconds. However, the sky is too light.

The same print made at the same exposure, but the sky has received an extra 12 seconds of exposure and is significantly darker.

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in an area in the center of a
e a piece of opaque card-
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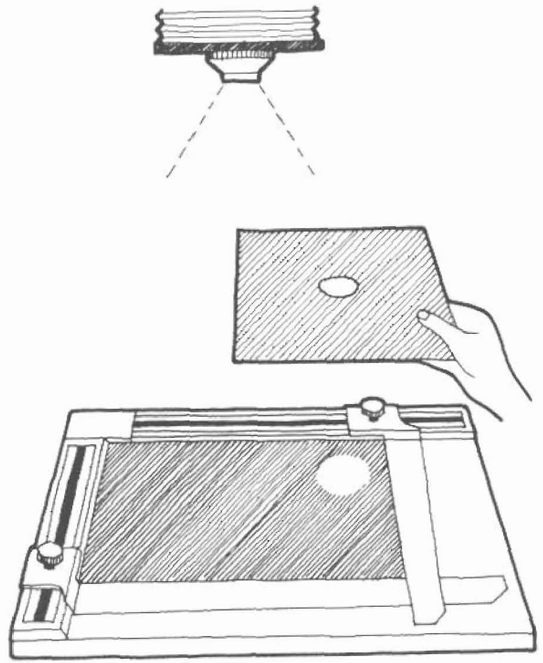

3. *Turn on the enlarger again, and move the cardboard so that the projected light falls only on the area of the paper that needs darkening,* such as a corner of the print.

4. *Move the cardboard back and forth slightly while adding extra exposure* to prevent the "burn" from creating a noticeable line on the print. In effect, the print tones must merge together evenly. (Actually, parts of the areas adjacent to the "burned-in" area will receive some additional exposure, but if done correctly, this added exposure will not be enough to affect the print significantly.)

The additional exposure causes only a part of the print to become darker upon development. The amount of burning necessary to make a perceptible change varies with each print, but sometimes it is considerable. To darken an area moderately, try a 40% to 50% "burn" (or 4 to 5 seconds additional exposure for a 10-second original exposure). For a more significant darkening, burn for at least 100% of the original

exposure time (a 10-second burn for a 10-second exposure). It is not unusual to "burn" for four or five times the original exposure (40 to 50 seconds more for a 10-second exposure), or even longer.

To burn in an area in the center of a print, use a piece of opaque cardboard with a hole cut out. First expose the entire paper for the correct time. Then position the cardboard about halfway between the lens and the easel, and turn on the enlarger again. Let light project through the hole to the areas of the print that need darkening. Be sure to keep moving the cardboard so the burning merges evenly with the adjacent areas in the print.

The size of the projected beam of light through the hole can be varied by stocking several pieces of cardboard, each with different size holes, and by varying the position of the board under the enlarger. When the cut-out is close to the lens, the beam of light reaching the paper is broader than when it is close to the paper. (If held close to the paper, the cardboard needs to be large enough so that light doesn't "spill over" and expose the corners and edges of the paper by accident.)

A long initial exposure time is not desirable if substantial burning is indicated. Say the required exposure is f 11 at 20 seconds, and a burn of five times that exposure is needed in an area. One hundred seconds is too long a time to burn in easily. Open the lens to f 8, and cut the exposure time to 10 seconds; then burn in for 50 seconds.

Dodging is the opposite of burning. An area of a print can be lightened selectively by holding back light from that area during the exposure. The rest of the print will not be affected, and will be rendered at the same overall brightness. To "dodge" a print:

1. *Make an initial print that has a good overall brightness.* Let's say that the exposure is f 8 at 10 seconds. Look at the print and determine what areas (if any) are too dark.

2. *Expose a fresh sheet of printing paper for the correct time* (f 8 at 10 seconds).

3. *During that exposure, place an opaque piece of cardboard just under the lens to block light from reaching the dark area(s).* Use the image projected on the easel as a guide to the area to be lightened.

4. *While dodging, move the cardboard back and forth* to prevent a noticeable line from appearing in the final print.

The amount of dodging needed varies from print to print. However, a relatively short dodging time can lighten an area significantly. Dodging for 20% of the initial exposure time (2 seconds out of a 10-second exposure) will make a noticeable difference. Never dodge for more

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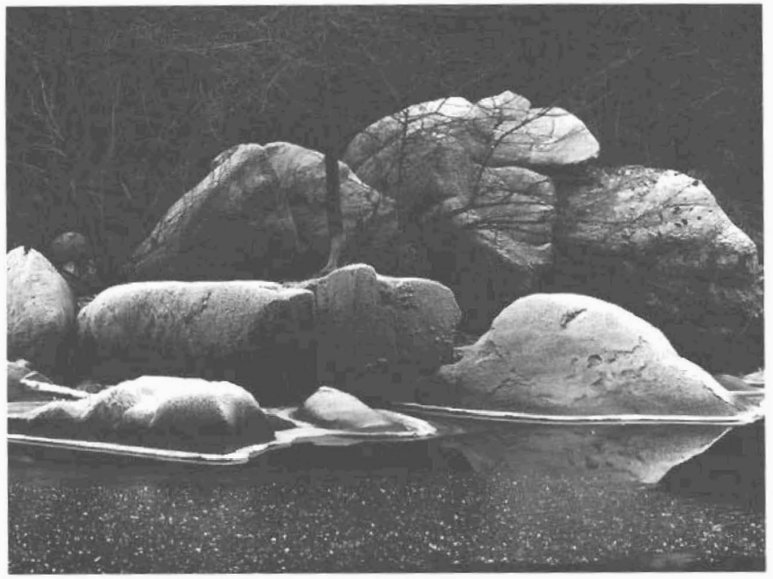

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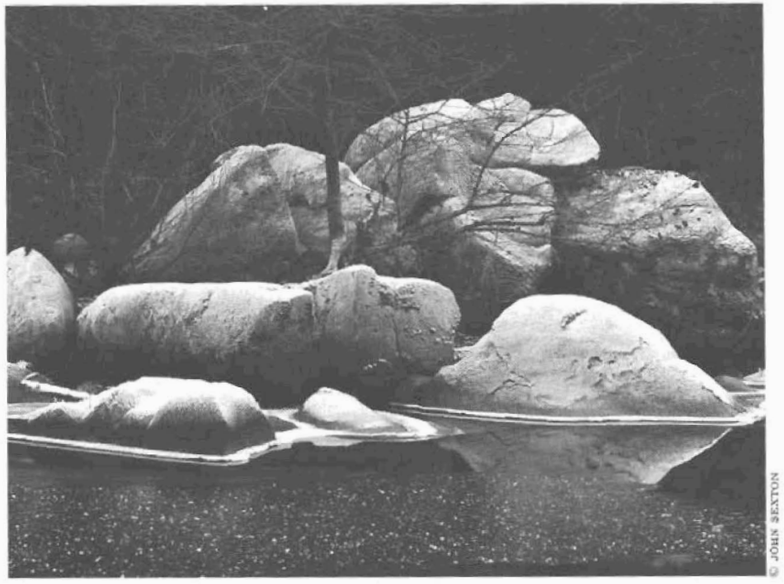

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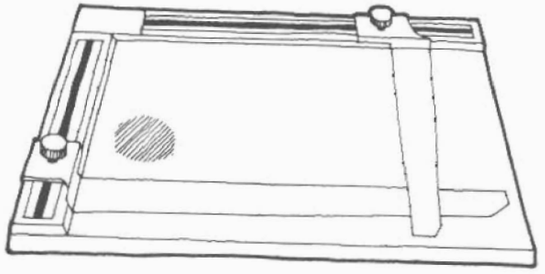
Dodging

To dodge an area in the center of a print, use a stiff wire handle with a piece of cardboard taped on.



than half the overall exposure (more than 5 seconds out of a 10-second exposure), because the difference between the dodged and the undodged areas will show up and seem obvious.

An area in the center of a print that is too dark can be lightened with a homemade dodging tool, consisting of a stiff wire handle (a piece cut from a clothes hanger works well) and a small piece of cardboard taped onto the end of the wire. Make up several tools with differently shaped pieces of cardboard (for example, round, square, and oblong) of different sizes.

To dodge with this tool, turn on the enlarger and expose the print for the predetermined time. During the exposure, position the dodging tool so that the cardboard covers the area to be lightened. Remember to keep the tool moving while dodging. The wire handle will not affect the overall print exposure because it is so thin.

A short initial exposure time is not desirable when dodging. An exposure of f 8 at 3 seconds, for example, makes it difficult to dodge accurately. A 1-second dodge is too brief, yet represents 33% of the

total exposure — a significant amount when dodging. It is best to close down the lens and extend the exposure time — say to f 11 at 6 seconds, or even f 16 at 12 seconds — to allow more latitude in dodging times. This way, if the initial exposure is 12 seconds, a 1-second dodge allows a subtle change, whereas a 4-second dodge makes a much more dramatic change.

These final printing steps — burning and dodging — often make the difference between an adequate print and an excellent print. Most prints need either less or more light in certain areas, and many prints need both. After determining the correct exposure and contrast for a print, examine that print carefully to see how it can be further improved. Then burn or dodge, several times in the same print if necessary, until the best possible print is made.

Use a soft lead pencil to note exposure, contrast, burning, and dodging data on each print for future reference. Write gently on the edge of the back of the paper so the mark will not affect the surface of the image on the front. This data may not be exactly repeatable each time the negative is printed, but it will provide useful guidelines.

Washing and Drying Prints

Finished prints must be washed free of fixer, or they will deteriorate in time. A short running-water wash — about 4 minutes — is recommended for resin-coated papers. However, fiber-based papers absorb more fixer so need a much longer water wash, almost a full hour. It is best to presoak fiber-based prints in a solution of fixer remover, and then wash them. Use the fixer remover for about 2 to 4 minutes, then wash the prints for 5 to 15 minutes. These times will vary with the weight of the printing paper (double-weight paper takes longer to wash than single-weight paper) as well as the brand of fixer remover used, and the efficiency of the print washer. Some manufacturers recommend a brief water rinse, about 2 minutes, before using the fixer remover.

RC prints should be washed, then dried, soon after they have been fixed, but fiber-based prints can be stored in the holding bath (a tray of plain water) until the end of the printing session. Change the water in the holding bath every 30 minutes or so to minimize the accumulation of fixer in the water.

To wash fiber-based papers, mix the fixer remover and pour it in a tray. Take prints from the holding bath, drain them briefly, and slide each print one at a time into the fixer remover. Do not put too many prints at once into the fixer remover. Limit this step to approximately

Washing prints with a siphon and a processing tray with holes punched out at the sides, toward the bottom.

10 to 15 prints. If more prints need washing, do them in additional batches.

When all the prints are in the solution, start the timing, and agitate the prints by constantly shuffling the bottom prints to the top. Use rubber gloves, if available, to minimize skin contact with the chemicals.

At the end of the required time, drain each print briefly, then place them one at a time facedown in the water wash.

To wash either resin-coated or fiber-based prints, use a good print washer that will effect a constant change of water. For example, if fresh water enters from the bottom, it should spill over the top of the washer to drain. Some excellent (and expensive) print washers are available to maximize washing efficiency, but there are inexpensive alternatives.

A good washer can be made using a plain processing tray, a bit larger than the prints to be washed, along with a *tray siphon*. The siphon is an inexpensive plastic device that clips onto the side of a tray. It connects with a rubber hose to a standard faucet. Water from the faucet enters the tray at the top of the siphon, and tray water drains off at the bottom. To help the draining action further, use a hammer and nail to make holes at the sides toward the bottom of the wash tray.

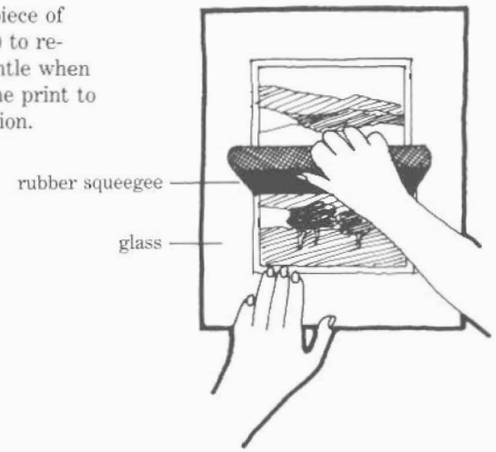
When washing prints, agitate by hand to keep them from sticking together. If the drain action of the washer used is not efficient, manually drain the tray every few minutes and let it fill up again with fresh water.

Once washed, prints should be squeegeed to remove excess water for quicker and more even drying. Place each print, one at a time, facedown on a large, clean sheet of glass or Plexiglas. Actually, any flat, waterproof surface will do. Push a rubber squeegee or sponge over the back of the print. Do not push too hard or the print may crease. Turn the print over, and lightly squeegee the front, taking extra care not to scratch the emulsion. (Some photographers prefer to squeegee only the back of a print.)

Once washed and squeegeed, prints are ready to be dried. Air drying is the simplest and cheapest way. Hang each print by a corner from a clothesline (or piece of string). Or hang two prints, back to back, with four clothespins, one on each corner, to help reduce the tendency of prints to curl. Or lay the prints faceup on a clean counter or table.

Simple drying screens can be constructed for more efficient air drying. Make a frame out of four inexpensive wood strips (1″ × 2″

Squeegeeing a print on a piece of glass (or other flat surface) to remove excess water. Be gentle when squeegeeing the front of the print to avoid scratching the emulsion.



stock works well), and staple plastic screening (available from any hardware store) to the frame. The screens do not need to be especially strong, since prints weigh so little. The wood can be hammered or screwed together, and metal corner braces used to keep the frame square.

Drying screens can be made to any size to fit space and storage requirements. Several screens can be stacked one on top of another to save space. They should be washed periodically with a mild soap solution.

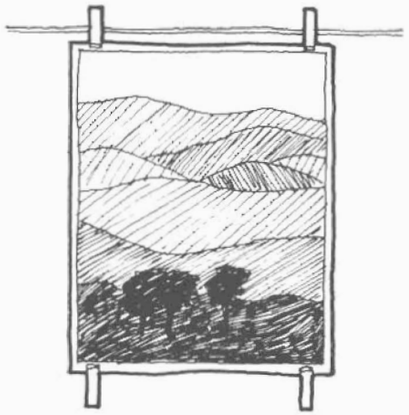
RC prints should be placed emulsion side up on drying screens; they will air dry in approximately 15 to 30 minutes. Fiber-based prints should be placed emulsion side down to minimize curling; they take much longer to dry, 3 hours or longer. These times will vary with the temperature and humidity of the drying area. To minimize curling, remove the prints from the screens as soon as they are dry.

Print blotters are another inexpensive and easy way to dry prints. They are available in rolls, spiral-bound books, or single sheets.

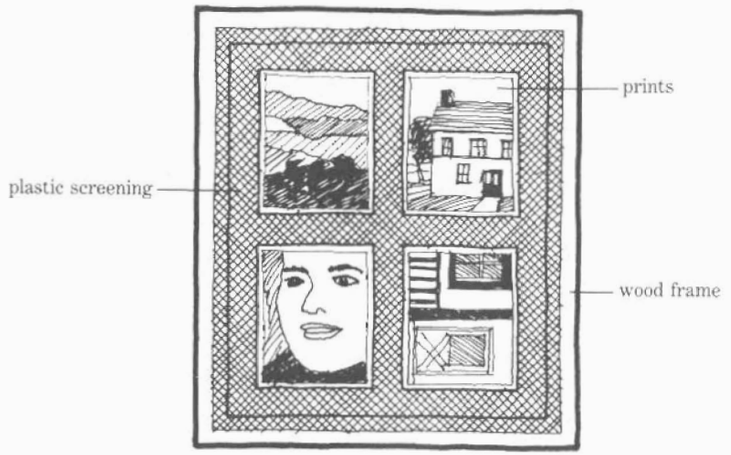
To use blotters, place each squeegeed print between pieces of the blotter paper until dry. Blotters can be reused often, but must be replaced from time to time. Prints take longer to dry when placed in blotters than in the air. However, blotters take up less room than screens or clotheslines, and are portable in case prints must be moved while still wet.

Air drying

Hanging a print to dry by the corners from a clothesline.



Laying prints on simple drying screens (top view).



Many types of electrically heated driers are available for both resin-coated and fiber-based prints. Simple models have a metal heating unit with a cloth cover. Prints are placed between the cloth and the metal plate, and the heat dries them. More expensive models have an electrically rotating drum as a heating unit that pushes prints through and dries them automatically.

Some driers are set up to handle resin-coated papers, and others are not. Air drying is always recommended for RC prints unless a good electric RC print drier is available. A hand-held hair drier can be used for quick drying, but is generally not recommended.

Contact Printing

A *contact print* is a print the size of a negative. A contact print from a 35-millimeter negative measures 1″ × 1½″; a contact print from a 2¼″ × 2¼″ negative measures 2¼″ × 2¼″; and so forth.

A *contact sheet* is a large sheet of paper, usually 8″ × 10″ or 8½″ × 11″, containing a series of contact prints.

"Contacts" are best used as proof sheets. An entire roll of film is contact-printed onto one single sheet of paper. Each contact print is then examined for its value, and only those that look promising need be individually printed, saving much time and money (in wasted chemicals and printing paper).

Contact sheets also provide a useful way to file work by numbering rolls of negatives to correspond to each contact sheet. For example, designate the first roll of negatives as #1, and mark the negative envelopes "1." Then mark the contact sheet of that roll accordingly, as "1." Such a numbering system will become extremely valuable when there are a lot of negatives and contact prints to keep track of.

The back side of a contact sheet can also be used to store additional information, such as where, when, or how the pictures were taken.

Large-format negatives are sometimes contact-printed to make a final print. A 4″ × 5″ negative makes a 4″ × 5″ contact print that is large enough to view. Because the negative is not enlarged, the print will have maximum sharpness and minimum grain.

To make a contact print:

1. *Position the enlarger housing near the top of its post,* so it projects a wide circle of light when turned on. The aperture setting is optional; start with f 8 or f 11.

2. *Place a fresh sheet of 8″ × 10″ printing paper, emulsion side up, at the base of the enlarger.* Do not use an easel.

Contact prints

A contact sheet of contact prints from an entire roll of 35-millimeter negatives. This illustration is reduced in size. The original sheet is 8″ × 10″.

3. *Position several strips of negatives emulsion side down in rows on the paper.*

4. *Then gently lower a clean sheet of glass (preferably heavy-weight) over both the negatives and paper* to hold them flat and tight against each other.

5. *Turn on the enlarger for a predetermined period of time.* Try f 8 at 5 seconds. A test strip can be made to determine exposure, using an "average" negative for the test. Over an entire roll of negatives, some may print light and others dark, so simply aim for a good overall exposure.

6. *Once exposed, process the contact sheet like any other print.* If it is too dark, try another sheet and expose for less time; if too light, expose for more time. If the same enlarger, lens, and printing paper are used, the time should stay pretty much the same from contact sheet to contact sheet, assuming reasonably consistent negatives.

Contact prints can also be made without an enlarger. Use a 15- or 25-watt light bulb positioned 3 feet or so above a counter or table. Place the paper, negatives, and glass under the light, and briefly turn the light on to make the exposure.

A Simple Printing System

A print is sometimes difficult to evaluate. Is it too light or too dark? Does it have too much or not enough contrast? With experience these judgments can be made intuitively. The following method will help systematize the process.

For film, the rule is to "expose for the shadows and develop for the highlights," but for prints the opposite is true:

Expose for the highlights;
adjust contrast for the shadows.

To use this system, consider only the important highlight and shadow areas of a print. Middle-gray areas tend to "fall in place" and look right if the lights and darks are rendered well on the print.

Expose for the highlights. Print exposure affects the overall print: highlight, middle-gray, and shadow areas. The longer the exposure, the darker the entire print.

With this system, consider a print well exposed only if the highlights (such as light clothes or light skin) look right. Ignore middle gray and shadow areas for judging exposure. If the highlights look good, the exposure is correct; if they seem light, add exposure; if they seem dark, cut back on exposure.

Ignore extreme highlight areas, such as particularly bright snow or sky, when judging exposure. Consider the entire print. Unusually bright areas need burning in after the exposure and contrast have been determined.

What constitutes good highlight exposure is somewhat subjective. For most prints, highlights should be light gray, containing clearly defined detail. Compare the highlights to the white border of the printing paper. They should be darker than that white. If highlights are too light, detail will be lost; if too dark, highlights are no longer light areas, but rather middle grays or shadows.

Adjust contrast for the shadows. Once the proper highlight exposure has been determined, examine the important shadow areas, such as dark hair and dark clothes. Ignore extremely dark areas. These can be dodged out during the print exposure.

In most prints, good shadow areas should be dark, but still retain detail. Shadows that are too dark become solid black; shadows that are too light look gray and "muddy."

Frequently, once the highlight areas are well exposed, the shadows and, therefore, the contrast look right, and no contrast adjustments are needed. However, if the shadow areas are too dark, the print needs less contrast, perhaps a #1 paper grade; if the shadows are light, it needs more contrast, possibly a #4 grade. Added contrast will result in darker shadows.

Final changes. The final step is fine-tuning the print. After adjusting contrast to suit the shadow areas, make sure the highlights of the new print match the original print where highlight exposure was judged to be correct. The contrast change may have lightened or darkened the highlights somewhat, so the new print may need a bit more or less exposure. Or, looking at a print with more or less contrast may make the highlights seem lighter or darker than before. In addition, changing paper grades (or filters) usually alters comparable exposure times, so some fiddling with new times and even additional contrast changes are commonplace.

Fine-tuning a print can be difficult, especially if the negative is technically bad — either dark, light, or with too much or too little contrast. Well-exposed and well-developed negatives are rarely difficult to print.

At all times, keep in mind that the key to evaluating print exposure is in the highlights. If the light areas look good, the print is well exposed. Then, the key to evaluating contrast is in the darkness or lightness of the shadow areas.

Miscellaneous Considerations

· If possible, try to use a range of print exposure times of approximately 10 to 15 seconds. Short times can make dodging difficult because the dodging time must be very short. Long times can make burning times too long and tedious. Also, enlargers can be bumped or moved slightly during long exposures, and cause the printed image to be less sharp than it could be.

· Thin negatives nearly always print flat — with low contrast — so generally need a #3- or #4-grade paper for a higher contrast print.

· Prints generally dry slightly darker than they look when wet. The difference is subtle, but should be considered.

· The larger the print, the more exposure it needs. A negative that needs f 11 at 10 seconds for a good 5″ × 7″ print needs about f 11 at 20 seconds for a good 8″ × 10″ print. Make a test strip to determine the new exposure.

· As discussed earlier, an enlarged negative loses contrast. A negative that prints well on a #2-grade paper at 5″ × 7″ needs a higher grade paper — about a grade #3 — for a print of comparable contrast at 8″ × 10″.

· Always develop prints for at least the minimum time recommended by the manufacturer. Prints pulled from the developer prior to full development may be streaked and will lack solid blacks. If the print is becoming too dark, make another print at a shorter exposure and develop that print fully.

· *Gang-printing* means making several prints from a single negative in one batch. First, establish the exposure, contrast, burning, and dodging needs of a print, then expose several sheets of printing paper one after the other accordingly. (Be sure to place exposed paper out of the way of the enlarger light when working on subsequent prints.)

Once several prints, perhaps six or seven, have been exposed, place each one facedown in the developer, one at a time, so that each print is thoroughly soaked before another is added. Once all the prints are in, start timing the process. Then shuffle the prints from the bottom to the top of the pile. Keep shuffling until the developing time is nearly completed. Pick up all the prints from the solution, drain them briefly, and place each print in the stop bath, then in the fixer one at a time, and repeat the shuffling process. Drain all the prints well before placing them in the holding bath.

When gang-printing, use rubber gloves to protect hands from chemical contact. Also, use oversized trays, if possible, to facilitate the shuffling action.

· *Archival* standards for processing negatives and prints suggest guidelines to maximize the permanence of these materials. Unless

processed, washed, and stored correctly, negatives and prints may fade or deteriorate with time. Just how much time depends on the materials and processes used. The fixing and washing steps are especially critical to preservation.

Museums, archives, and art collections have a particular interest in the archival handling of prints. Most photographers do not need to adhere to such strict archival standards for their own work. They should, however, be aware of the potential problems, and take care to process and wash negatives and prints for the correct amounts of time in fresh solutions, according to the manufacturers' suggestions. Extra care may be indicated for negatives and prints of special value.