The Negative
Traditional and Alternative Options

OVERVIEW AND EXPECTATIONS

In this chapter, I start you off with a magical excerpt from 1760, Tiphaigne de la Roche's (1729–1774) Giphantie. In his poetic literary vision you will see a conception of modern photography nearly eighty years before it was officially described to respective scientific societies in France and England. Also presented in this chapter is a little history of curious individual and scientific connections regarding the conception of the photographic negative. You will also be provided with a variety of negative options for alternative processes and will learn how to understand Rochester Institute of Technology (RIT) graduates when they talk about them.

We'll discuss a wide variety of alternative negative production methods, including single stage negative to negative, multistage interpositive to negative, and various types of films that you can utilize for contact printing. This chapter briefly discusses basic exposure and development theory. Pyro development, and Dave Soemarko’s contemporary LC–1 and LC–1B process for creating continuous tone negatives with lith film. You do not have to hunt around in this chapter for information on working in digital formats, because that subject is discussed in Chapter 3, “The Digital Option.”

If you are “white lab coat” impaired then you will appreciate that I have done my best to make this chapter uncomplicated so that you can successfully get underway with alternative process contact negative production. If you want more information I have provided a few references, and the appendices are abundant with data, resources, and recommendations for reading, chemistry, and materials.

A LITTLE HISTORY

Imaginative intellects, artists, and writers throughout recorded history have revealed the concept of a mirror that forever captures the image that it reflects, like Narcissus’s image in the water. The Roman poet Publilius Papinius Statius (40–96 A.D.) expressed this sentiment within his five-volume epic Silvae, but the most notable example of the written premonitions is found in Tiphaigne de la Roche’s Giphantie, 1760. In the following excerpt, de la Roche describes the imminent discovery of photography.
A Vision from 1760

That window, that vast horizon, those black clouds, that raging sea, are all but a picture. You know that the rays of light, reflected from different bodies, form a picture, and paint the image reflected on all polished surfaces; for instance, on the retina of the eye, on water, and on glass. The elementary spirits have sought to fix these fleeting images; they have composd a subtle matter, very viscous and quick to harden and dry, by means of which a picture is formed in the twinkling of an eye. They coat a piece of glass with this matter and hold it in front of the objects they wish to paint. The first effect of this canvas is similar to that of a mirror; one sees there all objects near and far, the images of which light can transmit. But what a glass cannot do, the canvas by means of its viscous matter, retains the images. The mirror represents the objects faithfully but retains them not; our canvas shows them with the same exactness and retains them all. This impression of the image is instantaneous, and the canvas is immediately carried away into some dark place. An hour later the impression is dry, and you have a picture the more valuable in that it cannot be imitated by art or destroyed by time. The correctness of the drawing, the truth of the expression, the stronger or weaker strokes, the gradation of shades, the rules of perspective, all these we leave to nature; who, with a sure and never erring hand, draws on our canvases images which deceive the eye.

— Charles François Tiphaigne de la Roche, Giphantie, Paris, 1760

In 1614, Angelo Sala wrote of his experiments in which silver nitrate inexplicably turned dark on exposure to sunlight. Shortly thereafter, in the mid 1600s, the Irish scientist Robert Boyle (1627–1691) was playing around in his laboratory when he observed that the silver chloride compound he was working with turned from light to dark. Boyle, unfortunately, thought that the foul air in his lab had caused the reaction and didn’t pursue the alternative explanation that ultraviolet (UV) light was responsible for the change. Boyle, by the way, was the gentleman who invented Boyle’s Law (1662), the most important physical law of SCUBA diving: ambient pressure increases volume decreases, and vice versa. Boyle was also a founder of the Royal Society where Talbot eventually had his day in the sun describing his practical photographic discoveries that ironically included the sensitivity of silver chloride to UV light.

In 1802, Thomas Wedgewood (1771–1805) and his friend Sir Humphrey Davy (1778–1829) made what might have been the first photogram. Wedgewood, who was familiar with the work of Heinrich Schütze and Karl Wilhelm Scheele, experimented with the light-sensitive properties of silver salts, began casting paper, glass, and white leather with silver nitrate solutions and laying stencils on these surfaces in sunlight. During exposure the silver salt sensitized turned gray, purple brown, and eventually black in the areas that were not filtering or blocking, the light. You can replicate this same effect by exposing a piece of silver gelatin printing paper to the sun. Wedgewood’s “Sunprints” required only a simple water wash to remain visible and were successful enough that his friend Davy decided to document their creations. There was, however, a paradox within the discovery: the light that Wedgewood needed to make an image would also destroy the image when he tried to show it off. In spite of this, Wedgewood found that he could exhibit his stencil photograms by the low illumination of candlelight, allowing his accomplishments to be duly recorded. Although there is evidence that some of these prints were still viable until the 1890s, I do not believe that any are in existence today.

By the early or mid 1800s, artists were employing photogram techniques with both creative and practical scientific intentions. Notable at this time were Sir John Herschel (1798–1871) with his flower etchings Antithotypes, Anna Atkins (1799–1871) for her wonderful cyanotype studies of algae, the Scotsman Moffat Panton (1801–1880), who employed potassium dichromate as a light-sensitizing solution for his “shadowgraphs”; and William Henry Fox Talbot (1800–1877), who was making Photographic drawings with waxed-paper negatives.

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(Courtesy of the George Eastman House, Rochester, NY)
on his Calotype, and between 1843 and 1847 they made nearly 2,000 images. (Adamson died in 1848 at the age of 27.) What was really unprecedented about their collaborative work was its artistic scope. As a result of Hill’s obsession with making photographic images that recorded the true essence of the subjects, he and Adamson were, in my opinion, the first individuals to introduce the concept of artistic intention in harmony with the new science of photography.

In March 1851, Frederick Scott Archer (1813–1857) changed the landscape of photography forever. Prior to 1851, the principal photographic options available, providing you with a group portrait of the over 400 people who had recently founded the Free Church of Scotland, Talbot turned the Calotype as a means of recording each person’s likeness and secured the services of Robert Adamson (1821–1848) as his technical assistant. Between 1843 and 1847 they made nearly 2,000 images. What was really unprecedented about their collaborative work was its artistic scope and Hill’s obsession with making images that recorded the subjectively true essence of the subjects; they had introduced the concept of artistic “intent” in harmony with the new science of photography.

During the “brilliant summer of 1835” Talbot created the first camera-made paper negative that could be used to generate a positive photographic print. He sensitized writing paper with repeated alternating baths of salt (sodium chloride) and silver nitrate. While the silver chloride-sensitized paper was still wet, Talbot placed it in one of his “moulage” cameras (since his patient wife, Constance, had given these to the machines) and made an exposure in sunlight. At one point, after a particular exposure had failed to yield an image, Talbot decided to reexpose the paper again with a solution of gelatin nitrate of silver (silver nitrate, acetic acid, and gallic acid) and saw to his amazement that his failed exposures latent image was emerging. He preserved the image with a bath of potassium bromide, and, after it had dried, used the print as a contact negative to sensitize a piece of paper. He initially called the results of this process Talbotypes or Calotypes (1840), and a year later, after a few improvements, Talbot placed a very restrictive patent on the process, effectively putting the brakes on the new medium.

In 1834, Talbot published a second photographically illustrated book (Anna Atkins was the first), The Pencil of Nature. Around 1843, something very interesting happened to the new medium of photography. A portrait painter by the name of David Octavius Hill (1802–1870) entered into a business partnership with scientist Robert Adamson (1821–1848). Hill had already been a printing commissioner to paint a group portrait of the 400-plus people who had recently founded the Free Church of Scotland. Because it wasn’t practical to paint hundreds of people from life, Hill adopted Talbot’s Calotype as a means of recording each person’s portrait to use as a visual guide for his massive painting. To accomplish this task, Hill secured the services of Adamson as his technical expert for the project. Because both were from Scotland, they were geographically free of the patent restrictions that Talbot had placed on his Calotype, and between 1843 and 1847 they made nearly 2,000 images. (Adamson died in 1848 at the age of 27.) What was really unprecedented about their collaborative work was its artistic scope. As a result of Hill’s obsession with making photographic images that recorded the true essence of the subjects, he and Adamson were, in my opinion, the first individuals to introduce the concept of artistic intention in harmony with the new science of photography.

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During a residence in Geneva, in 1834, Talbot tried working with Day’s information and discovered that the opposite was true and that Day’s silver iodide formula was not sensitive to light in the least. Talbot immediately began to use this knowledge as a way to fix his silver chloride images by dipping them in a bath of alkaline iodide following exposure. Unfortunately, although this treatment stopped the darkening of the print, it caused the opposite effect of fading the image after several days if the print were subjected to light. During the “brilliant summer of 1835” Talbot created the first camera-made paper negative that could be used to generate a positive photographic print. He sensitized writing paper with repeated alternating baths of salt (sodium chloride) and silver nitrate. While the silver chloride-sensitized paper was still wet, Talbot placed it in one of his “moulage” cameras (since his patient wife, Constance, had given these to the machines) and made an exposure in sunlight. At one point, after a particularly exposure had failed to yield an image, Talbot decided to reexpose the paper again with a solution of gelatin nitrate of silver (silver nitrate, acetic acid, and gallic acid) and saw to his amazement that his failed exposures latent image was emerging. He preserved the image with a bath of potassium bromide, and, after it had dried, used the print as a contact negative to sensitize a piece of paper. He initially called the results of this process Talbotypes or Calotypes (1840), and a year later, after a few improvements, Talbot placed a very restrictive patent on the process, effectively putting the brakes on the new medium.

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The exceedingly long time it took to make exposures, and that it was one of a kind product. The Calotype image existed on paper and was reproducible, but the image quality was inferior because of the contact paper negative required to make a print. The desirable solution to this limited menu was a single imaging system that could be simultaneously reproducible, finely detailed, and fast enough to consider recording actual life. In 1845–1846, Christian Friedrich Schönbein (1799–1868) discovered nitrated cotton (gun cotton) by com-
a bit of candid behavior. It was also democratically priced, being a fraction of the cost of the Daguerreotype. Incidentally, shortly after Archer published his experiments, enterprising photographers realized that an underexposed wet collodion negative, when laid on a dark background and viewed in reflective light, would appear as a positive. This visual phenomenon led directly to the even more democratically available Ambrotype and tintype processes.

Due to the obvious improvements, Talbot's patented process was abruptly replaced as the process of choice. Feeding injured, Talbot filed a suit against portrait photographer Silvester Laroche (1809–1886), claiming that the wet collodion process Laroche was using had a direct link to his Calotype process and was thus an infringement on his patent. In December 1854, the beswilled court disagreed. Because there was little point in using the bulky Calotype now that Archer's sharp and reproducible wet collodion process was patent free, Talbot decided not to renew his claim, and photography became democratic.

The irony of this history is that Archer's generosity to the medium allowed many entrepreneurs to make their fortunes with his invention while Archer himself experienced poverty and hardship until the end of his life.

In 1871, an Englishman by the name of Dr. Richard Leach Maddox (1816–1902) produced the first successful silver bromide, dry plate emulsion. In other words, it was possible to make a negative on a glass plate at any time and not just when the plate was wet with the sensitized collodion emulsion. It also was no longer necessary to take your darkroom with you when you went out to make some pictures. Maddox's achievement, free to the world like Archer's wet collodion, was described in an issue of the British Almanac, and one of its readers was a young man named George Eastman (1854–1932) whose occupation at the time was coating and developing wet plate collodion glass plates.

Eastman theorized that if photographers could use a dry plate negative system, then their cameras could be smaller and negative development would be less cumbersome and complicated. He also surmised that image development could wait until the end of the shooting experience rather than having to be done immediately following exposure times in seconds rather than minutes. This exposure speed allowed the subject of a portrait to exhibit mingling cotton fibers in a mixture of sulfuric and nitric acids. Ironically, in 1847, a young medical student in Boston by the name of John Parker Maynard formulated a durable, skinlike, medical dressing from the guancotton called collodion that could be used to treat wounds from Schönbein's explosives. In 1850, Gustave Le Gray proposed the idea that Parker's collodion solution could be applied to photographic purposes because it was the perfect vehicle for holding a light-sensitive solution on glass. Shortly after, in March 1851, Frederick Scott Archer described an application of salted collodion on sheets of glass for the purpose of making glass plate negatives.

Archer detailed a process where potassium iodide was combined with a solution of diluted collodion applied to a glass plate, which was then immersed in a silver nitrate bath resulting in a light-sensitive layer of silver iodide. This sensitized glass plate was exposed in a camera immediately after being withdrawn from the silver nitrate, developed in a solution of pyrogallic acid, and fixed in sodium thiosulfate. The advantages were immediately evident. The process provided a sharp, reproducible image negative and was far more sensitive, especially in the wet state, permitting exposure times in seconds rather than minutes. This exposure speed allowed the subject of a portrait to exhibit

![Figure 2–7](Francis Frith (1822–1898), Interior of the Hall of Columns, Karnac, Thebes, Luxor, Egypt, 1857–1858 (From a wet collodion negative))

Between 1856 and 1860 Frith made several trips to the Middle East, including one of over 1,500 miles up the Nile River. Working with the wet collodion process in a portable darkroom, Frith endured temperatures of over 120°F and the problems of sand, dust, and flies settling into his fresh, and tacky, collodion emulsions.

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The beauty of Eastman's Kodak system was that it eliminated the psychological barriers of the technical and allowed the amateur to make photographs without the need of chemistry or a darkroom. Eastman's motto, "you press the button, we do the rest," transformed photography by establishing a comprehensive photofinishing industry that was accessible to everyone.

(E Courtesy of the George Eastman House, Rochester, NY)
The recommended development times given to films are important to you in that the longer the film is developed, the greater the contrast for that particular film. When your film is being processed and being "pushed" beyond a normal development time, the areas that have received the least exposure (your shadow) will darken to the same degree as the more exposed areas (your highlights). Up to a point, the extended development's effect on the highlight areas of the negative will create an increasing contrast with the shadow areas. A basic rule of thumb for more contrast in your negatives, underexpose and overdevelop (pull) your film. Pulling basically means to develop your film so that the contrast is reduced relative to what the contrast would be if the film were developed for a normal time. For less contrast, overexpose and underdevelop (push) the film. Pulling basically means to develop your film so that the contrast is reduced relative to what the contrast would be if the film were developed for a normal time. After development, the resulting negative will exhibit a menu of tonal values that many large format photographers refer to as zones. In a negative, these zones are given calibrated values with numbers that can be applied to the lightest low-density shadows (low density equals degrees of transparency) and the darkest high-density highlights of the negative. When all of these assigned values and numbers are stirred together you begin to encounter assorted theories about the Zone System, which, thank your lucky stars, we will not go into in this book.

In 1888, Eastman began to manufacture the Kodak 1A camera, loaded it with a roll of flexible film able to record 100 images, and sold it for under $25. The owner of the camera would shoot the film, send the camera back to Kodak with the exposed film still inside, and get a freshly loaded camera (not necessarily the same one that was sent in with the exposed film) and two circle-shaped images of each exposure. The beauty of Eastman's Kodak System was that it eliminated the psychological barriers of the technical and allowed the amateur to make photographs without the need of technical instruction, chemistry, or darkroom. Eastman's idea revolutionized the medium of photography by creating a complete photo-finishing industry that was defined by its advertising motto, "You press the button, we do the rest."

As an aside, there is good story that the word Kodak was invented by a group of linguists and language experts at the request of George Eastman. Legend has it that Eastman wanted a name for his company that had no meaning or similar spelling, in any language on earth. The one that the language experts came up with was Kodak.

The early 1900s, the photogram reemerged. Christian Schad used torn paper as a photogram source to make negative images. Schad, a principal member of the Cubist movement (inspired by Paul Cézanne and adapted by Pablo Picasso and Georges Braque), used photography to address the same issues being explored in contemporary Cubist painting to illustrate the emotional forces of three-dimensional objects, seen two-dimensionally at once from many vantage points of place and time. Examples of the graphic power of a photogram can be seen in the work of Lucia and László Moholy-Nagy, Alexander Rodchenko, George Kepes, and Man Ray.

**An Appropriate Moment to Explain Things**

Let me try to make this simple. If you are standing on the beach in the moonlight, and the lunar light is illuminating your body, the darks are excellent in that there is a shadow of you nearby. That shadow against a field of sand is essentially a negative of you in the moonlight, and the best way to describe it is with the concept of a photogram.

The term photogram is used to describe a direct shadow pattern—the result of exposing a layer, or layers, of transparent, translucent, or opaque objects directly on a photographic emulsion. The effect is like a negative in that the degree of transparency in the layers allow light to pass through to a sensitized emulsion according to their respective densities. The most transparent objects allow the greatest exposure, whereas the least transparent prevent exposure. A photogram on paper is different from a negative because it is a one-of-a-kind image.

This is pretty elementary, but all negatives have visible zones of film density that describe the amount of silver that has been exposed and developed on the film. Clear or thin areas of the negative have the least exposed and developed silver and are primarily dependent on development. Darker and dense areas of the film have a great deal of exposed and developed silver and are most dependent on exposure. The center of this equation is an 18% gray (average film density of around .65) that is relative to any exposure made according to a light meter's normal 18% gray, Zone 5, recommendation.

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Just for your information, the ability of the normal photographic paper to render highlight densities is maximized in the vicinity of a 1.2 average density reading in the negative. In platinum/palladium printing, for instance, the process has the ability to render a much greater range of densities in the negative. Thus the compelling need to have a negative to match the almost linear curve of a perfect platinum negative. It is possible for the Pt/Pd process to render highlight densities beyond a densitometer reading of 2.0.

When working in non-silver and alternative processes it is necessary to create a negative, or a positive, that will match the negative print; one that can be contrast printed in direct sun or ultraviolet (UV) light. Most photographic artists have occasional desires to make big and impressive images. Being able to produce an enlarged duplicate negative is one of the only ways that you can carry around a small camera and eventually make large enough negatives for alternative contact printing. For all but the most dedicated large format photographers, this is a true bonus.
CHAPTER 2 THE NEGATIVE

Commercial Labs

If you need perfection, can’t do it yourself, or can’t afford the materials or time, you might consider hiring a commercial lab, or a service bureau, to make a negative for you. Consult the Yellow Pages and the resource listings in Appendix H, and ask those who work with these businesses who they would recommend. It is important that you hire a service bureau that is familiar with the needs of alternative process artists.

The Copy Machine

Most commercial copy services are capable of producing an enlarged duplicate film of whatever flat 2-D source you give to them. The quality is often inferior, but that particular look may be exactly what you are searching for. Check your local library as well because they often have a machine that will produce a crude medium-size transparency.

The Desktop Printer and Film Recorders

Desktop scanners and printers seem to get more sophisticated and affordable every few months and are now able to provide extremely high quality and resolution on film and on paper. Making an enlarged duplicate negative is an option for some ambitious “gummers,” while others will simply alter their exposure times or pigment to sensitize ratios. Also, in non-silver contact printing, burning and dodging are not practical techniques, and making adjustments during the interpositive phase (step #7 of a two-step process) will yield corrections that you might make during a normal paper exposure.

Another reason for enlarging your negatives is that in the real world your original negative will not have the correct tonal values for a particular process. For instance, platinum/palladium negatives will make you smile if they exhibit a healthy contrast and an average negative density of 1.5 to 1.7, printable only on a silver gelatin paper with a grade of 0. If in another example, gum bichromate prints may require a negative of the same image, each having a different average density. Making an enlarged duplicate negative is an option for some ambitious “gummers,” while others will simply alter their exposure times or pigment to sensitize ratios. Also, in non-silver contact printing, burning and dodging are not practical techniques, and making adjustments during the interpositive phase (step #7 of a two-step process) will yield corrections that you might make during a normal paper exposure.

Acrylic Films from Printed Sources

To make an unusual acrylic and flexible positive/negative to use in a contact printing or enlarging process, try appropriating magazine reproductions printed on “clay-coated” paper (high-quality inks and paper stock) and utilizing them as conventional images, distorted images, montage and/or collage sources. Clay coating, in this sense, defines an ink-printed page where a film of clay dust or talc is sprayed on freshly printed sheets of paper to prevent them from sticking together during the print run. Another image source that is less common but one

What Does Negative Density Mean?

Let’s say that when you’re reading the directions for platinum/palladium you come across some information that asks you to try having a negative with an average density range of 1.5. The majority of readers will say, “O.K.” and read on hoping for the best—unless that number is one that they have looked into before or they have a little experience with densitometers and parametric curves.

The 1.5 number comes from measuring the value for the thinnest shadow with detail with a densitometer and giving it a number. Let’s say that the number you calibrate with the densitometer is 0.35.

Next, you will measure the value for the densest highlight with detail. Let’s say this new number has value 1.85.

To find the average density of this negative all that you have to do is subtract the thinnest shadow number from the densest highlight number. In this convenient example you will come up with the number that was recommended to you for the process: (1.85 minus 0.35 = 1.5).

Duplicating can be either a single stage negative-to-negative process using a film such as Kodak’s S0-132 or a multistage negative to interpositive to negative with a film such as a two-step Ortho or Artistic Premium Half-tone Supreme (APHS) (see Appendix H). In a multistage duplicating process using lith film, you can increase the density range in the interpositive step and go for the contrast in the negative step. Refer to Dave Sommers’s LC-1 and LC-1B system for long tonal scale lith film interpositives and negatives later in this chapter.

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If you need perfection, can’t do it yourself, or can’t afford the materials or time, you might consider hiring a commercial lab, or a service bureau, to make a negative for you. Consult the Yellow Pages and the resource listings in Appendix H, and ask those who work with these businesses who they would recommend. It is important that you hire a service bureau that is familiar with the needs of alternative process artists.

The Copy Machine

Most commercial copy services are capable of producing an enlarged duplicate film of whatever flat 2-D source you give to them. The quality is often inferior, but that particular look may be exactly what you are searching for. Check your local library as well because they often have a machine that will produce a crude medium-size transparency.

The Desktop Printer and Film Recorders

Desktop scanners and printers seem to get more sophisticated and affordable every few months and are now able to provide extremely high quality and resolution on film and on paper. Making an enlarged duplicate negative is an option for some ambitious “gummers,” while others will simply alter their exposure times or pigment to sensitize ratios. Also, in non-silver contact printing, burning and dodging are not practical techniques, and making adjustments during the interpositive phase (step #7 of a two-step process) will yield corrections that you might make during a normal paper exposure.

Another reason for enlarging your negatives is that in the real world your original negative will not have the correct tonal values for a particular process. For instance, platinum/palladium negatives will make you smile if they exhibit a healthy contrast and an average negative density of 1.5 to 1.7, printable only on a silver gelatin paper with a grade of 0. If in another example, gum bichromate prints may require a negative of the same image, each having a different average density. Making an enlarged duplicate negative is an option for some ambitious “gummers,” while others will simply alter their exposure times or pigment to sensitize ratios. Also, in non-silver contact printing, burning and dodging are not practical techniques, and making adjustments during the interpositive phase (step #7 of a two-step process) will yield corrections that you might make during a normal paper exposure.

Acrylic Films from Printed Sources

To make an unusual acrylic and flexible positive/negative to use in a contact printing or enlarging process, try appropriating magazine reproductions printed on “clay-coated” paper (high-quality inks and paper stock) and utilizing them as conventional images, distorted images, montage and/or collage sources. Clay coating, in this sense, defines an ink-printed page where a film of clay dust or talc is sprayed on freshly printed sheets of paper to prevent them from sticking together during the print run. Another image source that is less common but one...
that allows you to use your own images is the laser transfer copy print. When making copies, ask that your black-and-white images be copied in color formatting because this will give you additional layers, beyond a single black, of thermographic dyes to transfer.

**Basic Materials for Acrylic Lifts**

- High-quality printed magazines (Time, Vogue, Esquire, etc.)
- Acrylic Gloss/Gel Medium
- A clean and dry coating surface (Masonite or Plexiglas® sheet)
- Brush (foam or watercolor type)
- Hot water in a tray with a little detergent
- Hairdryer

**The Technique**

With a foam brush, apply an even and thin coat of acrylic gloss medium over the magazine image you wish to make an acrylic lift from. Brush the first coat in a single direction, dry it completely with a hairdryer, and then recall the image in the opposite direction. Repeat these steps until you have 4 to 6 thin coats. Applying thick coatings or continuing to coat once the medium has begun to “set up” will result in a milky, translucent image; so work quickly. Once you have successfully completed these multiple coats, it will be time to separate the ink graphic from the paper support by immersing the coated image in a tray of hot, soapy water. This will eventually cause the paper support to break down and will leave you with the ink image supported in the flexible, transparent acrylic skin. If you get impatient, you can gently rub the paper...
support with your fingertips. The positive acrylic image will appear cloudy at first but will dry clear if you haven't overbrushed in the coating steps.

Once you have removed all of the paper from the image, the positive acrylic image can be applied directly to paper, wood, or glass with a thin acrylic medium or diluted glue. It can also be used as a contact positive for any alternative process. The image can be cut, stretched, mounted, collaged, digitized, and remade on acetate, and played with as you see fit. As you might expect, the positive acrylic image printed as a contact film will yield a negative print. To make a positive print it is necessary to make a film intermediate in the darkroom (see Direct Duplicating Films) or in a digital imaging program where you can scan and “invert” the positive to a negative ink-jet film acetate. You may also try contact printing the acrylic lift onto an RC paper and using the negative RC paper print as a paper negative.

**Polaroid Type 55 Positive/Negative Film**

If you don't want to work with any of the previous options and can be happy with a 4” x 5” negative, consider using Polaroid Type 55 Positive/Negative Film. This ingenious film can be shot in either a conventional 4” x 5” camera or in a pinhole camera that accepts a 4” x 5” Polaroid back.

**Figure 2–15**

Frank Varney, *Lily*, 1998

For this image, Frank Varney attached a 300 mm pinhole zone plate to an old Calumet view camera and shot with Polaroid Type 55 Positive/Negative film. Selenium was used to intensify the near infrared quality of the image. (Courtesy of the author)

Polaroid Type 55 P/N yields both a positive print and a negative. It is important to remember when working with Type 55 that you should be trying to produce a great negative rather than a great positive. It is rare to have both simultaneously. My advice is to use the positive as a way of evaluating the composition and context of your image and to focus your attention on making the best negative for the process you intend to use it for. Often this will mean a thin, washed-out positive that you will be reluctant to show and a negative that is rich and tonally appropriate for the process you are using.

Type 55 film can be cleared successfully in standard hypo-clearing baths and washed for permanence. When I work with Type 55 away from the lab I fill a plastic food storage container with hypo-clearing bath for transport and water wash the exposed film when I return to the studio. In workshops near the ocean, seawater (not from breaking surf) is likely to be in the solution) is also a successful clearing bath but the negatives usually require a clean water wash later on. Be cautious of the fragile Type 55 negative. Be sure to remove the metal strip and developer pod before placing it in the clearing agent. As an added note, when working away from the lab, please bring along a trash bag to throw away all of the refuse that is left once you have gone through all of Polaoid's packaging and packets. Also, be very careful when you separate all of the pieces that make up the pod, positive, and protective outer layer. It is very easy to rip or tear the negative at this stage. Finally, Type 55 P/N is the best film to use in a workshop or class environment due to its ability to allow you to make instant adjustments with exposure and instant gratification for the student. The negatives are more than satisfactory for any process you will be engaged in, and the very nature of the film immediately greatly accelerates a learning curve for students in an alternative process class.

**A Quick Nod to Conventional Films**

Shooting large format negatives in camera is still one of the best options for generating the perfect negative. As mentioned earlier, the amazing improvements in digital cameras, printers, and technology will likely challenge conventional film and wet lab technique in the very near future. In the meantime, however, conventional black and white films such as Kodak's Tri-X and T-Max or Ilford's HP5 + and FP4 can be purchased in a vast assortment of sizes and can be manipulated to your specifications through exposure and development.

Conventional standards for exposure and processing in silver gelatin printing are often lacking when applied to many alternative processes. There are only a few commercial products that are truly ideal for many non-silver applications. These are films where the full range of detailed blacks (thinner parts of the negative) and highlights (the thickest parts of the negative) are explored to the extreme ranges that are possible with a delicate process like platinum/palladium. This single subject, that of film and its relationship to image making, could easily take an entire book to explain, as you will discover if you go looking for one. I personally don't have the deep interest, knowledge, page space, or time to devote to this topic and so I will offer some resources. Be warned: it is very easy to get drawn into the realm of compulsive technique in this genre. The history of alternative process is full of individuals who made stunningly beautiful prints that were in the end, devoid of life, imagination, and inspiration.

**Some Good Sources for More on the Subject**

See Appendix H for additional information on these recommended texts.

- Dick Arentz, Outline for Platinum/Palladium Printing
- Dan Burkholder, Making Digital Negatives for Contact Printing
- Phil Davis, Beyond the Zone System Handbook
- David Fokos, How to Make Digital Negative for Black and White Fine-Art Photographs
- Dick Sullivan and Carl Weese, The New Platinum Print
More Negative Options: The Cliché-Verre

Cliché-verre (in French, among other things, cliché means negative in relation to photography and verre means glass) is a term describing a handmade negative on a transparent base of glass or acetate. It is usually created by applying liquid resist such as paint, syrup, asphaltum, varnish, oils, or ink. The painted glass is either contact printed or projected to a light-sensitive emulsion, whereupon the transparency is placed over the emulsion to make an image. The degree of transparency (tones of density) in the resist allows light to pass through according to density: less resist equals more exposure and vice versa.

The cliché-verre was reinvented by Adalbert Cuvelier in 1853 and used by artists to make reproducible plates for their drawings. Among the most notable of these artists was Jean Baptiste Camille Corot (1796–1875) who used completely exposed and sensitized glass plates as a transparent etching base/negatives for making paper prints of his drawings.

In the nineteenth century, artists who were disciples of the “Barbizon School” of landscape painting coated sheets of glass with hard and soft etching grounds or with black soot to make a transparent etching base/negatives for making paper prints of his drawings.

The etched and scratched lines in the ground allowed light to pass to a bi-chromated colloidal emulsion underneath the plate as a way of making an image on paper. For a quick idea of how this works, take a piece of glass or acetate sheet film and play it on with paint, inks, and resists. Then with a pin, nail, razor blade, comb, etching needle, or pencil, scratch away at the resist. When you’re done, use the resulting image as a contact negative with a conventional silver gelatin paper and you’ll get the idea immediately.

You can also make a camera obscura-like drawing by directing an image from a slide projector or enlarger to a prepared coated glass plate, acetate, or sheet of vellum. In the projected light, trace your image by following the lines formed by the image. If you’re done drawing, you have options. Among them are contact printing to a piece of silver gelatin enlarging paper or as a contact negative in any alternative process. Additionally, this technique is a terrific way to include text in your imagery. Simply create the text in your computer, print it out on an acetate, and use it as a cliché-verre layer during exposure.

Projection

The use of light projection, through either a positive or negative transparency, is another option when dealing with film as the primary force in a final image. I think of both variations as “alternative” image making, adhering to my lifelong belief that any creative process that makes use of light, to leave its mark and intention, can be thought of as photography. Negative (or positive) projections can be used in installations and performances. A negative projection from a slide projector can be a time-saving tool in printing large images coated with liquid emulsion. Superimposing these negative projections in conjunction with other media can also allow for the creation of entirely new perspectives of content and intention. Although positive transparency projection is not a negative source, in the way we have very rarely been dealing with film, it offers a wide range of possibilities to the alternative artist. One of the most intriguing uses is the work of my former workshop student, Tim Butler, who uses a projector to make projections on exterior surfaces and to create interior vignettes.
Kodak Aerographic Direct Duplicating Film 2422

This blue sensitive film provides fine grain, medium contrast, and is used for high-quality, one-step duplication of negatives or positives. Although this film requires a high-intensity light source, it basically acts like SO-3, and I mention it here as a film that might work very well with sunlight in a contact printing situation or in a pinhole camera. Students of mine have purchased this film by the roll in 250’ lengths for that purpose with the success edge going to the pinhole option.

A FEW MULTISTAGE DUPLICATING FILMS

Where it is necessary to make an interpositive before making the final negative, multistage duplicating films often provide higher resolution and are more appropriate when you wish to preserve or create a longer tonal scale from black to white. Some feel that they are also more flexible and allow you to alter the original negatives, contrast, shadow, and highlight detail. When making an interpositive it is recommended that you work to ensure that all of your negatives information is translated. It is not as important to you to think about contrast in this stage as it is to think about a fully realized exposure. Contrast can be addressed later in the final interpositive to negative stage with a more aggressive development.

Ilford Ortho Plus

This is an excellent two-step, continuous tone (or high contrast) film with fine grain. This film is a student favorite because of its cost, quality, and simplicity. In the "positive" first-stage Ilford Ortho Plus should be exposed for highlights and developed for shadows, and a conventional paper developer, for 2 to 4 minutes, will be adequate. In the second stage "negative" you will be processing for shadow details and developing for highlights. If your shadow density looks good but the highlights lack substance, increase the stop bath slightly for your developer, and vice versa. This film behaves like P4 without the traditional contrast and can be developed under safelight conditions. Ilford Ortho Plus comes in sheet sizes from 4” x 5” to 10” x 12” and can be developed in ID-11 normally for 6 minutes or 11 minutes for high contrast. You may also use Microphen, which can be developed in 4 minutes for normal development or 7 minutes for high contrast.

Kodak Commercial Ortho Type 3 Film

This is the most commonly found sheet film used for two-step negative duplication in a class darkroom situation. The first stage yields an interpositive and the second stage contact, with the interpositive, results in a negative. It is easy to find and is relatively inexpensive but known for its extremely high contrast when processed in special Ortho A-B Developer. You can make a more continuous tonal scale by altering the developer (for example, 1/3 Ortho AB, 1/3 HC-110 dilution B or D-76 1:3 and Dektol 2:1). The Kodak Commercial Ortho Type 3 film is fragile and foggy easily under bright safelights. It also is prone to pinholes and must be handled with great care. This film is most often used by students for making gum bichromate negatives.

Kodak SO-132

A film such as Kodak’s SO-132 (in the past known as 4168 and SO-339) is an imprisonment sensitive, long tonal range film that is used like a conventional printing paper. It presently costs about $4 a sheet in an 8” x 10” format and is also available in 4” x 5”. SO-132 provides a quick and painless direct duplication from an original small negative to an enlarged negative that can be used directly for contact printing. It is quite convenient because you can work with it under normal safelight conditions and develop it in standard paper, or film, chemistry such as Dektol, D-19, D-76, Xtol, and Duroflo RT. It is relatively fast and allows you to get on with your alternative printing without a great deal of technical meandering. The curious thing about this, and other single stage films, is that they are in opposite manner from the way you normally do in a darkroom with an enlarger and paper chemistry. Burning negative information on SO-132 will result in thinner values in the finished film, while dodging will result in denser values. It does take getting used to.

T-Max Reversal Chemistry

Another single-stage process yielding a positive transparency is Kodak’s T-Max 100, roll or sheet film, exposed for a long tonal scale and processed in T-Max Reversal Chemistry. If you use this film and develop technique, you will get positive images and may then go to the negative stage on a different two-stage film that may offer additional flexibility for manipulation. This process if going to a light film, for instance, may result in a significantly increased contrast.

Kodak Precision Line Film LPD7

Kodak Professional Line Film/LPD7 (LPF7) is a high contrast orthochromatic film that can be used for both camera and contact printing exposure. Its benefits include high maximum density, wide exposure latitude, and an abrasion resistant overcoating it may be used under normal safelight conditions. Kodak’s 1:1 fade conditions. Exposure is normally done with the quartz halogen, tungsten, or pulsed-xenon with filtration, but sunlight is also an option. Development can be accomplished with a wide range of chemistry, including Kodak Super RT, Kodak Litho Liquid (1:3), and Kodak RA 2000 and RA 2001, with normal development time of between 1 and 2 minutes. Consult Kodak’s Web site for specific technical data. Bergger BPF8 is another line film that you might consider as an option.

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Agfa Gevaton N31P

N31P is an orthochromatic copy film with an anti-Newton ring coating and generally regarded as one of the best due to a good straight line in its characteristic curve. N31P film comes in a variety of sizes and rolls but will be increasingly hard to find when the existing inventory has been purchased. The rumor is that it has been discontinued.

Agfa Gevarex GO 210p

GO 210p is a continuous tone sheet film with a Dmax around 1.5 and can be developed in Dektol 1:2 or 1:9 in combination with another less active developer. This film has the advantage of offering you a variable contrast by utilizing and adjusting blue or yellow filters when exposing the film. It can be developed under safelight condi-
When using a paper negative with an alternative process you must be prepared for fairly long exposure times. Successful images are generally quite soft due to the long exposure needed for a strong negative. This film can also be used to make 35 mm black and white positive slides from your negatives.

Exposure and Development:

For each non-silver, or alternative, process there is a slightly different negative requirement that will yield the best results. Platinum and palladium negatives, for instance, enjoy a very long sloping tonal scale between shadow and highlight density. The ideal negative here is one with high contrast in the neighborhood of a 1.5 to 1.7 density range. In general, paper grades and average negative densities can be approximated with the following comparative combinations. An average negative density (AND) of 1.5 is best printed on a grade 0 paper. An AND of 1.3 on a grade 1; an AND of 1.1 on a grade 2; an AND of .90 on a grade 3; an AND of .70 on a grade 4; and an AND of .60 (or less) on a high contrast grade 5. As always, any of these approximate recommendations are only relevant depending on what you intend to make with your negatives, and exposure of both interpositive and negative stages should be adjusted to the intentions of the artist.

In multiple stage duplication, the films listed can be processed in Ortho (high contrast) developers for a high contrast look or in a variety of film and/or paper developers...different combinations of film and developer and ask other artists for their personal recommendations and preferences.

Pyro

If you are extremely compulsive about your negatives, you can become a disciple of the “Cult of Pyro.” By joining, you will become Pyromaniac and may indulge yourself in the wondrous world of Pyro developers. Essentially, Pyro chemistry provides the user with a very long tonal scale—something that is a favorite of platinum/palladium printers.

When an exposed piece of film is developed in one of the Pyro formulas, the negatives sensitive silver halide reduction to a metallic state is not all that is taking place. The silver being reduced to its metallic state not only forms a negative but delivers a greenish yellow stain that functions like a staining agent, hardening the gelatin into a microscopic, base relief. This yellow/green Pyro stain works as a filter to UV light and allows films like high contrast lith to yield a long, very smooth, tonal gradient curve. For more on the complicated subject of Pyro— and to join the “cult”—I suggest investigating Gordon Hutchings, The Book of Pyra, published by Bitter Dog Press.

Dave Soemarko’s self-assigned task was to develop a working technique where he could control the interpositive (the first stage of the two-step process) in making an enlarged duplicate interpositive on a high contrast film. The traditional controls of exposure, development time, and developer dilution fall short when the requirement is placed on an inherently high contrast product such as a lith film.

Traditionally, an artist who wanted a continuous tone lith film would attempt to trick the film into providing a longer tonal scale by processing it in a diluted Dektol paper developer in the 1:4 to 1:10 range (a ratio of 1:4 indicates one part developer mixed with 4 parts water). Others would make exotic mixtures of both paper and film developers in an effort to control the tonal scale and still be able to use this inexpensive film. Everyone encountered the same problems:

• High contrast (high density) and loss of highlight and shadow separation (low density)
• Inconsistent densities between the test strips and the final positive and negative film
• An uneven or mottled appearance throughout the tonal scale
• The need to constantly refresh the developer to maintain consistency

Dave Soemarko’s LC–1 and LC–1B Low Contrast Developer Formulas for Lith Film

First off, it’s not a simple task to place density and adjust for the contrast when making an enlarged duplicate interpositive on a high contrast film. The traditional controls of exposure, development time, and developer dilution fall shorter still when the requirement is placed on an inherently high contrast product such as a lith film.

Arista Premium Halftone Supreme (APHS)

This two-stage lith film can be processed using Dave Soemarko’s LC-1 low contrast developer formula. It is less expensive than the APHS version and reportedly yields better results when used with the Soemarko’s LC-1B formula.

AristoCopy Film

The AristoCopy film is a continuous tone film similar to Gevatone and less expensive. It is available in many sizes and rolls of 30”x100’. A typical application of this particular film is to make positive and then project that positive onto a sheet of AristoCopy film for the negative. Exposure and development times tend to be longer. Development in Dektol 1:1 for 3 to 6 minutes will generally yield strong negatives. This film can also be used to make 35 mm black and white positive slides from your negatives.

Kodak 4135 Gravure Positive

This is a standard graphic arts film available through commercial graphic supply houses in a variety of sizes, including rolls.

The Paper Negative

It is possible to use a paper negative for contact printing, but fine detail should not be one of your high priorities. Paper negatives are the result of loading conventional printing papers into a pinhole camera. These paper negatives, if exposed on an RC paper, for instance, will often produce excellent images when contact printed with an alternative process or with another piece of conventional printing paper. You may also wish to try a paper negative that can be generated on an ink-jet printer.
Dave goes into a lot of detail in Judy Seigel’s Post-Fac- 
tory Photography Journal describing his entire investigation 
and how he arrived at his formulas. If you’re interested in 
seeing how his mind works, refer to that specific issue. 46. 
Following is a description of the salient points of the 
process. LC-1 is made from 2 stock solutions and water 
and is manipulated to suit the particular stage of the 
process you’re dealing with: interpositive or negative.

**Standard LC-1 Formula**

**STOCK A**
- 750 ml Distilled water (125°F)
- 3.0 g Metol
- 60 g Sodium sulfite
- 3.0 g Hydroquinone

Distilled cold water to make 1 liter of Stock A

**STOCK B**
- 10 g Sodium bisulfite

Distilled cold water to make 1 liter of Stock B

Once the separate stock solutions have been made they are 
mixed together in equal or unequal amounts and diluted 
with additional water to make 10 part formula. An example 
of this would be a 2:1:7 formula 2 parts of Stock A, 1 part of Stock B, and 7 parts water.

In a developer with a stronger alkalinity such as Dek- 
tol, which contains sodium carbonate, the processing 
speed is faster. The contrast of values is greater, and this 
combination results in accelerated exhaustion of the de- 
vilop, which, in turn, leads to uneven development. With Soemarco’s LC-1 formula and a mix of the preceding 
2:1:7 solution, Dave made multiple tests with the same 
stock and development and found that each negative 
was nearly identical to the other. There were no mottlings 
or uneven values, proving that the development was well 
controlled. He presented his film for 3 minutes and 
processed for 5 to 7 minutes and achieved a gradation of 
21 steps. The interpositive was low in contrast, indicat- 
ing that he could place all of the tonal separation in the 
original negative into the interpositive and go for the 
higher contrast positive in the negative stage by extend- 
ing his development time. This low contrast of the inter- 
positives aids in the values not being compressed when 
making the negative.

For a second example with the same negative, Dave 
changed his formula to 2:2:6, a proportional mix that 
indicated an increase in the sodium bisulfite portion of the 
formula. Because sodium bisulfite is an acid, the contrast 
is reduced. In this test, the interpositive development was 
slower and the shoulder curve was nearer linear. If you 
find uneveness in your developed film simply add more 
of the Stock A to your 10-part formula. Density will 
increase with this change. If you wish to maintain the same 
low contrast, you will need to add more of Stock B.

**The Rule**

The more acid (bisulfite) in the formula, the less active 
the developer, and the less contrast in the film. The 
reverse of this rule is also true.

An example of this showing a modification to the 10-
part formula is indicated in the following way. You have 
a formula of 2:2:6 giving you the right contrast but show- 
ing uneveness in the film. You would want to compro- 
sise for this, and so you would change the formula to 
4:4:2. This new proportion eliminates the uneveness 
but may give you too much contrast for the interpositive. 
An additional modification to a 4:5:1 formula with a little 
extra bisulfite makes a less active developer and reduces 
the contrast formula, providing the correct results. For 
almost any interpositive on lith film, a formula of 2:1:7 
or 2:2:6 is going to give you good results with a 5 minute 
development.

The principle is the same for making both the inter- 
positive and the final negative. In the interpositive, a low- 
density range is sought as a way of adjusting the overall 
density levels of the negative and having both the top and 
bottom end of the scale usable. In the final interpositive 
negative stage, the tonal range is attached to the process 
and you would likely want to use a formula indicating a 
stronger developer or a LC-1 formula of 2:0:8 with a 6-
minute development.

The two-stock LC-1 formula is particularly useful if 
you are testing a different high-contrast lith film. Once 
you have worked out the combination and dilution that 
works best for your film type it is simple to combine the 
Stock A and B parts and then dilute them with water 
before use. Combining Stocks A and B makes the solu-
tion less alkaline and extends its storage life.

**Figure 2-18**

Soemarco’s LC-1B Curve Chart

(Courtesy of the artist)

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Dave goes into a lot of detail in Judy Seigel’s Post-Fac-
tory Photography Journal describing his entire investigation 
and how he arrived at his formulas. If you’re interested in 
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- 10 g Sodium bisulfite

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mixed together in equal or unequal amounts and diluted 
with additional water to make 10 part formula. An example 
of this would be a 2:1:7 formula 2 parts of Stock A, 1 part of Stock B, and 7 parts water.

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tol, which contains sodium carbonate, the processing 
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slower and the shoulder curve was nearer linear. If you 
find uneveness in your developed film simply add more 
of the Stock A to your 10-part formula. Density will 
increase with this change. If you wish to maintain the same 
low contrast, you will need to add more of Stock B.

**Soemarco’s LC-1B Low Contrast Formula for APH Film for Both 
Interpositive and Negative Production**

- 750 ml Distilled water (125°F)
- 4 g Metol
- 80 g Sodium sulfite
- 4 g Hydroquinone
- 20 g Sodium bisulfite

Distilled cold water to make 1 liter of stock solution

To use: Dilute between 1:5 and 1:10. Develop film 
between 5 and 10 minutes at 75°F. The LC-1B is similarto an LC-1 dilution of 2:3:5 but with more sulfite and 
bisulfite added in proportion.