Alternative Photography
Until Now

The most frequently asked question in a workshop is, what text should I buy? The answer is, um, it's hard to say.

THE FIRST SUMMER I taught gum printing I spent a month testing papers, lights, storage, and a dozen other major details, "proving" several important, indeed trail-blazing points. Only later did I realize my “findings” might not apply beyond alizarin crimson, the color I'd used because it was so strong and good-looking.

Tests over the next decade confirmed the awful truth - any change of materials or conditions can change all the others, a major detail unmentioned in the literature. The more I learned, the more errors I found in print (and the more grateful I was that I hadn't published sooner). I could also see why a beginner working from a book might give up, saying, "It didn't come out."

Not, I hasten to add, that these "alternative" media are any more difficult or temperamental than factory processes. In fact, we can work in room light, so they're harder to fog. But everyone knows that each factory film, paper, developer, and exposure method has its own rules, while even the most obvious variables of hand coating tend to be ignored. Worse yet, we lack any authoritative body of knowledge at all.

Yes, Post-Factory

ON THE INTERNET THEY call it alternative photography, although the conventional wisdom has it that all silver-based media will soon be "alternative." Academia likes the term Non-silver Photography (title of the course I taught), although some of the processes use silver, which maddens the literal minded.

I used to call it crooked photography, in the sense of not straight photography, until straight alternatives like platinum printing became prominent. (I was also warned that "crooked" might attract the wrong sort.) Another term, "extended photography," is so inclusive it seems too inclusive for our purposes; "classic" and "handcoated" don't go far enough.

But by any name, the strange bedfellows of this relatively new phenomenon circle the globe, from the fine-detail fiends of platinum and palladium, and the view-camera virtuosos who stalk the wilderness with hand-held computers, to the coat-it-with-a-broom acrobats of the cyanotype mural, and the toy camera crowd who can't start a shoot until they tape up the light leaks in their Diana.

As computer prints grow ever more "photographic," the desire to make labor-intensive photographs by hand grows ever more urgent. Probably. But for more reasons than I
work out serious details for him or herself. The experts have done this (although as a rule only for their particular approach), but they're not generally the ones writing the manuals.

As we chalk up gaps and errors in the "literature," my students declare (flattering the teacher), "you should write a book." Perhaps one day these pages will migrate into a book, but for now, the periodical format seems ideal, encouraging as it does the speculation, amplification, correction and feedback evolving art-and-science require.

The "how-to" side of Post-Factory Photography will be, in effect, a series of interactive mini-texts. The "Y" side will comment on issues and ideas. (At present there is virtually no discourse in alternative photography beyond "we are so artistic!"

We have an enormous trove of information, new and old, to start. If you find mistakes or omissions, please write. If you have amplifications or commentary, please write, too. Internet: Editor@Post-Factory.org

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...and...
"The final image can earn its artistic validity only through the way in which the artist transforms it."

Art Processes in Photography

Co-authors Puyo and Demachy were eloquent, passionate and confident. Their introduction to Les Procédés d'Art en Photographie, a manifesto of Pictorialism, is one of the gems of photo history. It also came with complete instructions on how to turn photography ("stubborn and untruthful for artists") into art.

However, the 1906 original was (in the style of its day) punctuated at random, seeded with non-sequiturs, and strewn with sentence fragments. We are fortunate that the Post-Factory translator has managed to preserve flavor, yet clarify. Start on page 5.
One day in the year 1889, when Robert Demachy was at his photo store buying hydroquinone, he happened to complain to the dealer that he couldn't get a decent black with gelatin-bromide paper. "An unknown customer interrupted me," he recalled later, and asked, "Why don't you try Poitevin's gum process . . . you just mix together some gum arabic, some bichromate of potash, and a small quantity of moist water-colour pigment. You coat any sort of drawing paper, print, and develop with cold or tepid water." Demachy bought the ingredients "there and then," and after a week or so of experiment got "a few fair results which were exhibited at the London Photographic Salon."

Ten years later, however, he had a different perspective on the episode: "If, instead of meeting my concise and unknown friend," he wrote, "I had read one or two papers of the same order as most of the modern treatises on gum, I would have fled, appalled by the tremendous intricacies of the process." Fortunately, Demachy and his colleague, C. Puyo, had by that time published widely on the new technique, and were in ample possession of its gifts.

They also co-authored a book on pictorial photography. Les Procédés d'Art en Photographie, besides being a how-to, was a passionate interpretation of their style. The introduction [reprinted in translation, beginning next page] celebrates the "artistic effects" and "painterly interventions" to be had with the newly evolved media. "Straight photography," it declares flatly, is "too stubborn and untruthful for artists."

Today's reader will find revelation in almost every line of this treatise. Here, we see clearly, is where the practice of printing gum in a soft blurry fashion began — in ideas about the nature of art, not in any necessity or "nature of the medium," as so many of our modern books and articles would have it. Apparently writers with no first-hand experience in the matter decided, after the fact, that the Pictorialists' vision was caused by their materials, rather than simply made possible by them. Ample evidence to the contrary was ignored, and the enduring myth that gum can't do fine detail was born.

History shows, however, that enthusiasm for the strategies of Pictorialism was not universal, even at the start. The American critic Sadakichi Hartmann issued a "plea for straight photography" as early as 1904. By the teens, Alfred Stieglitz had found Paul Strand and dropped Gertrude Kasebier. By the '30s, "modernism" was in full cry and gum printing was rear guard at best. Lincoln Kirstein no doubt spoke for the critical consensus (albeit somewhat theatrically) when he said, "In the swampy margin of the half-arts, the wallowing of painter-photographer and photographer-painter has spawned probably the most odious and humorous objects in the lexicon of our disdain."

Granted, by that time gum printing tended to live up to its worst billing. But Kirstein was invoking laws of purity that ruled mainstream photography for more than 50 years. In 1917 Paul Strand declared, "the full potential power of every medium is dependent upon the purity of its use and all attempts at mixture end in . . . dead things."

In mid-century Clement Greenberg used almost the same terms, in what came to be called Greenbergian Modernism, or Formalism. Not until the late '60s or early '70s were these ideas themselves left for dead, by which time gum printing was so taboo that only post-modern contrarians would touch it. Needless to say, in today's lexicon, "painter-photographer" and "photographer-painter" are totally cool.

Meanwhile, we note that the philosophy of these pioneer French Pictorialists, if rephrased in the tenor of our day, would speak to many of the strongest currents in contemporary photography. Think, for instance, of the anti-focus joys of the toy camera, the simplifications of high contrast, or the fuss of printing through tissue paper (direct from pictorialist bolting cloth to Joel Peter Witkin). At the same time, and paradoxically, the passion for radical sharpness, immaculate detail, and perfect verisimilitude also flourishes in our midst.

In other words, la plus ça change... JS

Demachy's account of his introduction to gum printing apparently appeared in English more than once. This version was found in Gum Bichromate Printing, a book in The Practical Photographer Series, distributed by Burke & James of Chicago, dated May 1905, price 25 cents.

*Catalog essay for a Museum of Modern Art Walker Evans exhibit, 1938.
Not a line, so to speak, of the book we publish today could have been written or understood a mere 12 years ago. This remark itself shows how the period has produced noticeable progress in photography and no less remarkable an evolution in the ideas of photography.

The scientific facts from which all these new processes flow have long been known; but they have been used until now in only a small number of applications, for the most part industrial. Amateurs could scarcely reinterpret photography and make the alliance with it we have; it seemed to them perfect in every respect, without any of the faults which appear at the end of the honeymoon. The idea of controlling an image which appeared like magic, born from the mystery of their trays, seemed to them beyond sacrilege: absurd.

To change this situation took time, to make handling easy and secure, to free amateurs from petty technical problems, to let them develop a critical sense and a new way of seeing. By then, the photographic image had, for some people, lost much of its charm: they saw it as overly technical, excessively given to precise detail, untrue to the values of a particular expression. Photography seemed to them, as it was: obedient and truthful servant for scientists, but stubborn and untruthful for artists. Artists had liked to pretend they were in control, when in fact they were not. But now they need no longer be so obedient.

Significantly, the first word of this book is “Interpretation.”

The processes to be described are all flexible enough to allow, within limits, personal manipulation by the creator. Our goal is to show what are the limits of each method, under what conditions an intervention can be made, and what kind of freedom can result.

Interpretation

The print as produced physically by the negative may be correct from a documentary point of view, but it lacks the qualities of a work of art unless they are introduced by the photographer. In other words, we dare insist that the final image obtained through photography can earn its artistic validity only through the way in which the artist transforms it. Only processes which permit such intervention concern us here and this book is intended to describe and popularize them.

Within this appreciation we accept the goal of a rendering as faithful and correct as possible. All our efforts are intended to preserve this integrity. But, also, we take every means to simplify information of no interest that this perfect instrument supplies with such prolixity. Thus we prefer a method of printing which permits the best strategies for suppression of useless details.

What is missing in an ordinary print is the proper emphasis. We therefore choose an accommodating surface which we can abuse. Are values of the photographic image limited in relationships and by their short range? We want to enlarge the range and correct the harmony. Does the material make a dry and unpleasant image? We will try to convey the depth of an etching or the transparency of watercolor. Perhaps we will be accused of obliterating photographic character? That is exactly our intention, for we know from experience what this sacred term awakens in the heart of an artist. Such an expression – to borrow from the dictionary its precise style – is a “lost cause.” It sums up all the faults just enumerated.
Now, however, it is necessary to contradict what might be concluded from the preceding lines: charcoal, lithography and etching extend their arms and it would perhaps be too simple to take shelter there. Nothing will tempt us from photography; we remain attached to our own medium, not just for the special qualities inherent in the process, but for its photographic character of a happy sort – which differentiates it sufficiently from other processes to explain the faithfulness of its disciples.

For, aside from the marvelous speed which permits a photographer to capture in the blink of an eye a fugitive light effect, a fleeting attitude or moment, a precious document for further interpretation, doesn't photography offer the benefit of a drawing so perfect as to be impeccable, adding the velvety shades of its subtle smooth transitions – all with such perfection that master watercolorists (and mastery is the exception) can hardly equal such delicacy?

In brief, photography gives too much – that goes without saying – but since we dare choose among its prodigalities, it is worth the trouble for artists to give it their attention: there is something new to be drawn from it. How? We can hardly define it, but we can nevertheless indicate the road thus opened, point out the dead ends, advise perhaps on some byways and in any case show the road already travelled.

Left, Sookang Kim, Toilet, Paper, multiple coat gum print, 1997. Original was a black and white 35 mm negative enlarged onto kodalith, printed on gelatin-sized Rives BFK, each coat developed by spraying with water under pressure from a hose. A favorite at Sookang’s recent show, the print was bought by a boutique opening soon in Soho to sell luxury bath items and art.

“Compare the etchings by Pisarro of the Arpents Road with documentary photographs we have taken of the same place. The scene is identical... except that Pisarro has interpreted it.”

Let us summarize the ways in which intervention can be effected in the course of development. If, for example, we clear part of the image thoroughly, we will provoke a double modification in appearance, first by creating an opposition between the color of the cleared part, which will more or less approach the color of the underlying paper, and that of the least developed part, which will remain close to the original color of the coat. Then, in both sections a simplification is produced. In the clear part, the details will be more or less obliterated, lifted or weakened by forced development. In the other, for the opposite reason, details will be drowned in the sombre mass of nearly untouched original pigment.

Here, then, a simple inequality of rubbing or dissolving has added a double quality to the normal image. From one intervention we have added contrast and simplification. Of course this type of intervention must be restrained in more confined areas, or the action will erase the top of a mountain or the round side of a piece of pottery. The gesture is the same as that of the artist in charcoal, who kneads between his fingers a little piece of white bread. We have been reproached for it. I nevertheless see little difference between erasure by rubbing on a small space and the same practice on a more extended area, which is generously conceded to us.

Accents cleared by removal operate equally in two ways: by the appearance of a white where there was only gray and by exaggeration of the dark near the erased portion. This is the effect of contrast, which serves generally to augment by simple illusion the optical resonance of insufficient blacks. Finally, we know how to profit from different degrees of thickness in the coat, proportional to different degrees of exposure and to variations in the proportions of gum and bichromate, to drown under a softly invading blanket (which is the special flow of the gum process) the less interesting or too pronounced areas of our image. It remains to be seen how and with what instruments these interventions are practiced.
Photography seemed to earlier photographers as it was: obedient and truthful servant for scientists, but stubborn and untruthful for artists.”

For the moment, suffice to have shown that the photographer, in certain conditions, has the power to intervene, which fact leads us to grant the power of interpretation.

Compare the admirable etchings by Pisarro of the Arpents Road at Rouen with documentary photographs we have taken of the same place. You will see his intentional exaggeration of contrast, the shops and their modern signs drowned in thick shadow, the fronts simplified to the point where but hints of windows remain, with only the decorative lines accented by the artist's relentless sacrifice of all details in favor of knowingly ordered accents. The scene is identical to the one we have photographed, except that Pisarro has interpreted it.

Now, if the reader will consider the foregoing, in view of our account of the means of intervening, he will agree that our process, born documentary, can be transformed by methods of interpretation, as has long been done by the photographer who sees like an artist. Our freedom of action, doubtless very inferior today to that of the engraver or sketcher, will perhaps approach it better in future. It will be abused certainly, it is abused already, and we see from time to time mishandled values and badly placed accents, while pure drawing, which should be our sacred goal, is badly troubled by the overly confident hand of a photographer who doesn't see well. In any case, the inept use of a power can serve to show its utility had the energy been well directed.

Nor is that all. The artist, aware of the ease—and limits—of his printing process will know how to choose and compose a scene with ulterior interventions in mind. It is clear, for example, that certain complications of undergrowth, of waterfalls and picturesque rocks, at length exhaust the accommodating power even of gum bichromate. These are untreatable subjects, despite all the ability to simplify in the process of development, while a landscape of restrained lines, even of monotones, will perhaps awaken in the imagination of the gummist the idea of a possible effect. He will feel well in advance the possibility of accenting such a light, of blurring such a foreground; he imagines the final outline, and the negative, dull perhaps, which registers what we can call the first state, becomes the point of departure for the ultimate print, of a much stronger feeling, which results from the first conception. The gummist must therefore see in advance, and see as gummist in the same way the etcher sees as etcher.

What we say for landscape applies as well to the portrait. Such a deep black will be chosen with the intention of using only part of its tone and removing the rest in a particular fashion; such a white gown of clean, crisp outlines is destined to pass into shadow, while such drapery of a thousand shapely folds will keep only two or three of them; this vision is like the advance notes of the artist who sees only the simplified tableau that his process permits him to establish later.

Beauty of the Pigment Process

In the limited art of monochrome, where the means are naturally weak and resources limited, beauty of material is even more necessary. A painter of mediocre hand can compensate for such inferiority by marvels of particularly happy and delicate color, but what artistic value can a badly inked gravure have, a sepia without transparence, a photographic print in which the tones lack the rich depth and power which are a caress to the eye? and no matter the subject, be it the most original, most inventive, most graceful artwork in the world, does it reveal the most unbound senti- mentality or the most transcendent idealism?

Thus, for some years, from the day Photography promised to elevate itself to the rank of expressive processes, the goal has been to give pigmented material, of which the deposit created a photographic image, qualities which it lacked....

From this point the introductory comments become less compelling, indeed prolix. There remains, however, technical instruction, arguably the best ever written. That will be forthcoming.

With thanks to Marc Bernier for assistance with the French of the period and the topic.
Gum Control

One day last year French photographer Marc Bruhat declared to the world, *La gomme est le truc le plus faible qu'il y a*, which I translate as, "gum printing is the least reliable trick there is." But a hundred years ago, Bruhat's countryman, Robert Demachy, with a couple or other Frenchmen who didn't even have electricity, let alone a densitometer, invented gum printing as we know it. Their lucid instructions spread widely and rapidly. For the next 25 years, almost every photo magazine in the known universe (and there were a zillion) had several articles a year about how easy, inexpensive, and satisfying the medium was. What happened on the way to the 1990s?

Evidently myth and mannerism got bundled in with the facts – partly for "esthetic" and philosophical reasons, as the perpetrators themselves explain (see "Art Processes in Photography," this issue), partly the Peter Principle: Whosoever has achieved success at one level, will overreach on the next.

Paul Anderson, a prominent American Pictorialist of the 1920s and '30s, was another perpetrator. He thought he was devising the perfect gum emulsion. Anderson's "gum-pigment ratio test" has been reprinted as often as the Neiman-Marcus cookie hoax on the Internet – from Henney and Dudley's *Handbook of Photography*, bible of the '40s, to William Crawford's *Keepers of Light*, bible of the '80s. But it bears little relation to the way the medium actually works, which surely contributes to the sense of gum as *le truc le plus faible*.

On the premise that pigment particles must be surrounded by a certain proportion of gum arabic to keep them from embedding in the fibres of the paper, Anderson decided to find the exact amount – enough gum, but not a drop more than necessary. Beginning with an inch of pigment, he added a dram (about 1.8 cc) of gum arabic, put a dab of the mix on paper, added another dram of gum, put another dab on the paper, and so forth, adding and dabbing 10 or 20 times, until the final mix was mostly gum, very little pigment. When the dabs are dry, the paper is soaked face down in water – no dichromate, no exposure – for a half hour, then checked. The first dab that washes away completely with no residual stain is supposed to be the highest proportion of that particular pigment that can be printed without staining on that paper by still development.

Only it isn't. Dutifully running this test one day with fresh paper, on a whim I tried it on preshrunk paper. Oops, the result was completely different. I understood in a trice that any variable — length of soak, order of coat, etc. — would also be completely different. Later it dawned on me that the dichromated emul-

Top left, "Unibomber," one of a series by Arash Kazeminejad from newspaper photos. Scanned into Photoshop, "adjusted," noodled, and output as negatives, they were printed as one-coat gums in various shades of "gunpowder blue." Arash developed the prints by hose with scalding water (against all advice). Bottom left, Jiwon Park's gum print, approximately 8x10 inches, began as a small-format original taken in a museum, which he enlarged to a contact-size negative, printed in several coats of muted purple and green. Bottom right, Sandy Rosenberg's small-format original was taken with 35-mm on the streets of Kashmir in 1976, later projected onto Kodalith to make the large-format positive she used for this one-coat gum in white paint on black paper. Opposite page, portrait of Alex, approximately 16x20 inches, by Menno Kok, an exchange student from the Netherlands, is another one-coat gum in white paint on black paper, also exposed under a positive.

These prints are some of many made in a Non-Silver Photography class in Fall, 1995, within a short time of starting the gum unit, by undergraduates new to the medium. All had seven or eight other classes, as well as full-time jobs, internships, etc. Thus, clearly, if you start on the right track (and have talent), the great trauma of beginning gum we hear so much about does not happen. That, in fact, is another of the myths harmful to gum printing. (See text.)
The gum photograph may be most compelling when it flirts most delicately with abstraction, balancing the sparkle of paper texture against fine, soft midtone gradation, the look of photography against the graphic power of paint.

Finally, I know you can do "expressive" things with gum - scratch into the emulsion with a stick, rub it off with a plastic sponge, add sand to the mix, and so forth. Like any form of printmaking, gum can be as daringly abstract, graphic, creative, and free-form as you please; I surely reserve the right to do any damn fool thing with it myself. But that's not a matter of "gum control," and only peripherally of photography. I would suggest that the special, magical, enchanting quality of gum printing, what makes the use of sometimes hard-to-get and somewhat nasty materials so desirable, lies in the direction of how VERY photographic it can be - at the same time that it's clearly made with paint. In other words, the gum photograph may be most compelling when it flirts most delicately with abstraction, when it balances the sparkle of paper texture against fine, soft midtone gradation, the pure look of photography against the graphic power of paint.

Some printers desire no more than basics, preferring to work the rest out for themselves. Others (myself among them) can never read enough on the art and craft of a beloved art and craft - what A.D. Coleman would call the "hermeneutics" of the medium. For them, volumes are not too much.

Practical basics begin next page, in an expanded version of the worksheet I've given students for 15 years - so patched and repatched as knowledge and experience trickled in, there may not be an original sentence left. The use-tested introductory exercise, "First Step Into Gum" on page 18, is a template for gum tests at any level and strongly recommended. As I've said before, there's no such thing as failure with a test of this sort: it always gives you information.

"Gum Control" will be a regular feature of future issues, along with, I dare hope, my own continuing enlightenment and that of others. However, if you're wondering why it's gum bi-chrome for the process and di-chrome for the sensitizer, who can say? Probably nostalgia for the "bi" and march-of-science for the "di." But either one will get you the chemical, if they have it and will ship. JS.

*With thanks to Mike Ware for explanation and feedback on these pages, among many others.
Overview

A mixture of gum arabic, pigment, and sensitizer is coated onto a support and exposed under a negative. The dichromate hardens the gum in proportion to light transmitted, the gum getting hardest where the negative is thinnest. The print is then “developed” in plain water. The excess dichromate washes out, and the unhardened gum dissolves, taking its pigment with it, like a melting gumdrop, except possibly faster. The hardened gum, with its pigment, remains as the photograph. The reaction, in other words, is between the gum and the dichromate; the pigment is just along for the ride.

Gum prints today are often made in several coats, each exposed, developed, and dried in turn, leading some writers to describe gum as “by its nature” a multi-coat process. But many printers, including some of the pioneers, have made the one-coat print their standard — as we shall detail in future issues.

The paper

Another stereotype is that paper for gum should be the texture of tree bark. Many printers like the arthly rough watercolor-paper effect; it’s no secret that I do not. Yes, printing is generally easier if the paper has a slight tooth to grab the emulsion, but most hotpressed and other smooth papers have enough, and many of them print gum beautifully. Paper should be chemically pure, pH neutral, and, for multicoat printing, heavy enough to remain relatively stable on drying.

(300 grams per square meter is good) Paper also has to be able to take the long soaks: some fairly heavy papers still have no wet strength. Thicker is usually easier to coat, as thin paper may buckle when wet, causing bare spots and puddles when you brush over it.

I advise beginners to start with Rives BFK (for gum, not other media). It takes emulsion well, can soak for days without falling apart, has enough texture to be forgiving, not enough to degrade the image, and will usually print at least one coat without added size.

Other favorite papers include Fabriano Artistico, Fabriano 5 (new Fabriano Uno is also mentioned), Magnani Pescia, Saunders Waterford, Somerset Book, Somerset Velvet, Arches Lanaquarelle, Hahnemühle Merten Spiess, and Strathmore Artists’ Bristol Drawing. But almost any good artists’ watercolor or printmaking paper that will take the long soaks can be used if gelatin size is added. Students have made terrific one-coat prints in gouache (which, with more covering power than watercolor, is a Best Bet for one-coat gum) on paper just torn from their drawing pads. However, do not attempt your first gum print on romantic, flimsy, porous rice paper, which will hardly print gum at all. (Or if you succeed, let us know.)

Preshrinking the paper

When fresh, or “virgin,” paper is wet and dried for the first time, it shrinks. To re-register the negative when subsequent coats are planned, the paper is pre-shrunk. (Instructions in sidebar, page 12.)

Unfortunately, this preshrinking washes off the surface size applied by the manufacturer, and also raises the nap of the paper, making it on both counts less likely to fully release pigment. So paper you preshrink probably has to have a coat of size added before printing. On the other hand, totally fresh paper has a lovely smooth surface that makes a wonderful one-coat print, for possibly the most photographic gum print of all. The problem is that if the “one-coat” turns out to desire another coat, odds are you won’t be able to re-register...
if you haven’t preshrunk — at least not if the print is larger than 4x5.” On the third hand, if you know for sure you want many coats, shrink with no regrets.

Sizing the paper

Sizing paper, in this sense, is not measuring, but adding a water-resistant coating, so fibres will release pigment from unexposed areas. Since sizing is a pain, we usually do a bunch of sheets at a time — it keeps. But it may be safest to do that for your second batch, when you know your technique is glitch-free. (Bad sizing of paper is the second-most common cause of gum failure, right after the popsicle stick, which see below.)

For gum printing, gelatin is the best around size. Many kinds are sold for food, photo, and industrial use. In my tests, food gelatin (Knox in the US) in 3% solution has been consistently best, although evidence is that no ingredient or material is “best” in every combination, everywhere. Variables of local water, paper, pigment, colloid, etc., affect every facet of printing. Some printers find a hard gelatin that won’t clear at all around here is best in their equation.

Standard 22 x 30-inch artists’ paper is too large to size in one piece, unless you’re working on that scale and have no choice. Otherwise, tear it into quarters by folding in half, then half again; crease the fold firmly with your thumbnail, and tear along the crease lines. Don’t divide further at this point, because it’s easier to handle fewer pieces; subdivide later.

Filling a tray large enough to hold the paper without bending it with enough gelatin to cover a stack can take 4 or more litres. To estimate volume before mixing, fill the tray with water to the desired depth (one to two inches?), measuring as you go. Large quantities, as for a class, can be sized in two or more batches.

Sizing Formulas & equipment: sidebar page 12

Pour about a third of the water into the pot and sprinkle the dry gelatin over it; stir without shaking, just until it’s all wet, then let soak 15-20 minutes. Add remaining water, stirring slowly, gently, to avoid bubbles, and heat over a low flame while stirring, until gelatin is nearly 140°F (60°C), but not hotter. Heating much beyond that point will break down the gelatin.

Keeping the solution warm, hence sufficiently liquid, can be a problem, especially in non-tropical climates. Cool gelatin thickeners and coats the paper too thickly, thickening further as it flows down the drying sheet, so it’s much more likely to leave blobs at the bottom. If your room is below 120°F (50°C), it’s a good idea to put the tray in a larger, hot-water bath. Devices to keep the bath hot include aquarium heaters, water-bed heaters, color-printing heaters, immersion coils, or whatever you can devise. Of course the water, or gelatin, or both, can be poured out and re-heated, but that’s not easy with large volumes. In a really cold room, it helps to make the gelatin 3/4 strength, so it doesn’t set quite so quickly. (I’ve done that, with no noticeable ill effects.)

Slip the paper, one sheet at a time, into the gelatin solution, turning it once to check for airbells, which you brush or wipe off. Continue, one sheet at a time, adding and turning, checking both surfaces, until all the paper is immersed, or you’ve reached the top of the gelatin. After some 10 minutes, turn the stack over and remove the paper, first in, first out, as follows:

As you pull each sheet from the bath (at the short end of the tray), squeegee it gently with a plastic rod against the tray rim. I use a 2-inch-diameter clear plastic mailing tube — fat enough to connect well at the tray edge, soft and squishy enough to aid contact. The operation is easier, by the way, with two people holding the tube, one on each side, exerting just enough pressure to sheet off excess gelatin, while a third person pulls the paper through, slowly and steadily. One gummist says he fastens two rods together with rubber bands, pulling the paper through the middle, as through a wringer, which sounds worth trying. But squeegeeing on a flat surface, which some printers do, seems to leave a raised texture of gelatin where the paper is pulled off.

The paper is hung to dry by clips or clothespins at 2 corners. Each sheet must be carried and hung separately; if two touch each other, a texture of marks or bubbles may form in the gelatin as they pull apart, which can also spoil a print.

Leftover gelatin keeps for a few days in the refrigerator, but if it smells rotten, throw it out — it’s gone bad and will speckle your prints.

Harden the size in glyoxal

Better to add no size at all than fail to harden food gelatin, an organic compound which otherwise invites tiny life forms to lunch. Unhardened, it also holds more pigment stain than paper with no size at all. We used to harden size by immersing the coated paper when dry in a 1.5 to 2.5% formaldehyde solution. Formaldehyde, however, is toxic, carcinogenic, has noxious fumes,
Preparing the Paper

Preshrink

Soak paper in a tray of very hot water (125-140° F/52-60° C) at least 15 minutes. Slip one sheet in on top of the other, turning each one to remove airbells. Interleave occasionally. Hang to dry. (Some printers pre-shrink twice.)

Gelatin sizing equipment

* stove or hotplate
* stirrer
* thermometer
* measuring beaker
* metal pot big enough to hold all the gelatin
* storage container for leftover gelatin (a plastic gallon water container with the top sliced off is handy)
* tray large enough for the paper
* larger tray for hot water bath ($4-$5 at restaurant supply stores)
* immersion heater for waterbath, optional
* plastic rod for squeegee
* clothesline and clothes pins

Gelatin size

28 grams (4 envelopes) food gelatine (Knox in the US) per litre of water

Glyoxal Hardening Bath

15-25° cc of 40% glyoxal per litre of tap water

The low end of this range is probably best. Or test your own materials for least staining.

1/2 teaspoon bicarbonate of soda (baking soda) per litre working solution, optional.

10 cc methyl alcohol (methanol, sold in paint stores) per litre working solution, optional.

20 drops = one cubic centimeter
1 cubic centimeter = 1/4 teaspoon

Note: A cubic centimeter ("cc") is the same as a millilitre ("ml").

and becomes increasingly hard to get. Glyoxal, a related, but less dangerous and much less disagreeable aldehyde, that actually does the job better, now replaces it. (Available through Artcraft. See page 44.)

The bicarbonate in the hardener formula makes the solution alkaline, which scientists tell us strengthens links of the gelatin, so they don't unlink during long soaks. (Other alkali I tested turned the glyoxal orange.) If the glyoxal working solution gets full of paper fibre, filter it. If you're not planning to re-use the solution, you can omit the methanol preservative. At best glyoxal has a limited shelf life, tending to polymerize, or grow blobs, so don't mix more than you need. If, however, you are using a hard (275-300 bloom) gelatin, the print may clear better without further hardening. The only way to tell for sure is to test with your materials.

Wearing gloves, as you do for every step to follow, immerse paper into glyoxal bath, one sheet at a time, turning each sheet to cover all airbells. After several minutes of soaking, reverse the stack and remove sheets: first in, first out (no need to squeegee). Hang to dry, preferably outdoors. A lot of sheets hanging in a closed room can harden other materials in the vicinity.

Ammonium dichromate sensitizer

All the dichromates, including ammonium are POISON, toxic, and strongly irritating to skin, causing lesions and rashes. If they splash on skin, wash promptly with soap and water. Clean up spills promptly, wash bottle neck and outside of containers frequently, and dispose of waste correctly. Always wear gloves, keeping bare hands out of even apparently clear wash water. Institutions that have the capability collect first wash water from gum prints for purification. Or, first wash water can be evaporated outdoors, with residue disposed of properly. The straight solution should not go down the drain, and should always be used with care and caution.

Ammonium dichromate is classified as flammable, so shippers impose a hazardous materials charge. The "flammable," however, seems to be an exaggeration. Thirty years ago, the erupting dichromate-volcano was a standard at school science fairs, but I have failed to learn of a single case where it spontaneously erupted or caught fire unless forced to do so, as when someone hammered it in a metal frying pan. Dichromate was fed to English soldiers in WW I as a sausage preservative. In the 19th century, photo workers put their hands in it continuously, some of them with no apparent ill effects. It is, however, fercocious on some skins (including my own), and sensitivity is cumulative, so contact at ANY level should be RIGOROUSLY avoided. Unfortunately, in this as in so many other matters, the "health hazards" books cite dangers of industrial quantities eight hours a day, compared to which our usage is miniscule. In other words, care is called for, not hysterics. The danger is primarily in sloppy work habits that put skin, air, allergens, and workroom at risk, a danger with photo chemicals across the board.

The standard texts say don't use brushes with metal ferrules, another exaggeration, since dichromate doesn't touch the ferrule. But keep it from metals, like jar covers or tools.

Gum arabic

Lithographer's gum arabic 14° baume (a measure of specific gravity), bought by the gallon from commercial printers and some artists' suppliers (see Sources), is much cheaper and generally better for gum printing than the small bottles of water-white gum sold at artist supply stores. Gum arabic varies from year to year and manufacturer to manufacturer, according to soil and weather at the acacia grove, as well as processing and preservative at the factory. If you find one you like, buy a couple of gallons; it keeps forever, and you have eliminated one variable for life.

Although the lighter gums command a premium price, I have found them no better; in fact, quite dark gums often work best, and, surprisingly, seem not to degrade colors. You can also mix your own 30° (or heavier) solution from powdered gum arabic, adding as preservative two drops per ounce of formaldehyde or phenol. (Salicylic acid is cited as a preservative, but in my tests gum so preserved did not work well. Etcher's gum is not good for our purposes, either.)

Pigment and Paint

Any paint that dries water soluble can be used: gouache, designer's colors, watercolor, even dayglo paint. You can, should the whim seize you, soften paint cakes in water. I've also cut open 50-year-old tubes of dried paint and softened them in water in a film cannister. Pigment in powder is good, and very economical, although messier. But you can't use oil or casein paints, which do not dry water-soluble. No dyes or inks either, as they sink into and stain the paper. Acrylics are possible in small ratios, but that's the ad-
For measuring small amounts of liquid, use a dropper bottle or, as at near right, a small funnel to pour into a graduate. Syringes or pipettes tend to be more mess than they're worth. The worst resort is a little liquid in a great big container—you might as well pour by eye. Far right: A perfectly dry foam brush sucks up too much gum emulsion, but a really wet one will dilute emulsion. Work a dropper or two of distilled water into the foam, just enough to dampen it, before dipping into the mix. Note also that a few drops of water left in the mixing vessel after washing can dilute small batches by 10 or 20%.

Left: It's simply not possible to do a decent coating job hanging onto the paper with one hand. Aside from the odds of running emulsion up your thumb, the paper must be firmly fastened for this delicate operation. You also need both hands free for tool-management-in-a-hurry. Taping the sheet to a hard surface, like glass, works very well—no holes in the paper and a handy, washable work surface. (Big sheets of plate glass can sometimes be liberated during architectural renovations.) But use drafting tape, or masking tape you've stuck onto your pant leg first (or whatever), so it doesn't tear the paper when it's pulled off. Or use pushpins to tack paper into something receptive to pushpins. Corrugated cardboard covered with plastic works fine, and is also washable.
vanced class. For this start-up chapter we use classic watercolor in tubes.

Cheap paints are a false economy. Made of inferior, non-archival pigments extended with fillers, they take more paint for a given depth of color. Good-quality tube watercolors are relatively expensive, but go a long way. The 14 or 15 ml tubes are the most economical, although the better brands have several price brackets, from the cheapest earth colors (classic for gum and highly archivable), to the most expensive rare pigments. There are also good new synthetics in all price ranges.

Confusion arises (often) because manufacturers use the same name for colors made with quite different pigments, while colors now made from archivally improved synthetics are still marketed by the traditional names. Under pressure from artists’ groups, manufacturers increasingly put the pigment name on the label (along with the permanence rating), but not yet all. Winsor Newton Artists watercolors have new labels with this information, as do Schmincke and Holbein watercolors (though all are in the world’s smallest type). Rowney Artists watercolors, last I looked, didn’t, but data sheets are available on request. Daniel Smith’s competitively priced house-brand watercolors give all information in the catalog.

Cotman and Grumbacher Academy, among other “student” grades, are not good for gum printing. My students discovered Niji (“rainbow” in Japanese), sets of 8 or 12 tiny tubes that sell in the school store for $6 or $8, work surprisingly well, and nearly always clear. But few such cheap sets do work well, or even work. The fact that all have colors you’ll never use reduces the saving. Some companies add dispersal agents, which attach pigment so firmly to the paper it doesn’t clear – or maybe it’s alum. Whatever the exact agent, it seems to occur only with cheap paint.

A word about color

The conventional paint wisdom is, “never use color straight from the tube, mixed color is more beautiful.” For once, “they” may be right. Try an earth color to start (Vandyke brown, sepia, Indian red, burnt umber, burnt sienna), darkened and cooled with indigo blue – a very intense color, hence convenient as well as economical. Thalo blue, thalo green, neutral tint, carmine, quinacridone red and perylene maroon also have excellent covering power. But note that strong colors, which give a big hit in one coat, may also blot out what’s underneath in multicoat printing. Ivory black is good, black gouache is stronger; both improve by warming with reds or cooling with blues. Zinc white is good for opaquing other colors, or for printing on black paper. Davy’s gray is a lovely color, although low in covering power. Some pigments, like terra verte or certain violets, have so little covering power in the original they’re useless for our purposes. Now, however, you often find such mixes as “terra verte shade” in stronger pigments.

Negative range

One of the great beauties of gum is soft, delicate midtone transitions, but you can’t get them if they’re not in the negative. For one-coat gum, the negative must have no more steps than the emulsion-paper combination can print at one time. Gum emulsions rarely print more than eight steps per coat, often as few as four. For a negative with a greater range, coat and expose two or more times – a long exposure to bring in the highlights, a short one to hold detail in shadows. A classic approach is three exposures, for shadows, midtones, and highlights, with shifts of color in each to warmer or cooler tones (traditionally of black). A total change of color between exposures gives a split-tone effect, as for instance brown highlights, blue shadows.

Print Range

Print range is affected by almost every variable on the menu, including exposure light (less UV makes a shorter range print), the nature of the paper and the way it’s sized (more size makes a shorter range print), concentration of pigment (more concentrated pigment makes a shorter range print), and length of soak. (Long development opens up midtones and shadows, but without enough exposure will also wash out the highlights.) These points, among others, will be parsed in future. We start with the basics.

Mixing Emulsion

Ingredients are mixed just before use. Sensitizer and gum arabic can be kept in dropper bottles, preferably glass, and measured by counting drops. Larger batches can be measured by funneling into 5, 10, or 25 cc graduates. (Small graduates are hard to find, but worth the search. Large graduates do NOT measure small amounts accurately.) Some printers use syringes or pipettes, which I find more mess and trouble than they’re worth. However, plastic measuring spoons work well for intermediate amounts.

My vessel of choice for mixing emulsion is an oblong plastic dessert dish liberated from Alaska Airlines. (I exaggerate. American Science Surplus sold 20 for $2.) Or find a wide-mouthed jam jar, lid of a plastic butter dish, or other container wide enough for the applicator to fit in without bending, shallow enough to reach bottom, and heavy enough not to tip over at a sigh. You also want an edge thick enough to wipe off excess emulsion on it. But the devil is in mea-
suring the pigment. Not that measuring pigment with great precision is crucial for printing in the straightaway. Many a great gum has been made in a rather hit or miss fashion. But to expand our understanding and control of gum's infinite riches, the ability to perform a precisely measured variable test is essential. (Not to mention that we lost 60 years dinking around with that gum-pigment ratio test!)

Measure the Pigment

Some do it by eye, brushing out a few strokes to see the color. Some measure the "worm," although there's too much push-pull in the squeeze for precision, and different tubes have different sized mouths. Setting a transparent vessel (say, a nice French jam jar) on a ruler lets you measure, at least approximately, while squeezing. Some printers weigh the paint, which is my choice for precision mode. Of course absolute precision with small amounts of intense color, like indigo blue, would take one of those scales that weighs fingerprints. A certain amount of "play" is inevitable, which is why, all other things being equal, it makes sense to use a less powerful pigment (burnt sienna?) for generic tests. With more bulk, the percentage of error is smaller. But, in my experience, the common system of mixing a lot of pigment and gum together and keeping them for ongoing use is bad news. Paint settles to the bottom, is hard to restir, complicated to measure, and, because it's never quite the color or concentration you want anyway, ultimately stifling.

By eye: Mix gum with a "dab" of paint. Brush a small swatch out on paper, to learn by looking. Are intensity and color right for a single coat, an adjustment coat, a change of tone, or whatever you plan? Bear in mind that the denser the color, the shorter the scale, also that the actual coat is going to be diluted by dichromate to about half the strength you see now.

By weight: Forget the business with plastic wrap on the scale to weigh paint you then transfer to the mixing dish - a mess that leaves so much behind the weight changes anyway. Put the mixing dish on the scale, weigh it (mine is 20 grams), then weigh the paint squeezed into it. This is lots easier than it sounds; trust me.

Until you have a sense of the covering power of various colors, start with a half-inch or half-gram of paint, 30 drops of gum arabic and 30 drops of sensitiser, for enough emulsion to cover two 4x5" prints or one 8x10." To cover two 11x14's, a gram to a gram and a half of paint with 4 cc each gum and sensitiser is about right. (But if you're toggling between drops and cc's in your mixing, measure a cc from your own dropper. Mine are 20 drops to a cc.)

Equal parts gum and sensitiser is simply a starting point. With all other variables constant, more gum increases contrast (emulsion is less sensitive, so there's less highlight exposure); more sensitiser lowers contrast (emulsion is more sensitive, so highlights expose more). The usual range is from 2 parts gum with 1 part sensitiser, to 1 part gum with 2 parts sensitiser, but proportions can be extended in either direction. You can also add water, up to 30% of the volume of gum, for easier spreading, less density and less shine in the coat.

MIX!

It's a scientifically proven fact that the most common cause of screwups in gum printing is mixing emulsion with the back of a brush, a popsicle stick, a foam applicator, even a "brush" that's too stiff, too big or too little, which all sooner or later leave bits of paint to streak your print.

You mix the gum and paint together with a soft round brush first, add the dichromate all at once last.

A hard brush doesn't disperse paint well.

Paint is mixed more easily and completely in the smaller volume of fluid.

If paint is on the stiff side, you can begin with part of the gum, adding the rest as you go (like making white sauce).

Orange dichromate masks the color. If you mix color first, you see what you've got.

You can reserve a drop or two of the mixed color-in-gum for spotting the finished print.

Things do get forgotten in the heat of the moment, so I repeat: Mix the gum with the paint first, and always brush a small patch onto paper. Even before you know what you're looking for, look; then compare with the finished print to train your eye. Final color may be different from the color as originally mixed, but less than you might think, if dichromate stain is cleared.

Coating with foam and haké brushes

Coating with safelight is folly and should be outlawed. Plain roomlight or tungsten light, even window light as long as it's not direct sun, is fine for the entire operation, except drying the coated paper. In fact, we coated by fluorescent lab illumination at school with no sign of ill effects in 15 years.

The best tool for applying emulsion seems to be the foam applicator. I use the 2-3/4 inch-wide ones for everything, except 1-3/4 inch for very small prints. The kind with wooden handles have softer, finer foam than the ones with red plastic handles, and work much better. For smoothing, I suggest a 3" haké brush. I've seen a coarse painter's brush used, but besides being rough on the paper, I doubt it smooths much.

The clock starts when you add the dichromate. Mixes made with our nearly saturated (26%) ammonium dichromate may go off in an hour, even sooner in hot humid weather. The wait after mixing before coating, and the wait after coating before exposing, are definite variables. If you're doing precise tests, these times should be constant. An emulsion coat using our strong sensitiser is probably unprintable after 8 hours. (The stronger the dichromate, the more its effects are increased by aging, heat, and humidity. The Pictorialists kept paper coated with 5% dichromate for weeks.)

Many variations of coating technique will "work" and printers often devise their own. For instance, some use only the foam applicator brush. Some leave the coat runny enough to flow slightly when hung to dry (which usually accentuates paper texture, as emulsion flows into the pores). One writer said she uses as many as 8 (eight!) haké brushes!

My present method, which seems to give the most delicate print, is as follows: The foam applicator is lightly dampened with water (so it's not too absorbent), blotted if
necessary (so it’s not wet enough to dilute the mix), then dipped into emulsion and stroked rapidly across the paper. Don’t worry about smooth, just distribute as evenly and quickly as possible barely enough emulsion to cover.

Hold the applicator straight up, so only the tip touches paper. Stroking too much or too hard, or dragging the flat of the foam along the paper can abrade it and/or grind in the pigment. The beginner’s mistake is to go so slowly and “carefully,” while pressing so hard that what is, after all, only a piece of paper never recovers. Just wet the surface, you’ll smooth in the next operation.

The moment the surface is coated, begin to whisk with the hake brush, flicking lightly and rapidly, first in one direction, then at right angles, until the coat has a smooth or burnished look, with emulsion dispersed as evenly as possible. If paper is too wet with emulsion, the hake hairs clot in bunches, leaving streaks. You can try blotting the brush quickly on a paper towel, but it’s quickest to switch to a fresh one. (Obviously, for a day’s printing you need several hake brushes.) An uneven coat tends to even out in development, but brush streaks are likely to be visible, and annoying. Over-whisking can also grind the emulsion into the paper. When the coat looks right, or is essentially set, stop. The whole coating operation takes perhaps a minute.

Dry the paper

Put the paper to dry in the dark with an electric fan to move air, but NO direct heat, which fogs or even speckles the print. Most papers dry within 20 minutes (depending on absorbency of the paper, and temperature/humidity). The paper should crackle when bent, and the back should no longer feel cool or damp. But thick paper may retain moisture in the center, which squeezes out under pressure onto your precious negative, destroying it. So err on the safe side.

While the paper is drying, wash applicator and brushes in mild soap and water. An old terry cloth towel is excellent to blot them dry. The occasional soak in hair conditioner helps preserve hake brushes and gives them attitude.

Expose

AVERAGE GUM PRINT EXPOSURE is 1 to 5 minutes three inches from close-ranked black-light fluorescents, or 75 to 100 units on the NuArc 26-1K. Time varies by color, mix, and gum. (One gum Arabic may have twice the “speed” of another.) There may or may NOT be a brown printing-out effect visible before development. Dark colors or thick coats may show nothing at all (when first timers have been known to decide “it didn’t come out” and throw print away without developing).

Develop

For some reason I know not, there’s a tendency to leave a developing print face up in the tray. Not only will room light fog it in time, it lies half in, half out of the water, so development, if any, is grossly uneven. A developing print must lie face down, except when you’re actually inspecting or working on it. (And you do want to inspect at intervals, lest a bubble of air collect from air in the water, leaving an undeveloped circle.) The tray, preferably flat bottomed, must be well filled with water to prevent accidental bottom strikes, and, needless to say, the print must be handled gently.

Slip the print into room-temperature water, face up at first, to see that it wets without airbells; when it’s limp, turn face down in STILL, not running, water for a minimum of 20 minutes, preferably an hour or more, changing trays if water becomes too heavily discolored. Orange dichromate should start streaming in a few minutes. It may take 15 or 20 minutes, or more, before unexposed color softens and starts to stream.

Timing here varies with printing style. Some printers expose heavily and start brushing or spraying promptly, before much of anything is visible in the tray. Others, planning “automatic,” or still, development, simply keep an eye on things at this point. If pigment streams immediately, odds are the print is underexposed, perhaps salvageable by prompt heavy application of fan heater, but perhaps not worth the effort, unless you don’t mind a slightly runny look. If pigment hasn’t even began to stream in an hour, print is probably overexposed, or otherwise faulty. Scratch into an edge of the emulsion with a toothpick to see if it’s softened. Depending on the signs, you may decide to continue the still soak, as balky prints sometimes clear overnight, or proceed to stronger measures:

After an hour or three, or your patience limit, whichever comes last,

1. Raise water temperature to 100°F (38°C) or more (not too hot, which melts the size).
2. Place print on sheet of glass or back of tray set at an angle. Aim stream of water from hose or pitcher at the support above the print, so water slices down over it.
3. That failing, spray or pour water directly onto print.
4. Household ammonia in the water, perhaps one-half to one ounce (15-30 cc) per litre may or
may not give the necessary blast, but...

5. Household ammonia in hot water is almost always effective—the strongest "photographic" development.

6. A different look, but it may get you the picture, is brushing with a soft watercolor brush (try squirrel). Brush harder. Use stiffer brushes. Use a sponge. Try a loofa. Or a slurry of fine sawdust in water, which gives a grainy, but even effect.

Still or "auto" development, the most photographic form of gum printing, is the model for this tutorial, but the brush is a valuable tool with any style of development. You can clear a highlight, e.g., a catchlight in an eye, open a dense shadow, or entirely remove an area for a later coat of another color. However, don't brush until the print is otherwise finished, because once the emulsion is disturbed, it will wash off that area completely if left in the water.

For the most delicate work, brush with the print lying face up in the water, which cushions it. A drop or two of water from an eyedropper held very close to the paper may be gentler even than the finest brush by hand. A turkey baster is handy for aiming a more forceful stream, as is a long-spouted watering can or pitcher. The further you raise the water source from the paper, the greater the force of its landing.

As noted, this type of gum is delicate when wet (hard-exposed-and-scrubbed prints are much tougher); any abrasion can ruin it. So only ONE PRINT TO A TRAY, don't let hose or tongs touch the print, no running water in the tray (tray siphon is certain death), and change trays carefully.

Drain and dry print

Hold the print up by a corner for a minute to drain, before laying it (face up, of course) on a slanted screen or smooth surface to dry. Water that puddles on a print can concentrate residue, leaving a ring or stain, so be sure there's no "h kommocking." Do not recoat until paper is thoroughly dry. (Hanging the print to dry saves risk of puddling, but be careful it doesn't stretch out of shape between coats.)

Clearing the print

 Dichromate stain, if any, usually washes out of a dry, finished print with an hour or two re-soak in plain water, but stubborn stain can be cleared in a few minutes in 5% sodium sulfite, or 5% sodium or potassium bisulphite. Pigment stain may be cleared (the books say) in a brief bath of 5% potassium alum, although that may degrade the image. Pigment stain, or veiling, may also be cleared from small areas, like specular highlights as follows: Resoften emulsion with a long soak, then rub area gently with a twist of cotton wrapped around a sharpened applicator or kebob stick.

Re-register for multiple coats

There are a few not entirely satisfactory strategies for holding register by fastening paper to a rigid substrate, as well as a promising version under study, to be addressed in future. For now the standard methods of re-register are:

1. Print dark coat first, re-register by eye through the negative. The best version of this method is on the Light Box. Really! Guaranteed not to fog the print. (Even UV fluorescentes take an hour or more to affect a print through the back.) Simply position the negative over the coated paper on the light box and secure with clear tape for no-sweat perfect re-register. This does not, of course, work with an opaque substrate.

2. Put register marks (e.g., cross-hairs) in borders of the print, and trace onto edges of negative, or extensions taped onto the negative.

3. Stick pins through 2 corners of negative and into paper. To re-register, put pins through both sets of holes again.

4. Outline negative or 4 negative corners on paper in pencil. If lines disappear under further coats, retrace. (These lines could show in the print, however, unless it's overmatted.)

5. Mark a line at the center of each of the four negative edges and continue it onto the paper. Match up lines to re-register. This is recommended for large negatives, since it registers from the center, putting problems at the edges.

6. Punch holes in dark negative borders or in a taped-on opaque strip. The holes print as dots; line up holes and dots to re-register.

7. Bregman register pins (probably overkill for our purposes, but just so you know): They can be set along all 4 sides, or 2 or 3 can go on one long side, or some other combination. Paper is placed under the negative or set of negatives in register, holes punched through all at once with an office punch. Peglike register pins are fitted into the holes, then lowered in this position onto a solid base and taped onto it. To print, you fit, first the coated paper, then the negative over it onto the pins. Fasten the negative in position on the paper with clear tape (clear so it doesn't mask emulsion under it); remove the combo from the pins and expose. (Some printers have contact frames made to accommodate register pins, although I'm not sure why.)

Fake "Color Photos"

First coat: yellow, longest exposure as "highlights"
Second coat: red, medium exposure as "midtones."
Third coat: blue, shortest exposure as "shadows."

A very short black exposure can be added for "shadow accents." The effect is also worked with "posterized" negatives: thinnest negative for highlights, medium for midtones, dense for shadows. Brush between coats to clear some areas.

Local color can be rendered by masking parts of a negative, by coating just in sections, or by exposing a whole print lightly and brushing off unwanted parts. Handmade color
Famous Gum-Intro Exercise

FIRST STEP into GUM

Part 1 Coat a piece of paper about 4x5 inches with a pigment/gum/dichromate mix as if making a print. (A total of 20 drops is plenty.) When it's dry, cut paper into 3 strips. Number them 1, 2, & 3. Expose the strips under a 21-step sensitivity guide for 3 minutes (assuming yours is an average UV light, otherwise you have to test to find the range). If you have, or can borrow, two extra 21-steps, expose all at once. If not, expose one right after the other.

Develop* #1 for 1/2 hour.
   #2 for 1 hour
   #3 for at least 3 hours, or up to 24 hours.

Part 2 Repeat Part 1 exactly, with just ONE variable changed. For instance, change exposure (to 1 minute, or 10 minutes, or . . . minutes); or change color, or use a different brand of the same color; change proportion of gum to dichromate; change paper; change method of development (to brush, or hot water, for instance); or change the development between coating and exposing.

(If you're changing exposure time, or the wait before exposing, let the change factor be at least 50%, preferably 100%, of the original.)

Notes: This exercise is designed to take no more than one hour at a time. Time from coating paper to putting it in water should be approximately the same for both sets of tests, unless that's your Part-2 variable. In very hot weather, these times should be exactly the same.

Part 3 Trim the strips, staple or tape to a paper with ALL data written legibly on the front (date, pigment and brand, mix formula, paper, exposure, length of soak, etc.). Study the results. They should illustrate the most important principles of gum printing and be a useful reference forever.

Enjoy.

* Development is, of course, face-down in still water.

Gum Controls

To make image darker: add pigment, add black or use darker pigment, use more dichromate, expose more, apply more coats, use rougher paper to hold more pigment.

To make image lighter: use less pigment or a lighter pigment, add white, expose less, develop longer or harder, brush off color.

To increase contrast: use less sensitizer, use a darker pigment, use a higher ratio of pigment to emulsion, expose less, brush out light areas, size paper more heavily, add a short dark or black exposure to intensify shadows, make a contrastier negative, or intensify the one you have. Another tack is to try daylight fluorescents (bulbs with less UV).

To reduce contrast: use higher ratio of sensitizer, use a lighter color or smaller ratio of color to emulsion, expose more, develop less, size paper less, flash print briefly.

Consider also the pictorialist device of an overall "tone" exposure without a negative of a very weak color in the orange-tan range.

Gum Glitches

Emulsion flakes off: gelatin size too heavy, too much gum, emulsion coat applied too thickly (add water to thin it, if necessary), too much pigment, too smooth paper.

Pigment stain in highlights: overexposed, too much sensitizer, the pigment itself is a stain, the size is bad or failed (too weak, not hardened, rubbed off, washed off in too-hot water, etc.), sensitizer is contaminated, mixed emulsion sat too long on or off the paper, paper was abraded or emulsion ground in during coating. In addition, some paint brands and some papers just do not clear in gum printing, leaving residual pigment for none of these reasons, although in paint a dispersal agent is always suspected.

Dichromate stain in highlights: overexposed; too much sensitizer; print fogged or cooked by exposure light, sun or other heat; pigment may be reactive with the dichromate.

Paint flecks in image: gelatin size is bad, contaminated, washed off, or too weak; sensitizer is too fresh; paper is abraded; paint is poorly mixed into emulsion; or dry pigment has been insufficiently rubbed into the gum. Also, some unknown papers are no good for gum and just fleck, ditto for some brands or colors of paint.

Basic Gum Dichromate

continued from previous page

Separations are another option (and a future article).

Real color separations

For digital color separations, see Adobe Photoshop. For analog color separations, see Options for Color Separation (Zimmerman, out of print), Keepers of Light (Crawford), Camera & Darkroom April '93 (Steve Anchell), or Post-Factory to come.

Colors for tricolor printing, for fake or real color separation, including CMYK of computer color, are matched as below. (The K stands for black.)

cyan – thalo blue, or “Winsor” blue
magenta – alizarin crimson or quinacridone red
yellow – cadmium yellow pale or medium (Winsor Newton), permanent yellow pale (Rowney), Hansa yellow or arylide yellow.

PS: NEVER put a print in water without noting exposure, pigment, mix, and paper in pencil on the back. You will not remember next week, let alone next year.

Notes

1. Grams per square meter, usually written gr/m² or gsm, is the standard European designation for paper, preferred because it’s constant for a specific area. The traditional pound weight used for paper in the US means per sheet. If paper is a non-standard size, it may be heavier or lighter than the same “weight” paper in a different size. Roughly speaking, however, 300 gsm equals 140-pound.

2. Submerge newly loaded brush in water, gently pull out loose hairs, dry, then work airplane glue into base of bristles with flat of palette knife. (They’ll still shed, but less.)
The St. Louis and Canadian Photographer

Of all the old photo magazines around this place wafting their mildew spores onto our long-suffering histamines, why do we choose The Saint Louis and Canadian Photographer for a cameo in our premier issue? Ah, how could we not? First there’s the striking symmetry of dates. The magazine is dated March, 1898, exactly 100 years ago as we put the first issue of Post-Factory Photography to bed in March, 1998.

Then there’s the poetry and mystery of the name. What in the world is the connection between St Louis and Canada? The Mississippi River? The Publisher-and-Proprietor hails from Canada? We have Volume 22, Number 3, meaning 264 issues were already in circulation, yet we have never seen another, or even heard the name.

The magazine is geared to professionals, studio and portrait photographers, not the amateurs of the magazines we know from this era. Reports on organizational activities come from Iowa, Virginia, Kansas, Missouri, Michigan and Brooklyn. Ads, notices, and submissions come from everywhere – South Dakota to South Carolina and both coasts. Employment and gallery-for-sale ads are national: “Oldest established photography gallery in largest city in Texas,” “For sale in a beautiful New England town... over 4000 sittings last year,” “Wanted, a first class printer, both glass and platinum; none other need apply” in Tennessee, “must have own lenses” for branch gallery in Kansas, “strictly temperate” in Illinois, “position wanted out of yellow fever district,” and gallery for sale due to “Klondike fever.” Not a blip from Canada, however.

There’s also the splendid portrait of Mrs. Fitzgibbon-Clark, Publisher and Proprietor, on the cover. She looks young for her achievements. Even today, how many women are proprietors of photo magazines? She publishes books, too. We are keeping an eye out for a hat of comparable character.

At the same time, it must be admitted that the articles run to more sermonizing than our post-modern temperament appreciates, for example: [While we say all honors to the worthy dead we cannot believe that wisdom died with them. Neither is it well to discourage the active living; far better urge them to emulate the examples of these former worthies, and, if possible, surpass them in usefulness. Photography’s greatest triumphs are yet to come, and they will be the work of the young men now enlisted. Do you hear the SLOGAN, boys?... Probabilities are to be reached for. Possibilities are to be fathomed. Glimpses are to be intelligently followed... And so forth. In fact, by our standards, rhetorical flapdoodle runs amok in several articles. One on that perennial favorite, whether photography is art, quotes Scripture (“He that saveth his life shall lose it, and he that loseth it shall save it”), with examples from the Panama Canal to the Washington Monument and the Eiffel Tower. The answer seems to be, yes, photography is art, although “the true artist... simply lets nature show herself.” Another item ridicules Mrs. Catherine Weed Ward for having made an assertion “too utterly dense for the ordinary human being to solve.” Nevertheless, the author sneers, the “devotees who kneel at the feet of this priestess of high photography” were pleased with her talk.

There are in any event some extraordinary reproductions from negatives by “Schweig” of St. Louis – posed genre photographs of a kind usually too cloying and stilted to take seriously. Schweig, while no Gertrude Kasebier, is a cut above most. His "Jolly Hypocrites" pulls us in for a good look (three young girls laugh gaily as a fourth, all smiles, reads from a letter). What is extraordinary, however, is the rich black and smooth highlights of the Schweigs in reproduction. We’ve not seen their equal except in gravures. (Maybe these are gravures.) The values will NOT survive our own reproduction, but we include “The Birth of Day” for concept and flavor (next page). All done from life, Mrs. Fitzgibbon-Clark tells us, unlike others of the period, created by montage.

Finally, there is a most affecting letter-to-the-editor in this issue, which we reprint, beginning at right.

IS PHOTOGRAPHY A PLAYED-OUT PROFESSION?

The letter is apparently picked up from the British Journal of Photography. The writer notes that "three of your correspondents are...thinking of building studios," and sends a warning. 

...I could not help smiling when I read that you spoke of me as having "a world-wide reputation," for that very Friday I had had a hard day's work, all for nothing; the rain came on and as I was trudging home with all my apparatus (profits now do not run to the luxury of a porter) I was passed on the road by a local chimney sweep driving along, with his brushes behind, in his own dog cart, and I would have given that chimney sweep my "world-wide reputation" for a ride in his cart.

...The "Busy Man" who wrote you the other week has evidently got on and feels happy; he puts his success down to his own exertions and the exercise of common sense, and thinks that, if all other photographers
"THE BIRTH OF DAY."

Illustration from The St. Louis and Canadian Photographer, March, 1898, approximately 90% of actual size. (Story begins page 19.)
Quantum Mechanic/Quantum Magic

Professor Bob Schramm has done almost every alternative process in the book. His audience at a gallery talk thinks it's magic, but obviously it's science – with labwork from cooking lye developer in the driveway, to mixing gold toner in the studio. Schramm also shows a new wrinkle in an old classic – putting Vandyke brown on artists’ canvas – and reports on four (4) Vandyke brown formulas.

Schramm’s “day job” for 30 years was Professor of Quantum Physics at West Liberty State College. Which makes him, he says, a “licensed quantum mechanic.” Off the job, he has for 15 of those years been teaching himself the “hand-coated” or “non-silver” photographic processes from whatever sources he could find in print, plus trial and error. At first he had to dig information out of old photography books collected from antique shows and rummage sales. Then reprints, updates and modern compendia became available. By the time we “met” on the Internet, he’d been winning awards in juried area art shows for some time. Not always “Best in Show,” sometimes only “Best in Class,” but along with the honor, came cash awards and sales. He tends to reinvest the money in platinum, he says, the only really expensive part of “hand-coated” – if you don’t count buying the large-format cameras. Retired last spring from full-time professoring, although he continues as Senior Lecturer, College Archivist, and school photographer, Schramm steps up exploration of photo media and his free-form approach to materials.

Schramm: When I entered college, a long time ago, I took a standard aptitude test. The results were: 1. Musician, 2. Scientist, 3. Artist. As scientist-artist, I tend towards the pictorial, but every once in a while the “art in the blood” does out. My mother was quite a painter in her day. She is now 93 and no longer painting, more’s the pity, but I marvel at some of the work she did. I inherited my artistic ability from her.

He had been to the opening reception at the Stifel Fine Arts Center in Wheeling, West Virginia, where he was half of a two-person show titled “Photography Black & White” (although some of his prints were in monochrome color). A group invitational of five other photographers was on at the same time.

People at the reception seemed to like my brush-developed gum prints, but were most enthralled by the platinum. Two local commercial photographers were fascinated. One of my brush-developed gums is featured in the catalog. (And note in the list of works the “Seigel-toned Cyanotype.”) So far, my alt-process prints look like star of the show... We’ll see if anything sells.

At the Wheeling Artisan Center my competition is local photographers doing gelatin-silver in black & white and color. Their prices are half or a third of mine. Their prints are barns with painted-on Mail Pouch Tobacco signs, covered bridges, cows standing in fields, flowers, birds, autumn leaves, etc. The public thinks it’s art and they sell a lot more than I do. It’s hard for some folks to understand why I charge more: I do a lot of explaining.

Seigel: Speaking of explaining, I see by the catalog and the articles [Wheeling News Register] that all the photographers in your shows to date have been men.

Schramm: I know of only one female photographer in this area doing “fine art” work, but she does gelatin silver and color prints, doesn’t do her own darkroom work. She came to my slide talk. Maybe it will inspire her. I know of only three other people doing alt-process work in W. Va. and all are men. But more than half the students in my photography classes are women.

Seigel: I see that the pear print is pure platinum. Are you rich?
turned out to be just what I wanted. I mounted the finished "prints" on cork, burlap and stained plywood, for an earthy look. The cloth is nailed to a board in the four corners with copper nails.

I was skeptical, as well as curious; Bob obligingly mailed a sample. The canvas was indeed a medium-weight artists' unprimed cotton duck, now nicely hand-fringed all around. The print was marvelous. The tension between the cloth texture, the brushed-on effect, and what was clearly a real, rich photograph worked perfectly. But Bob insisted it had a blob in the border and the coating was uneven. I reminded him that he’d been pleased with it a week ago. Had he turned perfectionist?

No, I just learned how to put a uniform coat on canvas. It took some practice. Aside from the blob, there were places where the coating was too thin. I have since learned to do better.

I'm a nut about things like that. Twenty-five years ago I put a new roof on a little building next to our house (now my studio). I fused and fumed and stewed for months because, in my opinion, the tiles were not perfectly aligned. Finally Jeanne forced me to go around and look at the roofs of neighboring houses to prove that my roof was OK. But I was never happy with it until we had it replaced by a professional about three years ago. So you can see what you are dealing with.

Seigel: Did you try bleaching the blob with Clorox or hydrochloric acid?

Schramm: The canvas isn't white; I was afraid of leaving a white spot.

Seigel: You could touch up with a little watercolor, or strong tea, with a very dry brush, so it doesn't spread. Also a magnifying glass. I have the kind that fits around your head. Leaves both hands free, and you always know where it is — on your head.

* Seigel had supplied the formula.
A Vandyke Brown Print on Artists’ Canvas

Schramm: I took some unstretched canvas and washed it on light cycle in the washing machine with a little scoop of Cheer to remove the sizing, dried it partway and flattened with a steam iron. Then I ripped it (after starting the tear with a small scissors cut) into approximately 11x14-inch pieces, pulled off the loose threads for a fringe all around, ironed again, and with a #1 pencil lightly outlined an 8 x 10 area for the image.

The canvas is then laid on a piece of flat plywood covered with three layers of Bounty towels. The paper towels soak up the excess and keep it from spreading past the lines or soaking through to pool underneath and make blobs — as I learned by experience. The sensitizer (VDB-1) is applied with a hake brush, to within a quarter-inch of the line. Unlike coating paper, you have to do a little scrubbing to get the cloth to take the sensitizer evenly, but be careful not to splash, since you can’t wipe it off. Then give the sensitizer a chance to soak in and the towels a chance to soak up the excess before hanging it to dry. Air dry in the dark near an electric fan, but without heat. To print, you lay the dry canvas on a piece of plywood, with the negative on top and a piece of heavy glass to hold it down. Exposures were about the same as VDB on paper. With six 15-watt fluorescent BL bulbs 4 inches from the print frame, exposures ran 90 seconds to three minutes. “Fish Heads” was about 90 seconds.

Seigel: That sounds pretty quick for VDB. What kind of negative is it?

Schramm: The bulbs were new, which may have speeded things up, but the exposure for VDB on the cloth was the same as on paper. The negative was a little thin for VDB, but contrasty enough. I’d say it would print gelatin silver at about #1 contrast. The original was made with a Leica M6 and 50 mm, f-2 lens on T-Max 400, at a fish market in the famous “strip district” of Pittsburgh, PA. I projected it onto ortholith film processed in Dektol diluted 1:8 with water for the positive, and exposed the positive in a contact frame onto another sheet of ortholith for the negative.

Later I made a negative with the 8x10 view camera that had a better range for VDB: T-Max 400 film rated ASA 320, developed in D-76 ten minutes at 20° C, which is 40% more development than the usual, to increase contrast by 40%. That negative took three and a half minutes’ exposure on cloth and paper.

Seigel: Any special development for cloth?

Schramm: Not really. I usually rinse VDB about 1 minute before fixing, watching the runoff. When it’s not “milky” any more, I stop washing. As I recall, the cloth prints washed about 2-3 minutes before fixing, while I watched the runoff for milkiness. When the water stayed clear, I fixed in 25 gm hypo/1000 cc water for 2 min, and washed 30-40 minutes, as for standard VDB.

Seigel: Bounty ought to send you a case for that testimonial. But why Bounty? Could you stretch on a frame instead of using paper towels?

Schramm: My wife buys el-cheapo paper towels, which I have tried. They don’t absorb as quickly. Newspaper wouldn’t absorb enough. Stretching on a frame might work, but then you’d have to have a frame for each print and stretch it, etc. I was trying to keep it simple. Bounty paper towels are the “quicker picker upper.” I have found they absorb liquids much faster than other brands, though they’re more expensive. No, I don’t have stock in the company.

Seigel: You said the prints were gold toned...

Schramm: I heard that a gold toner for salt prints could be used for VDB. I tried it (Keepers of Light formula) with VDB-1 prints. They turned a slightly blacker brown, otherwise no apparent effect. Since there was a slight tone change, I assume it worked and the prints are more archival. “Fish Heads” was gold toned, too.

Seigel: Congratulations on the project.

Schramm: I think I am most pleased with these cloth prints because they turned out the way I imagined them. Makes you feel like you know what you’re doing.
The Gallery Talk

"These don't look like photographs.... Is the uranium print radioactive?... Does it glow in the dark?"

By BOB SCHRAMM

The gallery talk was not very well attended for all the publicity that went out. Only ten persons showed. Nevertheless, all seemed very interested and asked a lot of questions, although not especially about alternative process printing. Mostly stuff like, could a person process their own color film and make color prints? What did I think of digital prints or digital imaging? Did I think it was real photography? The comments about my prints were all things I have heard before, but I like hearing them.

A list of comments in approximate order of most frequent to least frequent:

"Are these drawings?"
"These don't look like photographs" (one of my favorites).
"This looks like an etching" (said of a high contrast VDB and a high contrast platinum print).
"Beautiful."
"Drop-dead gorgeous."
"This looks like a charcoal drawing" (monochrome gum, brush developed).
"These are my favorites (three gum prints). They are so impressionistic" (as intended).
"Is the uranium print radioactive?"
"Does it glow in the dark?"
"Is it safe to stand near it?"
"Why is the chryosotype blue?" (I guess they expected it to be gold-colored; I explained about finely divided gold.)
"Are big sheets of film exposed the same as 35mm film?" (Yes, if you are printing gelatine silver; no, if you are printing platinum, cyan, etc.)

Some people had difficulty understanding that I was making my own printing paper. Some understood that I was making my own paper, but thought I was buying a prepared sensitizer. They did not understand that I was combining several chemical compounds. One gentleman thought my UV light source was the type used for growing grass, i.e., Mary Jane, boo, weed, etc. I think I got most of them straightened out on these points.

In general, my audience consisted of amateur and semi-professional photographers, and a few people with art degrees. No one asked any technical or "how to get started" questions. All thanked me for an interesting slide talk and complimented me on my work. Two people said my work was much better and more interesting than what was in the main gallery (gelatin-silver images). Everyone left with a greater appreciation of alternate process printing and an improved, but incomplete, knowledge of what alternate process prints are.

It was worth doing. I made some small progress in educating people. I had fun. They had fun. They liked my work. They liked me. I liked myself. I have sold one small platinum print from the show so far. That's not the point — but none of the other exhibitors had sold anything.

See page 32 for side-by-side step tests of the 4 vandyke browns.

Note the note, opposite, about the spelling of "Vandyke brown." Schramm advises, "When in doubt, stick with Nadeau. He has done the research." Nadeau spells it "Vandyke brown." But the Getty Museum's book, Looking at Photographs, which does cite Nadeau in its "Selected Bibliography," nevertheless spells it "Van Dyke brown." The book, however, confirms Schramm's idea about origin. The process, it says, is named for its "rich deep browns... thought to resemble those achieved by Anthony van Dyck, or those of the pigment named after him."
FOUR Vandyke brown formulas TESTED

Flash! Classic Vandyke brown formula works best....

While he was working with VDB, Schramm tested four formulas, as follows: He mixed with distilled water, measured with a graduated cylinder accurate to 1/2 cc, weighed chemicals to 1/10 gram with an O'Haus electronic balance, and used three new foam brushes, one for each formula, to coat Rives BFK paper, which was air dried. Exposure was timed with a stopwatch "accurate to 1/10 sec." The light source was blacklight fluorescent bulbs, three inches from the contact-frame glass.

The standard Vandyke formula (used for Fish Heads) was called,

VDB-1

Solution A
Ferric Ammonium Citrate 9.0 gm
Water 33.0 cc

Solution B
Tartaric Acid 1.5 gm
Water 33.0 cc

Solution C
Silver Nitrate 3.8 gm
Water 33.0 cc

Combine solutions A and B, and slowly, add C while stirring. This makes 100 cc of sensitizer. Schramm says he usually mixes 200 or 300 cc at a time.

distilled water to make 100 cc

Take equal parts A & B, fix in 5% plain hypo.

Exposure, based on test strips, was 4 minutes for #1 and #2, but almost 10 minutes for #3. With step tablets next to a quite-contrasty negative (made from 35 mm), Schramm found while the prints were still wet:


In the dry prints next morning, color differences were more subtle. But by the time the tests got back from a trip to New York, Schramm reported:

"I'm amazed. They've all oxidized. VDB-1 changed least, if at all. VDB-2 got blacker and more like VDB-1, but still foggier in the highlights. VDB-3 lost most of its greenish tone, color now more like VDB-1, though less D-max and highlights mottled. Putting the prints side-by-side certainly makes it easier to detect subtle differences. There's no doubt that VDB-1 has the greatest range and D-max."

Another formula cropped up later, in an article by George Smyth, "Stone Knives and Bear Skins," in Maximum Monochrome, May/June 1997 [MD Muir Publications, 1006S, 74 Plaza, Omaha, NE 68114]. Smyth didn't say where he got it, but you could check his web site at http://www2.ai.net/gismsyth/. He's one of the few who mentions a washing aid (Perma Wash), after which he washes the prints for 15 minutes. Smyth commends Artcraft Chemicals [see Sources] for being

"very easy to work with" and "willing to sell small amounts to your specifications." For paper, he likes Fabriano Artista, as well as "papers from Strathmore, Crane and Arches." He gives two formulas, VDB No. 1, as above, and the following, which we will call VDB-4. He said he hadn't tried it yet.

VDB-4
silver nitrate 35 g
ferric ammonium citrate 93 g
tartaric acid 15 g
water to make 200 cc

Divided by ten this becomes 3.5 g, 9.3 g, and 1.5 g in 20 cc of water – or almost exactly VDB-1, except with one fifth the water. It's so concentrated, especially with no A, B, & C solutions, it seemed something might precipitate out. Apparently not. Schramm (mixing the smaller amount), reported that all went into solution. He let it age, as he does all VDB formulas, since "the fe am citrate tends to make the solution cloudy. In 12 to 24 hours it seems to clear." The verdict was:

"When you take the print out of the print frame there's a good strong printed-out image, but it all washes away in the first wash. Thinking the sensitizer hadn't been dry, I repeated the experiment the next evening. Same result."

Schramm tried some toners on VDB-1, reporting that 5% lead acetate seemed to do nothing, but a gold toner used for salt prints made the brown tones look darker, presumably also more archival. One of his findings is something we know, but that's so easy to forget: you CAN'T judge an emulsion til it's GOOD and dry. I personally found the tests all very satisfying. Not just because, like food I didn't cook, I especially like tests I didn't do, but for the news that we use the "best" VDB formula.

O.R. Croy, by the way, may have been the Michael Langford of the 40s, writing many photography books, most of them about tricks, like double printing, melting emulsions, high contrast, etc. – what you'd do with one click in PhotoShop – now interesting as period pieces rather than ideas. The illustrations are so tacky A Photographer's Place sold them (used) for $2 apiece. Croy does seem more reliable than Langford, however, or did when I first read him 15 years ago. JS [See p. 32 for the step tests.]
Carmen Lizardo: Drawing on the Right Side of the Computer

Carmen's camera had broken down, she explained, and lacking money to fix it, she'd been doing portraits with her scanner. She mimed scanning her body, then interrupted herself: "I feel like I won the lottery."

Paying for graduate school with a patchwork of student loans and part-time work, Carmen didn't mean she was in the money. She meant getting where she was, with a BFA in photography, and an MFA in Computer Graphics in progress, from where she began, a country girl in the Dominican Republic, without falling into any of the booby traps along the way, seemed as likely as winning the lottery — and as thrilling. Six years ago, "I didn't know art existed... I'd never even heard of Rembrandt." Her school did not teach art or anything about art. In fact, she said, there was no art school in her country at all.

Raised by grandparents while her mother worked in the States, Carmen arrived here originally, aged 20, to get her mother's permission to marry a local Dominican boy. Mom, it turned out, was horrified, declaring her much too young for marriage. If she wanted that big wedding, she'd certainly have to pay for it herself. Carmen's English was rudimentary ("I knew the colors"), but her schooling had included computer skills. Through a friend of a friend she got a job in a bank in New Jersey, earning an hourly wage, doing data entry to save for that dream wedding.

We won't mention the boss making goo goo eyes at her, though that was terrifying. "I was very innocent and devout, I went to church four times a week." But before long she realized that she hated doing routine mindless work all day. I'm 20 years old, she thought. What am I going to do for the rest of my life? What she did was go to Brooklyn College for an aptitude test. What came up was, of all things, art.

By then she had a good friend in this country, Luis ("not a boyfriend"); the two of them went to the Brooklyn Library to look up catalogs of local art schools. They found Pratt, FIT and Parsons. Carmen visited all three. At Parsons "I wanted to run away." The administration was all attitude and the women students wore makeup and high heels, "just like the bank." FIT wasn't so bad, although not love at first sight. But "the minute I walked onto the Pratt campus it was like I'd always been there...it was so beautiful."

With financial aid from HEOP (Higher Education Opportunities Program), Carmen enrolled as a freshman Fashion Merchandising major. But her friend Luis, who had also enrolled, was taking photography. "I just knew what to do with the camera," Carmen admits. "I kept telling him, 'no, don't do it that way, do it this way.'" Luis suggested she take a course in photography herself. She did, and then another, and another, until her teachers wondered whether she should consider changing her major.

Carmen was ready instantly, except for one Big Roadblock. Photo majors have to take a course in life drawing. In her first year Carmen had taken an Intro to Life Drawing class that ended in trauma. "I dashed in late with an armful of supplies, and when I looked up there was a naked person in the front of the room and everyone was staring at her. I was so shocked I dropped everything in a huge crash and ran away." Later, the teacher was reassuring: "In art school we do this; it's OK." But, Carmen says, "I never could get used to it."

The administrator in charge of program changes was another formidable figure — and not the type to bend rules. So Carmen had a dilemma. By this time, however, she was married, not to the boy from home, but to a fellow student, a painting and drawing major. He did loads of life drawings, which he signed with a great big flourish, the signature sometimes larger than the drawing itself. One day, looking for a missing shoe under the bed, Carmen stumbled over a bunch of life drawings he hadn't signed. "So I stole them."

And promptly took them to Monsieur l'Administrator to prove she didn't need a life drawing class. He was indeed impressed. "These are very good," he said. "Are you sure you don't want to major in painting or drawing? You really want to be a photography major?" Carmen assured him that she did. And so she became a photography major without a class in life drawing.

But now that she's a photographer, how about photographing nude? "Oh sure, I do them all the time. Will she take a life drawing class one day? Mmmmmm, maybe. At that moment, besides using the computer as a drawing tool, Carmen's dream was to start an art school in the Dominican Republic. Her grandmother has a big old house in the country, eight bedrooms. It would be so wonderful, she mused, to teach art to girls from the country, to give them something for themselves, something in their lives.
besides boring jobs and raising children.

Which may have to wait a bit. Today Carmen enters the world of computer graphics with the same passion and talent that carried her from country girl to art-school whiz. As of this writing, she’s a teaching assistant in digital photography and technician running the photo department digital lab. Besides her course in electronic press, she’s working on her thesis, scheduled for fall ’98, to be an installation with sensor motion, sound, sculpture, video, books, projection and a few castings — so far.

**Full Body-Scan Job**

Carmen takes the lid off her Apple Color One Scanner ($799 in 1996, by student loan), holds it at the appropriate angle, on “a really long squishy cable,” and stops breathing for about four seconds. The device can scan at 600 dpi (or an interpolated 1200 dpi), but she does face-scans at 150 dpi: “Higher is too slow — I have to breathe.” The scan is indeed fast and in almost no time she appears sideways on the 17-inch monitor. The picture is extremely dark at this point. The scanner is calibrated to room light, but there wasn’t enough of it. Not a problem, however — Photoshop contrast controls bring up a “normal” look instantly.

As for the rest, Carmen reels off, “81 megabytes of RAM — I put in the upgrade myself, from the manual. It came with 16 MBs, you can upgrade to 500. The PowerMac 7500 is highly upgradable, you just open the case. And memory is so cheap now. When I bought the computer, 16 megabytes cost $600. When I upgraded, 32 megabytes cost $200.” (A year later, $125.) She has a one-gigabyte hard drive, “but I need another gigabyte.”

As things go in the computer world, this moment, nearly a year ago, is now ancient history. With Carmen’s advice, the photo department has now installed an Epson Stylus Photo printer. Just last year, her own Epson Stylus Color 500 was, “the most wonderful printer in the world.” With 720 dpi, it looks almost continuous tone.” The 500 cost $275 in ’96; a year later, the 600 (1440 dpi) was only $300. Both printers, Carmen noted, could take any paper, “Canvas, rice paper, Rives BFK, anything under 250 gsm.”

In one live scan job, Carmen had a friend lie down on the scanner bed five times, moving her body along in sections. She fixed the overlap in Photoshop, then printed the composite in Vandyke brown on rice paper, which she glued to wood with methyl cellulose. The face-scans were printed in several media, including C-prints, as well as directly from Photoshop with the Epson.

For a C-print, Carmen outputs the file to a portable disk for transport to a service bureau for translation to 35-mm format. “If I know I’m going to go to 35-mm film, I scan in a 5-1/2 x 7” print to start, because it matches 35-mm format. Otherwise I re-size in Photoshop.” She saves the file in EPS format at 150 dpi. That’s 2.3 megabytes if it’s a color file, so it has to be carried on a Zip or E-Z Drive disk. A black and white file at 72 dpi will fit on a floppy. “I don’t worry about the low res, because in continuous tone there’s only film grain — there are no pixels to show.”

The file is positive, for transfer onto negative film. Carmen takes the disk to the film recorder service at school, along with a roll of 200 ASA Kodacolor ($5 at the school store), then sends the exposed film out for processing. These negatives she prints with the photo department’s color machine. For black and white negatives, she takes a file in grayscale and a roll of Tri-X to the film recorder, then underdevelops the film by 20 to 25% (straight D-76, seven minutes at 68° F/20° C). These negatives she prints like “regular black and white”, preferably on Zone 6 glossy paper, which she loves, or Forte warm tone — “beautiful, but very expensive.”

For printing directly with the Epson, Carmen has explored a dozen options, including printing on transfer paper, which she ironed onto watercolor paper. That’s waterproof, she says, and lasts longer than a regular inkjet on paper. She’s also printed on plain paper with the school laser printers, 8-1/2 by 11, and 11 by 17 inches, 300 dpi and 600 dpi. These she uses as paper positives or negatives, waxing them for “waxed paper negatives,” which printed, look “something like fabric.” She wasn’t enthusiastic about the Epson scanner papers, however. They may be cheaper by now, but at the time were “very expensive, about $35 for 15 glossy 8x10s.” Prints on Rives BFK last better, she says, because the paper is archival, even though the ink isn’t. Prints on the Epson scanner paper last “about three months” without fading. It wasn’t entirely clear, in this context of rapidly cascading technology, whether that meant a lot of time or a little.
Vandalous Blues and other Works of Art

The Photographic Arts
By John Wood
Illustrated, color & black & white, 191 pp
University of Iowa Press, 1997, $65.00

The wonderful thing about photography as delivered to us by the "artworld" is how it makes our own little lives look rosy. We may be utterly dysfunctional, but never as abject as Nan Goldin people. We may be ugly as sin, but we're prettier than William Klein's bug-eyed monsters. Even our sex lives, odds are, would never interest Jesse Helms. But, however welcome and comforting the reigning photo-perversities may be, they tend to obscure another side of photography — the thick and varied strand of picture making and taking that luxuriates in the print as wondrous physical object, where the sensuous deployment of materials expresses something beyond bad news. In fact, if I may broach the idea without a bolt of lightning striking me dead, this photography conveys hints of transcendence, dare I say rapture? That's rapture (there, I said it again) of either process or image, or both, even a marriage of the two.

As a matter of fact, the sensibility flourishes today, as it has since Julia Margaret Cameron, although not necessarily in Artforum or the Whitney Museum (beyond the Starn Twins, and whatever happened to them anyway?).

Rapture, of course, is tricky to express in a photograph (or any medium) without degenerating into hokiness, as unintended humor from as far back as Henry Peach Robinson, through William Mortensen and beyond well shows. In our ironic times, the safest venue for rapture, if you don't count the rapture of S&M, is rapturous nature — in the way of majestic sunsets and mist rising over still waters. Unfortunately, this rapture tends to platitude, or is so rendered in our time. No matter how ardently the photographer has waited for a sublime shaft of light to arrive on earth, we've seen it in 25 magazines and 50 slide shows. Besides which, Adobe Photoshop can do the same thing without mosquito bites. Yes, rapture is an unironic yearning for beauty, or so slightly ironic you don't notice it, but let us also have, please, the invocation of hitherto unseen, even unsuspected, magic.

In his beautiful new book, The Photographic Arts, John Wood, professor of Art and English, and Director of Creative Writing at McNeese State University, ranges this territory, from what he calls the "vandalous" blue of John Metoyer, contemporary cyanotypist, to the daguerreotype portraits of the miners of the early American West, and back to "The Conceptual Songs of Jerry Spagnoli," a modern daguerreotypist who houses his plates in wooden sculptures of his own construction. There is a chapter on the "Masters of European Pictorialism and the Problem of Alfred Stieglitz," and one on "American Symbolism," including the first mention I've seen in print of Adelaide Hanscom, whose gravures in a circa-1904 edition of the Ruháiyát of Omar Khayyám unerringly hit a note of high rapture, besides being arguably the most beautiful prints ever put between covers. (I held this book in my hands five years ago and, to my continuing chagrin, failed to buy it for something in the vicinity of ninety dollars.)

The jacket copy, listing Wood's other books, two on daguerreotype, one on the autochrome, explains that "this sumptuously illustrated collection of essays dealing with historic photographic forms that have essentially been neglected [fills] in critical gaps in the literature." In all, there are six chapters of history and criticism, followed by 103 plates, of which the first 58 are in color. These are so gorgeously printed and many of them so beautiful we cannot help wishing for all in color, whatever the cost, although we try to be reasonable.

Meanwhile, speaking of photographs in color, in the chapter on "The American Autochrome" we learn that "the fabulous claims [Coburn] and Stieglitz made in print about their own work and that of their friends... distorted our understanding of the real history of the autochrome." The names of the great autochromists, familiar a mere 75 years ago, Wood says, have "slipped from history books," which celebrate the Photo-Secessionists whose autochromes may have been "no more than beginners' experiments." This chapter is a treasure of new information, provocative commentary, and common sense, with little or no worshiping at the shrine(s). However, that said, I must add that Wood's The Art of the Autochrome (University of Iowa Press, 1993), presents the lush autochromes to convince us of the grand beauty of the medium and the superiority of now-forgotten autochromists, while those in the book at hand seem to this (admittedly inexper) eye too close to the look of National Geographic for rapture.

My stern nature forces me to make a couple of other criticisms, although the relief of a take on American photo history that dredges up not one single smarmy portrait of Georgia O'Keeffe by Alfred Stieglitz cancels out far greater sins than that the dimensions of the originals are not indicated (frustrating as the omission is with unfamiliar modern work), and that the date is seldom given, so that, aside from our unsatisfied curiosity, in sections where vintage and contemporary works are intermixed, we are confused, at least momentarily. I also disagree with certain of Wood's assertions on contemporary photography, although that is not fully a complaint: he has addressed this work with as much asperity, independ-
ence, brilliance and history as any historian or critic has recently brought to the medium, and we can but be grateful. We may even hope it will have a civilizing effect on the practice, although odds are against that, certainly in New York, mother lode of hooliganism in art.

I found John Metoyer’s cyanotypes the most affecting works in the book, satisfyingly original and powerful in both image and process, not to mention beautifully reproduced, or that cyanotype was my first love in “non-silver” photography. Several Metoyers are as memorable as anything in so-called “alternative photography” today, and we are indebted to Wood for bringing them to our attention. However, I disagree with Wood on one strand of Metoyer’s work, which he similarly greets as a revelation. Certain photographs, for instance doll parts with objects arranged to evoke metaphors, such as childbirth, I find contrived, with a strong aroma of deja vu, and chunky-to-lead esthetically, hardly hinting at the visual magic that suffuses so much of his other work. Fair enough. No one is brilliant at every turn. I don’t fault the then 31-year old Metoyer, whose achievement is grand for one of any age. But this gives further grounds to question Wood’s judgment in contemporary esthetics, which I am inclined to do when he takes a swipe at another cyanotypist, John Dugdale, as not having a proper “20th-century vision.” Here I disagree, and not just because Dugdale is my friend and neighbor.

“Vision of one’s time” is an elusive, invisible quality, as fraught, treacherous and subjective as any in art crit. I shall address the point, a serious one for artists, especially those using “obsolete” media or equipment, at greater length in future. But for now, whether you share Wood’s enthusiasm to the hilt or only so far is irrelevant. What is relevant is his excellent discussion of important issues, not just made visible, but articulated, considered, and expanded, with real information to enrich our lives and give us something to disagree with. Plus of course the pictures.

So, basically, my advice is, if you can rustle up the $65 and have any interest in photography since the ’49-ers, your money will be well spent on The Photographic Arts. From absorbing accounts in letters and diaries of the miners and their lives, through Wood’s fact-filled, wonderfully opinionated essays on other modes and moods, from the uncanny portraits of the American West in those amazing silver-on-copper objects, to John Metoyer’s rhapsodies in blue, it’s just a good book to read, re-read, and look at. The cyanotypes, new and old, could start a craze. No, on second thought, they illuminate what is already upon us.

* * *

Cyanotype at the Platinum

Sorry, folks, it is beyond my powers of restraint to forbear mentioning the concatenation of Johns in this story. John Metoyer, cyanotypist, stars in big book by John Wood, John Stevenson of Platinum Gallery presents his first New York show, Sir John Herschel invented the medium, and at this particular moment John Dugdale looks like its most famous practitioner. As it happens, Metoyer uses the New Cyanotype, a medium described by John Bamier in Photo Techniques Magazine, Jan/Feb ’97, edited by Mike Johnston. True, the inventor of the New Cyanotype is Dr. Michael Ware, so I can go no further with this angle, but nothing is perfect.

Many of the Metoyer prints featured in the Wood book were in the Platinum Gallery show. Several, such as My Resurrection (previous page), and Altar Boy with Death and Tree, are from Metoyer’s exploration of his “roots” back in the county of the family’s American origin. It seems that his great-to-the-something-power grandmother was a Creole named Coin, a feisty young woman married to the ultra white, and considerably older, mayor of the town, apparently to the displeasure of various local poohbahs. When the husband died suddenly, she inherited Melrose, the largest estate in Louisiana, then promptly lost everything in the Civil War, whereupon the family scattered. John’s branch settled in the Chicago area, where ultimately his father became a printer and John grew up with printing as a fact of everyday life, plus the freedom of a home darkroom - from a very early age.

Having heard stories of the family’s original Eden all his life, John decided to go back to get a sense of it himself – taking pictures, of course. In Metrose Archangel he stands on land of the original estate. Reaching for a personal belief system, Metoyer explores the “religion of me,” putting himself in a number of ritualistic poses and places.

Whatever his search may or may not have revealed about the ancestors, here’s how his branch of the family turned out so far. His big sister (whose name I didn’t get), proud of the success of her “baby” brother, jumped into the car, leaving her own two babies with husband, and drove seven hours from Akron, Ohio, to Far West 22 Street on a fine fall Saturday, learning en route (the hard way) that the speed limit in New Jersey is, would you believe?, 55 mph. Pulling up in front of #551, she parks right at the curb (doesn’t everybody?), climbs the three flights to see her brother’s oeuvre for the first time (although, being a chemist, she has answered many a chemistry question over the phone), pulls out a credit card and buys one of the most beautiful (Resurrection of Me), after which she tells the dealer about the relationship. Then, warned that police in NYC give tickets for parking at the curb, she dashes off with her prize, and the seven-hour drive back to Akron that night.

If you missed the show at the Platinum (Sep/Oct ’97), Stevenson has his own Metoyers in the back room; ask to see them whenever. If I have garbled a name or two in the story, I apologize, as I wrote the details down later, but the essentials, told to me at the scene by big sister, are true blue. The other thing important to mention is that the work was so intensely blue it leapt off the walls, no small recommendation for the New Cyanotype, of course. JS

Cyanotypes courtesy Platinum Gallery, 551 W 22 St, NYC 10011
had done as he had done, they would have got on equally well, though there is not one single maxim or piece of advice to which ninety-nine out of every hundred photographers could object, nor which is neglected in their every-day practice. Some of the advice he gives is quite unnecessary; for instance, he says that the "busy" man taboos the "fuzzy" portrait, as if portraits "fuzzy" enough to cause the likeness to be lost were ever put into any photographer's shop window or show case. The principal thing which the "Busy Man" insists on is work — hard work. Work undoubtedly makes people happy, but I wish I could believe it made them financially successful. I used to think that, if I worked hard enough and long enough, I should get on, so I used to work until about 2 o'clock every morning except Saturdays, when I knocked off at 12 p.m. I did my own operating, printing, developing, toning, mounting, book-keeping, and everything, even to sweeping out my studio and cleaning my windows at 8 a.m., but at the end of ten years I was as poor as when I began, and what was more, was completely knocked up. A famous London photographer came here and told me if I went on I should soon be dead; I felt like it, but still I had an idea that, if I only worked hard enough I should get on. On his advice I got a printer and toner and knocked off work at 6. Do you know that from that moment I seemed to get on better; then, in a few years, I got a retoucher in summer, and got on better still. I happened one day to mention this to a brother photographer, and he told me that he had found out years ago that the secret of financial success was not to work at all yourself, but to get others to work for you. He added, that you will never be able to do this, for, in the first place, you will not be happy unless you are at work, and, what is more, the population of your town is not big enough for you to expect enough sitters in a year to justify you in employing hands to do all your work.

Of course, it does not matter to one photographer whether the photographers in other towns get on or not, but it is of importance that young men who are thinking of entering the business — I say business, for it is the "high art" or "photographic artists" who call it a profession — should not be under any wrong impression and that they should not think that, if they work hard enough, financial success is sure to follow. When I left school at the age of thirteen, I used then to dabble in photography; so my father told me that, as he could not help me at all, he thought I had better be a photographer. My objection at once was that I did not think it paid, for knowing all the photographers in the town, now a city, where we lived, I knew by the way their sons' trousers were patched, and other things, that the profits from photography were very small. All those photographers are now dead, and not one of them has made any of his sons photographers; yet the "Busy Man" and your correspondent at Carlisle make out that photographers' sons need not wear patched trousers; if they had to in the days of the carte mania, in these days of "amateur" and "process" competition, it seems to me that they will have to go without altogether, for now there are ten photographers where there used to be one, and rents are higher, because the public will no longer go up stair cases through "green baize doors," yet your readers are told — and among your readers are thousands of amateurs hesitating to make the fatal plunge from "am" to "pro" — that if they only work hard, in a clean, well-appointed, comfortably furnished studio and work-rooms, and exercise the tact and good sense which most Englishmen are gifted with, and make children so enjoy being photographed that they "howl" when they go, and passers-by mistake the reason of their tears; that they take pains with plain sitters, as if every one did not know that it is these people who are capable of the most improvement, and who always give the biggest orders; in fact, that, if photographers everywhere understand their business, they will get on in spite of too much competition or failure of other trades, and the increasing growth of amateur work and process work.

To a young man who is thinking of devoting his energy to photography as a profession, I would say, if you have abundant capital and are lucky, you may, perhaps, do well; but, as for work overcoming everything, no such thing; it may bring you honor, but not necessarily £ s. d., or even as much as a new suit of clothes every year. W. W. R.
"I would fire the CEO of any company that held its product until it was ready."

Paul Saffo, Institute for the Future, Menlo Park, Calif

THE DATA BASE

My first computer, a Mac Plus, took no more space on the dining table than a pair of sneakers. The year was 1986 and the Plus was state-of-the-art. It came with all of 2 megabytes of RAM, worked by swapping floppies, and woed unto the damsel who couldn’t find her floppy when the screen ordered, "reinsert disk 'Microsoft Word.'"

Then one day, aged 10, the beloved Plus died. Its replacement, in the reign of the Dominatrix System 7, now fills every surface of what was once a dining area with three levels of peripherals, plugs, accessories, connectors, conduits, cables, drives, and externals in a nest of coils that soon swallowed a domestic animal and a small child.

But there was a worse problem. Back in 1986, when we needed a database to manage subscriptions for the world’s most obscure artists’ publication, there were not many around. Lotus 1-2-3 wasn’t designed for the job and cost an absurd $400 not to do it. But MacUser Magazine brought a $49 program to our attention by giving it many mice: Record Holder became our good friend, and put us in full command of everything from format to print-out design. Each step was simple, logical, controllable, and clearly explained in the manual. You could do whatever you could think of, any way you wanted. It never crashed, and a nice young man answered the phone evenings for tech support. We used it for everything, hardly imagining that other data bases, especially ones costing $400, would not show how your document was shaping up with an on-screen "print preview," but expect you to launch a print-out blind.

Still, I had a premonition that Record Holder might not survive an upgrade, so I hung on to the Plus as long as possible, ignoring the scorn of offspring for my "toy computer." When, ultimately, the dread day arrived and I tried to launch Record Holder on the new computer, nothing happened, not even a crash. Naturally, the small company that had made this intelligent database was long gone.

I looked in MacUser. I asked on the Internet. I consulted experts. I turned to Web pages, mail order suppliers, computer stores, even the offspring. I tried mail merge and Apple Address Book, among others, but they would only print what they had in mind. It was computer hell, telephone hell, and what the hell am I going to do with this drawer full of info on scraps of paper hell rolled into one.

In computer hell you try to figure out something simple but essential for a data base, like close trailing spaces, from a manual that cares only for stunts, like finding out how much each member of a group from Ohio spent on an excursion to Dubuque. Any stray.

At length, I download a trial version of Infogenie from the Web. This data base will search, store, and organize your e-mail and print labels, it says. It also has a live person on tech support for the price of a phone call to California. I speak to Robin, who is endlessly patient and knows everything, an enticement to buy if ever there was one. But Infogenie, too, tends to the fascism of the breed — do it our way or go to school for higher programming skills. (In retrospect, that might have been quicker, but if I could foresee the future, I’d own Microsoft, right?)

And so on through several more programs. The manuals, if any, provide mere scraps of random information, and when you tell Tech Support what simple thing you’re trying to do, they say, “that requires higher programming skills.” Filemaker Pro, you understand, could arrange every symphony since the clavichord relationally and play them, you know, like music, but couldn’t omit fields with no data. I am thinking about programming school, in a place called Paramus, when a friend says Claris Works has a nice data base.

I return Filemaker Pro under the 30-day guarantee. Sadly, Claris Works turns out to be as pig-headed as the rest of them, flatly refusing to cancel a failed layout without erasing all data, among other bonehead behavior. I launch a cooling off period; that is, I give up for the time being.

Meanwhile, Performah scolds me for being a bad person: SHE crashes, then complains about the low-quality shut down, holding up a diagram of the havoc wreaked. She refuses to empty the trash on the pretext that it is "in use." (Other Fairly Old Persons besides myself may remember "Alice’s Restaurant," in which Arlo Guthrie had a similar problem disposing of trash.) When I change her settings for the tiniest second, she sweeps all my Ethernet extensions into the Disabled bin. Talk about your fanatic housekeepers!

However, on the bright side, at last the experts have noticed that computers are overdesigned and under-helpful. The New York Times’s computer expert, Stephen Manes, explodes in disgust (1/13/98) at new software that runs a killer tease as bad as Robot’s. Manes says
he’s “no longer flabbergasted or even surprised at the number of products I try that do not work as advertised or do not work at all.” He cites “a steady stream of horror stories” from colleagues, friends, acquaintances, relatives and readers that make my Dominatrix seem relatively benign.

When Microsoft executives held a conference to present Windows 98, Manes reports, their “unspoken assumption was that... problems will remain numerous, varied and exasperatingly hard to cure.” Manes then mentions in passing a little-known fact that, having taken considerable razzing on the topic of my Mac, I was not sorry to learn: “Windows machines are particularly great offenders,” he says. (Are you listening, offspring?) Indeed, “Apple Macintosh users clearly encounter fewer problems... installing software and hardware.” Yes, yes! And vendors report “far fewer support calls for Mac.” Although, it is true, he adds, that Apple machines do like the heavy crash. However, what galls Manes most is the bithe way companies ship “products with known problems while planning to fix them in the next release.”

In an earlier NY Times story (6/24/97) the picture is even starker, the experts angrier. In fact Michael L. Dertouzos, head of MIT’s computer lab, is practically incendiary when he tells an interviewer, “people should revolt... take up arms.” The machines are in charge, he says, forcing you to do what they want, not what you want. He describes how a computer forced him to upgrade his software over the Internet when all he wanted was an emergency airline reservation. Dertouzos has also observed that new computers have “too many features, too few of which are the ones the user wants at any given moment,” adding that computer companies put enormous effort into “trivial improvements in appearance or presentation.”

In the same story, Dr. Leonard Kleinrock of the computer science department at UCLA describes “feature shock,” pointing out that “anything Microsoft does makes it worse.” Paul Saffo, head of the Institute for the Future in Menlo Park, CA, explains that poorly tested products are marketed for buyers to test because the company “must get its product on the market first, and fix it later.” In fact, “I would fire the CEO of any company that held its product until it was ready.” (Ray of hope: technology changes so fast that the item may be obsolete before you have to solve the problems it came with.)

This article ends with soothing promises that one day we will be able to ask our computers questions “in common speech.” But I’m not impressed. I have spoken to my computer in some very common speech to absolutely no avail. On the other hand, maybe the worst is over: Since starting this story, I have advanced to System 7.6.1, which seems of an altogether different personality. The Dominatrix has mellowed; a kinder, gentler personality emerges - motherly almost. When I absent-mindedly open a big program without closing the others, does she take this opportunity to crash? Not at all. She sends me a nice note saying, “You don’t have enough memory for that, dearie. Try closing Microsoft Word and Pagemaker 6.5.” I do, and all is well.... And at last, even Record Holder is resurrected, about which more in due course.  JS

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New Under the Sun
Overheard at APAD. 1998

A prominent dealer from a major American city, showing a customer a platinum print, noted that platinum is an extremely difficult and valuable process. Because it must be printed by contact, she explained, only one print can be made from each negative. What’s more, exposure can only be by sunlight. Our informant couldn’t say whether the customer bought the print, but reported that he was clearly impressed.

VDB tests from page 25

Right: Bob Schramm’s Vandyke brown tests, fully aged. Differences among the emulsions may not be distinct in reproduction, but were as follows, from left: VDB-1 had the best D-Max, with 12 differentiated steps, legible numbers starting with step 3. Paper white was, however, somewhat veiled. VDB-2 had 14 visible steps, and cleaner paper whites, but the D-Max was less and the numbers didn’t separate in the shadows until step 4. (This formula actually printed the Notre Dame test negative best, because it was contrasty even for VDB.) VDB-3 was unusable, not only mottled, with heavy staining, but with very little density. VDB-4a and 4b were the same, exposed 4 minutes and 10 minutes respectively. Neither got any density to speak of. Another paper than Rives BFK might have been less grainy, but neither this formula nor VDB-3 invite further effort. However, a printer using a harder paper (eg., Fabriano Artistico) might want to compare VDB-1 with VDB-2 on it.
Sense and Sensitometry

Part 1: THE H&D CURVE

Photography books almost always describe how light goes through the little hole, and hint strongly that shadows and highlights are problem areas, but they rarely explain how density in the negative translates into density in the print, a critical factor in all printing, and a real hazard with post-factory processes. Suddenly the well-mapped terrain of data sheets, established procedures and standard materials is behind us; now we’re on our own. But that’s just one reason to read this article. The other is so you can drop the phrase “H&D curve” and know what you’re talking about.

The basics of how reality gets reversed into a negative are familiar, almost self-evident: Dark areas of the original scene send relatively little light to the film, exposing the emulsion only slightly, so they build little density in development. These less dense, or “thin,” areas let a lot of light through to the print, exposing those areas heavily, to recreate, in effect, the original darks.

The light areas of the original scene send lots of light to the film, exposing those areas strongly, so they develop proportionately more density. These denser film areas in turn allow relatively little light through to the print, producing relatively little print density, to recreate, as it were, the highlights of the original scene. (Medium levels of light produce midtones in both film and print, and, all other things being equal, are rarely a problem.)

Highlights develop faster than shadows. Not only have they gotten more energy from the bigger hit of light, their extra energy causes more “infectious” development as well. The longer this different rate of development goes on, the greater the difference between highlights and shadows. In other words, increasing development time increases contrast. Up to a point, that is. Film highlights eventually reach maximum density (“D-max”), or their limits. Having developed faster, they get there before the shadows reach the end of their slow, low-energy development. Any parts below D-max can continue to add developer fog. In other words, if you really overdevelop, you’ll actually lose contrast (although of course you’re not going to do that).

But you, reader, probably knew all this. A few complications are less well known however: Both shadows and highlights display certain inconvenient behavior. Photo emulsion, we learn, does not respond to shadows and highlights at the same rate as to midtones; there’s no equal pay for equal work at the ends of the scale. Two Englishmen, F. Hurter and V.C. Driffield, discovered this with their famous “H & D curve” in the late 1880s, although they set out to solve a different problem.

As William Mortensen described the situation: “Faster emulsions were beginning to appear... and there were no standards of useful units of speed. But oddly enough, this part of Hurter and Driffield’s work has proved the least important of their accomplishments. The ‘H&D unit’ for express-

The figure at left shows the H&D curve as a series of steps. The Increasing Rise portion, or toe, has the least exposure and least density; the Equal Rise or straight line portion shows the midtones; and the Decreasing Rise, or shoulder portion, represents the highlights. Note that the steps at both ends are shorter than the middle steps (see text). This chart, from Mortensen on the Negative, also appeared in the US Army’s 1941 instructional manual on photography, except that there the three sections were labelled Underexposure, Correct Exposure, and Overexposure. (We are more tolerant today – or more realistic.)
The "curve" on the previous page is an imagined row of steps. The curve for practical everyday use is a line drawn through what would be the tops of those steps. In the figure at right, numbers 1 through 21 on the horizontal axis represent the steps of the 21-step transmission guide. Numbers on the vertical axis represent log density. Readings are entered as a dot at the appropriate level on the line over the step number. Connecting the dots "draws" the curve.

Particular chart shows three variations of Farmers Reducer on Commercial film. The strips as originally exposed and developed had nearly identical readings, as seen in the solid lines (color-coded in the original) overlapping in the center of the chart. The three dotted lines below them represent the readings after 30 seconds, 1 minute, and 2 minutes respectively for Farmers Reducer bleach, followed by fixing.

Note that all the lines are parallel, showing that, although the density is less, "the curve" remains the same. Other tests with similar bleaches give similar results. In other words, conventional reducing formulas do not change contrast (no matter what the "literature" says). Note also that the 2-minute bleach (bottom line) wiped out shadow density to step 14, and even the shorter bleaches brought the toe too low for comfort.
temperature and chemistry. Problems, if any, are routinely addressed with variable contrast filters, graded papers, and/or development controls.

However, enlarging a negative in black-and-white film materials and matching it to a non-standard emulsion/paper combination is a whole other proposition. You still have to deal with all that light, but now you’re on your own. The human eye, we’re told, can distinguish 1560 different shades of grey. We must compress that range onto film, which can differentiate only 256 shades, and from there onto paper, which has a mere 50. That’s glossy black-and-white factory paper. Hand-coated papers have fewer, since their dark is less dark than shiny black. Prints in colors other than black can have even fewer. In other words, you probably want all you can get. (Note that these numbers refer to visually distinguishable shades, not steps on the sensitivity guide, each of which has many detectable increments.) In most hand-coated materials, contrast controls are limited, making it especially important for

Not everyone received the news from Hurter and Driffield with joy. English photographer P.H. Emerson had a fit.

negative range to match emulsion range. Such expedients as dichromate added to Vandyke brown and kallitype work only within limits, if at all, and often degrade print quality. Platinum seems to have the most useful contrast controls, but even they can only do so much.

If shadows of the original scene fall low on the toe of the camera negative, they are abbreviated, or compressed, which makes them more likely to overexpose print shadows until separation, or “drawing,” in these areas sinks entirely out of sight. That’s why photographers often halve or quarter the rated speed of camera film. Many pros, for instance, shoot 35-mm Tri-X film at EI 200, sometimes as low as 100, rather than the official ASA 400; the extra exposure gets shadows safely up to, or at least near, the straight-line portion of the curve. (Manufacturers are perfectly aware of this, but film speed is a big selling point.)

On the other hand, modern camera film has such a long density range that its shoulder is rarely encountered, which can cause trouble of its own down the print chain. Detail in print highlights is never a cinch; extra-high original density makes it tougher.

Note that the shoulder, or densest part of the negative, becomes the toe, or lightest part of the print, while the toe, or thinnest part of the negative, becomes the shoulder, or darkest part of the print. But we rarely speak of “shoulder” or “toe” in a print, except to make a particular sensimetric point. We avoid this particular confusion factor by speaking of print shadows and highlights.

In any event, odds are against getting the entire contrast range of the real world onto the straight line portion of a film. Ansel Adams himself allowed that “a considerable proportion of the negative values may lie on the toe or on the shoulder sections of the curve as well as on the straight-line section.” Thus the near values of toe and shoulder are “permitted,” but they remain danger points and we try to watch out in their vicinity.

200, 400 and 800 Units

OK, enough theory. Let’s look at an actual print — a 21-step sensitivity guide exposed and developed on the chosen paper in the chosen emulsion. Or make that three prints — one with a long exposure (800 units) on a NuArc 26-1K Mercury Exposure System, or “plate burner,” one with a medium exposure (400 units), and one with a short exposure (200 units). On most papers with this light source, a “normal” cyanotype negative needs about 400 units. (Exposure in “units” permits the built-in sensor, or “integrator,” to lengthen exposure as the bulb ages.) Roughly equivalent exposures with closely ranked black-light fluorocumbines three inches from the paper stage would be 16, 8, and 4 minutes. Cyanotype is used in these examples for its medium scale — longer than gum, shorter than Vandyke brown or platinum — also because it’s so easy to coat and process.

Part 2 of this article, “The Ordered Negative” (following), explains the sensitivity guide in detail. For now we’ll simply count steps in the schematic exposures shown at left. The step-guide print exposed for 800 units displays many of the general attributes of print exposure, so we examine it in some detail. First, we see several steps of maximum density, or “D-max,” ganged up in the low numbers. No divisions are visible, even the step numbers have disappeared. Not until step #7, do little steps, the compressed shadows of print shoulder, start to appear. All those blocked up steps at the bottom show that 800 units is much more exposure than cyanotype needs on this paper, at least under a normal nega-
negative. Only a negative so dense that shadows don't begin to separate until step #7, or 0.95 log D on the densitometer, want this much exposure.

From step #7 on, tones progressively lighten, and the dark step numbers stand out more distinctly on them. At step #8 or #9, the well-defined, "normal" steps of print midtones begin. If the "story" of the photograph is in these values, all is well. Good print separation continues until about #11, when steps start to get smaller again and finally fade away. After step #13 there's highlight veiling, but no detail. These palest tones on the print toe, above what might be called the "working" highlights, carry scant information, but still print the numbers of the step tablet sharp and clear, so the inexperienced might take them for useful highlights. They do, however, help make a graceful transition to paper white with a very contrasty negative.

To see how many actual steps the emulsion-paper combination will print, we count the separated steps, beginning with the highest blocked step, #6, as darkest dark. Six from 13 equals 7; add in step #6 itself to get 8. In other words, these conditions will print no more than 8 steps; less exposure will print fewer.

In the "normal," 400-unit exposure of the second diagram (on the same paper, needless to say), shadow separation begins at density equal to step #2 or #3 on the transmission guide, midtones begin at about step #6 and highlights reach #9 or #10. This exposure again yields 8 steps, and would be right for a negative in which shadows start at #2 or #3 and "working" highlights end at #9 or #10. That, in fact, would be the "correct" negative for cyanotype on "normal" paper, and would certainly save much time, bulb life, and electricity compared to 800 units. There's also some question that print quality at 800 units suffers (although that's not this article).

The third step print, 200 units, is underexposed. It shows good separation all the way down to step #1, because the darks never get dark enough to start "shouldering." In fact the darks in this short exposure are little more than normal midtones—nowhere near D-max. It follows, also, that there are fewer steps than usual: tone ends at step #6. This, by the way, is what happens if we expose less to avoid fogging highlights when a negative is too thin.

Note that with three such step-guide prints on hand there's no need to make test prints, as long as the variables of paper, emulsion, and general handling (including light source) stay the same. We take a reading of the highest highlight in the negative where tone is expected (Part 2 explains how to do that), and match it to a step print. If, for instance, highlight areas in the negative go to step #11, a "normal" exposure of 400 units, which prints density only to step #9 or #10, would be too little, but 800 units, which prints tone to step #13, would be too much. Halfway between, at 600 units, is probably about right.

If shadows of the negative don't fit when exposure is geared to the highlights this way, choices are to accept it stoically, compromise the highlights instead of the shadows, remake the negative, find a different scale paper, dodge, bum, flash, or mask in printing, bleach the print, and/or try the "print controls" for that particular medium.

**Contrast Control by Paper**

**THE EXAMPLES ABOVE ARE, AS NOTED, on paper of average contrast. There turn out to be contrasty, or short-scale papers, and softer, or long-scale, papers for most emulsions (as is strangely unremarked in the literature). Charts showing contrast and density range for each "alternative" emulsion are meaningless then, unless pegged to a particular paper. Beginners ask what kind of negatives to make; answers can only be tied to the paper. In cyanotype, for instance, contrasty papers, like Coventry Rag, Johannot, and Stonehenge, have fewer steps, perhaps six or so, each step being larger than average. The big steps mean tone at the top tends to break off abruptly, like jumping off a cliff. This may give the print a bleached look with a negative that's "correct" for cyanotype, but can make a thin, flat negative, otherwise not printable in cyanotype, printable. Still, a high-key image, say delicate reflections in a white pitcher on a light wood table, won't "come out" on such contrasty paper. Tonality of that order needs a long-scale paper. Whatman Fine Print, for example, and some of the platinum papers, can print a fine long stretch in cyanotype, for a total of 12 steps or more.

Of course, in addition to the print strategies noted above, a negative can be intensified, to add a certain amount of density and contrast, or bleached, to reduce density, even "harmonized" in cases of utterly unprintable contrast, somewhat trickier, although a logical last resort. These and other "contrast controls" will be covered in future issues. Now we're trying to get it right the first time.

**Recap**

- Think of a stack of bricks that can sit in a hole, on the floor, or on the roof, but is always the same number of bricks. All conditions and variables being equal, the number of steps that a given emulsion/paper combination will print remains the same.
- More exposure doesn’t print more steps, it simply stacks up identical steps of maximum dark at the bottom of the pile.
- Less exposure does print fewer steps, because the darker steps are omitted. But the range of the print emulsion hasn’t changed; it’s just not all there.

**Q. We’re at the end of the film era. Isn’t sensitometry almost obsolete?**

A. While we dare hope that digital methods will make getting to the enlarged negative MUCH easier, hurdles of cost and technology remain. Meanwhile, the rule of the "curve" applies to all silver media, including camera film and factory-paper prints. Equally important, non-silver print emulsions have their own characteristic curves. The principles are at work everywhere.
You can hitch your star to “a standard negative” if you like, but if it’s a picture negative, it’s chaos, mere density scattered at random. The step guide, on the other hand, is an ordered negative. Hardly bigger than a popsicle stick, it tells more about the action of light on an emulsion than any but the most expert eye can read unaided. Apply it to light-sensitive materials and it maps them, calibrates their perfect negatives, fine tunes exposure without test prints, and, in many cases, can take the place of a densitometer. Whether you call it the 21-step, as I have in Part 1, transmission sensitivity guide, plate maker’s sensitivity guide, step wedge, step guide, step tablet, “the guide,” or, in the vocabulary of students, “the thing,” this little stack of densities in measured increments is an essential tool for hand-coated processes.

The following “tutorial” on use of the step guide assumes that the reader knows basics of making enlarged negatives in at least one format. For those who don’t (as well as those who do), a Negative Thinking article in Issue #2 will tell how to make really good continuous tone negatives with ortholith (usually called “lith film”), which comes in very large sizes at very low prices. A companion piece will reveal for the first time anywhere how to get sheet film out of the box without a fingerprint! In fact, every issue of Post-Factory will have authoritative information on usual, unusual, and emerging ways to get to the enlarged negative.

About the Guide
There are 12-step guides, 14-step guides, 21-step guides, 31-step guides and 34-step guides that I know of, and probably others. They come in different sizes, with and without numbers on each step, officially “calibrated” (for a lot more money) or not, and in numerous other formats.

I use the Stouffer Company’s T2115 (represented schematically in these pages), This strip of transparent material 1/2 by 5 inches wide, has 21 steps of tone in grayscale. Each step is denser than the one before by a measure of 0.15 log D, or a half stop. Two steps, or 0.3 log D, therefore, equal a full stop. (“Log D” stands for “logarithmic density,” a reminder that densitometric measures are most often figured by logarithm, not arithmetic.) It’s big enough for our processes, which don’t need a test as big as your arm, small enough to tuck in next to a print, and cheap enough to yield an occasional specimen to the emulsion gods without heart-break. (And do not think that you can protect your guide by sheathing it in plastic, because the plastic seriously distorts UV exposure.) The small size not only saves paper, but, if you have guides in depth, lets you gang up as many tests at once as you have room for in the frame.

The T2115 costs $5.50 plus postage, with a discount for bulk orders to schools (see Sources). Stouffer also makes other formats, as does...
Kodak. Agfa makes a graduated guide, a ramp with neither steps nor numbers. Guides for other purposes have different arrangements and different increments. As noted, several guides are better than one, and a couple of dozen are a major asset.

Not every great artist has a densitometer. You can make perfect negatives with just the step guide and the step print.

Step Numbers on the Guide

The step numbers are invaluable for all kinds of gauges and comparisons, as well as a readout of definition, detail, contrast, and almost every facet of printing. When the printed numbers go soft, contrast is bad. When they get clumpy, grainy, irregular, blotchy (particularly with gum), or any other way except finely etched precise lines, print character not fully evident in solid slabs of tone is revealed. How the numbers do or don’t grow fainter in the higher steps is another clue to exposure. The point at which they emerge from solid darkness to become readable speaks clearly of life on the shoulder. Nineteenth-century photographers, who made guides by layering strips of translucent paper, often wrote numbers in by hand. (See inset next page for other available guides.)

Reading the Guides

There may be tiny but measurable differences in a given step from guide to guide. Thus, if several guides are used for a test or series of tests, slight differences cannot be taken as definitive. For the greatest possible precision, as in testing factory-film controls to be read by densitometer, it’s advisable to use the same guide for each exposure and to take all densitometer readings from the center of the step. When making prints in our hand-coated processes, however, differences at this level are usually insignificant.

“Calibrated” guides are sold with exact readings for each step. This adds greatly to the cost, but for our purposes adds little to function. There may still be variation from guide to guide, and even if not, considering the loose tolerances of most hand-coating operations, “calibration” is beside the point. However, it’s often useful to know a guide’s densitometer reading. If you can get access to a transmission densitometer, read and record each step for one particular guide.

Otherwise, use my numbers, next page. Odds are they’re close enough, since we generally use these values relative to each other, rather than pegged to an absolute.

The Densitometer

Not every great artist has a densitometer. Fortunately there’s an excellent way to read negatives with just the step guide and step print in tandem, as will shortly be described. But first, a word about densitometers:

The reflection densitometer reads light reflected from an opaque surface, such as a photograph. That’s not this article. The transmission densitometer reads light transmitted through transparent material, which is our subject here. (I have, as it happens, measured print density by transmission; readings seemed to correspond with visual evidence, but that was a stab in the dark, so to speak, and not relevant here either.)

The look of the numbers in the step print is an excellent guide to definition, contact, and nearly every other aspect of printing.

A transmission densitometer is essential for precision work with factory film. A Macbeth black and white transmission densitometer can be bought used for about $500. (See Pass & Company in “Sources.”) Mine is smaller than a bread box and sits in a closet on a swing-out stand from Staples ($35). Others are on the market, digital and analog, including at least one for both transmission and reflection. Newer models often have RS-232 connections, which transmit readings directly into your computer program.

Making the Step Print

The first absolute essential for the enlarged negative is a good step print in the chosen materials, which is the only way to tell what kind of negative to make. “Good” means with the darkest shadow tone near or at D-Max, that is, as dark, or nearly as dark, as the uncovered space around it; no more than two steps so blocked up at the bottom that their numbers disappear; and highlights ending in smooth, well-defined tones. If you don’t have any idea at all of exposure time, start with bracketing exposures: take a guess, then halve and double it, zeroing in as necessary.

Some processes, like salted paper and carbon, have a very long scale and will print graduated density for 16 or 18 steps or more. Platinum averages about 12 steps. Cyanotype on Strathmore Bristol drawing paper averages 8 or 9. A gum emulsion may print 8 or more steps, as few as 4, or even fewer, depending on the variables. (Of course you can cover an entire strip with tone if you overexpose enough, but the number of differentiated steps is the issue.) This is when you see if that really expensive, ultra-arty paper actually makes a glorious print, or discover that a modest, unassuming little paper prints wonderfully.

Check the Shadows

If three or more of the lowest steps in the step print are blocked up, you’ve exposed more than necessary. If the first step is much lighter than the surround, you’re too far from maximum print density to rest on your laurels. Try 50 and 100% more exposure. If the first step (the clear space at the top of the
guide) prints as dark as the surround, you can consider that D-Max - for those variables. (Double coating often, but not always, increases D-Max, although that's another article.) If you really underexpose, neither the surround nor step #1 will be D-Max, but the difference between them is always a useful indicator.

Whether your darkest print shadow should actually be at paper/emulsion D-Max is another question. For instance, I'm told that one guide to platinum printing says the darkest print tone should be only 90% of D-Max, on the principle that putting the shadows a little lower on the print shoulder improves separation. (The closer to D-Max, the smaller the shoulder steps, just as the closer to zero density the smaller the toe steps - as seen in the Mortensen diagram, Part I.) But each medium/paper/image has its own character. Study those shadows in a few bracketing step prints; weigh their behavior and the nature of your image. You may decide to trade D-Max for shadow separation - or not.

Check the Highlights

If highlights trail off in a foggy look, odds are they're overexposed, or cooked in some other way, assuming the emulsion is fresh. If the number of visible steps is lower than the norm for this emulsion, what look like "highlight" tones are probably underprinted midtones - but you knew you needed more exposure because step #1 was so much lighter than the surround. Try 50 to 100% more exposure. Again, if you don't know the norm for this emulsion, bracket. (There's more about reading the step print in "Exposure at 200, 400, and 800 Units," Part I.)

The Bad Positive

Among the many routes to the large negative (see sidebar next page), probably the most common, and in some ways the easiest, is by making an intermediate positive (also called interpositive, or diapositive) from the original negative, and then the large negative from that. The general rule is that these positives should look "bad." That is, they should look flat, like a print that's been overexposed and under-developed, which, compared to the norm, they are.

Underdeveloping keeps the shadows from getting too dense to expose through. In a print, you can decide to sacrifice shadow separation to improve D-max. In the intermediate positive, you don't want D-max, and want all the shadow separation you can get. The negative is going to be much easier to make if no density in areas of the intermediate positive where you don't want density separation is higher than step #8 or 9, or the vicinity of 1.25 log D on the densitometer.

The overexposure is to insulate ample tone and detail in the positive highlights. Exposure through those highlights lands on the negative toe. (The lowest density is always the toe, whether the view is positive or negative.) As noted, separation in the small steps of the toe is a problem. The more separation in the positive, the better the odds of enough in the negative. Note also that highlight tone looks stronger on the light box than it really is. The eye is fooled by pale tones that do not transfer to the negative. Even entirely clear film can be deceptively pretty on the light box. To carry some kind of "drawing" to the negative, tone should be no lower than step #3 on the 21-step, or about 0.35 log D on the densitometer. That's above the low toe, closer to the straight-line portion of an emulsion, and generally easier to work with.

In other words, the flat interpositive condenses the density range enough so you can get it all, from highlights to shadows, in the negative, maybe even with toe and shoulders to spare. Contrast is resurrected when you make the negative, which you will tailor precisely to the print materials. In fact, you can make as many different negatives to suit as many different emulsions as you like from just this one flat "master" positive. (Note that when making a negative by contacting a print onto film, as in option 2 next page, the rule of "flat positive" still applies.)

Beginners tend to make devilishly contrasty positives, seduced by their sparkly look on the light box. Or they go to the opposite extreme and make positives that are truly flat and terrible. The trick is to get the positives flat, but still there, and with all their information transferable.

Making the Negative

The step guide print is used in tandem with the step guide to make an enlarged negative keyed to the way the material...
Study the chosen photograph; a factory-paper print is good for reference, but some experienced photographers just examine the original negative with a loupe. Note the key or "story" parts of the picture, particularly in the shadow and highlight areas. Suppose you have a white cat on a dark velvet sofa. Will the cat show fur or be only a silhouette? Will the sofa show structure and texture or be one big shadow mass?

Make a wedge of exposures on your chosen film (through both highlight and shadow areas), develop, then measure their density on the light table with the punched cards and the 21-step, as described next page. No need to archivally wash these strips, as long as fixing is complete. Blotting dry is OK, too. Film tone changes when totally dry, but not enough to matter here. Read the negative test densities as instructed, find their numbers on the 21-step, and check the step print to see what tone those numbers will print.

Now you're looking three ways, from the negative test strips and the transmission step guide, which are transparent and sit on the light box, to the step print on paper, which has to sit on something opaque. (It's all too easy to absentmindedly stick it on the light box, too.) Some professionals examine test prints with a light to match exhibition illumination. Illumination is important when examining prints, but that's not this lesson. (Forget I even mentioned it.) Suppose three film-test exposures show sofa (shadow) density at steps #3, #4, and #5. Check these numbers in the step print. Which is separated enough to show local contrast, and "draw" form? Dark enough to suggest the richness and depth of the original? Let's say you pick step #4 as the best compromise. Now, however, you have a highlight problem.

Exposure strong enough to get form and separation into the shadows of the negative would send the cat fur into orbit, or let's say to step #13. But our theoretical emulsion only goes to step #11. To be white with some tone, the cat should be in steps #9 to 11. If you expose the negative less, the sofa will be too thin and print too dark; if you expose the print more for the cat, the sofa will again print too dark. You must lower cat (highlight) density by development controls: diluting the developer, less development time, and/or less agitation.

But what if you're making the negative for a longer-scale medium, like Vandyke brown or platinum, which need a density range of 12 or more steps to show their full tone? If shadow separation starts at step #2 (for instance), to print 12 steps the negative has to go to step #13. The cat at #9 to 11 would look gray; it needs #10 to 13. But increasing film range is usually easy - just add development time. As noted in Part 1, high-lights add density faster than shadows, so odds are you'll pick up the necessary extra steps. Other options include stronger developer and more agitation.

Of course you could dodge the cat when making the negative, or burn it when making the print as a photogram, without a camera.

1. The original negative is exposed onto film, either by contact or enlargement, to make a positive, which is contacted or enlarged onto sheet film to make a negative.
2. A black-and-white silver gelatin print or a color print (both are positives) is contacted printed onto sheet film to make a negative, or onto photo paper to make a paper negative.
3. A 35-mm slide (which is a positive) is projected onto sheet film to make a negative.
4. The original negative is projected onto direct-duplicating sheet film, which makes a negative directly from a negative.
5. Duplicating film is exposed in the camera, or standard camera film is reversed processed, to make an original positive, which is exposed onto sheet film to make a negative.
6. A small-format positive is made by copying a 35-mm negative in a slide duper; this positive is then enlarged onto sheet film to make a negative.
7. The negative is made directly in large format by view camera or pinhole.
8. Polaroid positive/negative film is exposed in a view camera or under an enlarger.
9. A film or paper negative is made as

Options for Large Negatives

1. A negative is printed by laser or ink jet onto paper or acetate.
2. A laser, ink jet, or other computer positive, is contacted onto sheet film to make a negative.
3. A photo copy or laser print on paper is waxed to make a "waxed paper negative" (which may in turn be contacted onto sheet film).
4. Files generated by digital camera or computer are taken to a service bureau for imagesetting onto film.
5. Video or monitor display is captured by camera, or output digitally, then processed as above to make a negative.
6. Slides or movie film are projected, re-photographed in any format, then processed as above.
7. Imagery fed to the computer by scanner, CD, or other device is output and processed.
8. Paint, dyes, markers, ink and other materials are applied to transparent sheets to make cliches verre or "constructed negatives."

Each option has many sub-options, variations, and unexplored possibilities, as well as advantages and disadvantages. Digital avenues broaden almost daily; others have probably been overlooked. (Watch this space!)
(although dodge/burn is no fun in UV printing). We’re not exhausting all strategies here, just showing how the transmission step guide and the step print work in tandem to calibrate the large negative to the print material.

The White Cards on the Light Box

Finally we get to the neat trick for measuring film density — excellent when making the negative (for reading film test strips), and when making the print (for reading the finished negative to gauge exposure). Equipment is a light box, two small white cards with holes punched in them (standard office punch) and a transmission step guide. A guide taped into a frame of black card is advised — the frame blocks glare of the light source, so reading is easier and more accurate. (See illustration p. 38.) Put the film to be read on the light box with the guide next to it. Place the hole of one card over the area you want to read, isolating it. Run the hole of the other card up and down the guide, until it lands on a step that matches the tone in the hole. When you’re close, toggle between the higher and lower step until you zero in on the match. Make a note of the number, then go on to the next area.

Sometimes the step number needs a “plus” or a fraction, like “step 6 1/2,” or “7 plus” to describe it, but overall the method is easy and surprisingly accurate (although some say it helps to squint). In fact, human vision is so precise in this respect that the operation of many early densitometers depended on matching tones by eye.

Reading by Densitometer

As noted, the densitometer can be a great convenience, but requires one more step when printing: since our test prints have been made with the step guide, log D readings have to be translated into step numbers. I may not remember that log 0.95 equals step #7, for instance, but I keep the card handy (page 39) and look it up.

Summing up

Print range is the number of steps the emulsion/paper combination will print. It may be expressed in terms of reflection densitometer readings, as “a print range of 1.3 log D,” or in step numbers, as “the emulsion prints 15 steps on Fabriano Artistico.” The number is fairly constant for each paper/emulsion combination (except in gum, where development is a major variable). If you try for more steps by adding exposure, shadows block up; if you try for fewer steps with less exposure, shadow density is lost. As noted above, the books cite various additives for contrast controls, but, except for platinum, they’re iffy, often degrading print quality while “resucing” it. (And platinum controls can only do so much.)

Negative range is found by subtracting the measure of the thinnest shadow area from the measure of the densest “working” highlight. It can be read by the card and step-guide method above, or on the transmission densitometer. With the step guide, one number is added for the bottom step. If the shadow is, for instance, step #3, and the highlight step #12, the negative has a range of 10 steps. By densitometer, it would read log 0.35 for the shadow and log 1.69 for the highlight, or a density range of log 1.34 (1.69 minus 0.35), usually rounded off as 1.35.

Needless to say (and the reason for this entire operation), printing is lots easier if emulsion/paper range and negative range match. If the negative has 14 steps from shadow to highlight, and emulsion/paper prints only 10, you lose four steps, which means a print with less density at the bottom or less information at the top, or both. Conversely, if the negative measures only 10 steps and the emulsion/paper combination needs 14 steps to reach full tone, the choice is to expose enough to suit the emulsion, which fogs the highlights, or save the highlights and settle for anemic darks.

In other words, the negative is the heart and soul of a print in any medium, and it behooves us to make the best of it.

H

aving begun photography relatively late in life and somewhat against my better judgment, I started at my local public library, which offered a few National Geographic-type books, and, for some strange reason, Ansel Adams’s “The Negative” on the shelf beside them. I took the Adams along on vacation, reading it in bed each night in a different back-country motel, where I found it very helpful. No matter if the mildew was thick enough to fold, the mattresses made of hay and baling wire, even the sheets clearly pre-slept-in, it put me to sleep in 30 seconds.

Back home, I learned from more accessible books (later editions detoxified Adams’s prose, but I still could not share his enthusiasm), then went to photo graduate school. There we became, not quite experts, but sophisticated, in a matter of days. Indeed, if we were so naive as to ask what film had been used, or how it had been developed, we were shushed. Seminars were like a Victorian course on marriage — big on the beauty of marital relations, silent on how it’s done.

But, it so happened that my interest in non-mainstream processes made me an instant “expert” in some quarters, which led to a teaching job. I was scrambling to learn enough to at least carry off a credible fake when I met Greg Schmitz, who introduced me to the 21-step sensitivity guide. Today, thanks to both, I dare claim some actual expertise. (I should probably recall my early students for an upgrade.)

I realized from the outset that meaningful testing requires controlled exposure and had made a set of nine identical 4x5 negatives for the purpose. These worked pretty well, confirming my suspicions about uneven light of sun lamps and floods, revealing the character of different papers in a given medium, and so forth.

But when I saw my first step print — smooth tones laid out in order and numbered — there was no going back. I’d been working in the dark, so to speak, after all. The difference in teaching from then on was also like night and noon.

T

oday’s photographers have been raised on variable contrast papers; if a print gives trouble they change filters. “Non-silver” processes don’t offer this luxury; many have little wiggle room at all. In these precincts it’s crucial for the negative to fit the emulsion, yet the very concept is now obscure. Photographers marinated in photo theory may have hardly examined the tones of an actual

continued page 43

POST-FAC TORY #1... PAGE 41
Q I'm told that lith film will make a good continuous tone enlarged negative, but it's not working for me. I even added Orthazite, which didn't help. Any suggestions?

A Edwai calls its product Orthazite "the original benzotriazole restrainer" (it's basically a 1% solution of benzotriazole), but any restrainer is going to make your problems worse.

Restrainers are used to hold back highlights, mostly to keep paper whites from fogging, as to salvage old photo paper — which is why they're also called "anti-fog." In the negative, however, "white" or light areas are the shadows, which you're probably trying to get more of.

What you need to hold back, with that very contrasty lith film, are the highlights, which tend to go through the roof. Your best bet is to beef up shadows with added exposure, and hold back highlights by shortening development time, diluting the developer, using a soft-working developer, and/or agitating less. (More about that in future.)

But speaking of benzotriazole for factory paper, some photographers add it to developer for a blue-black print tone, which may work or not, depending on the paper and developer. Another restrainer, potassium bromide, nearly always warms print tone, sometimes almost to brown — again depending on paper and state of the developer. (Try a half-teaspoon/litre to start.)

Potassium bromide in powder form is much cheaper than benzotriazole in either powder or liquid. But note that any restrainer slows down development; you have to add exposure — from 10 to 50% more. Note also that the restraining effect wears off with long development.

Q I ordered "hypo" for Vandyke brown, but what came were the crystals I know as "hypo clear." My friend has instructions that say use sodium thiosulphate for fixer, then hypo clear. Which does what, and which comes first?

A Printers without a traditional photography background can get confused here, especially if they've done platinum printing, where a clearing bath indeed does something like what "hypo" does with silver emulsions.

The term "hypo" comes from the original name for the chemical, sodium hyposulphite, which, not surprisingly, was called "hypo" for short. Today the chemical is officially sodium thiosulphate, but we still say "hypo."

The term "fixer" (or "fix") for sodium thiosulphate evolved because that's the bath where the image gets fixed, or made permanent. The final photograph is pure metallic silver; the unexposed emulsion that didn't darken is silver halide (a silver salt). The fixer dissolves away those unexposed halides — otherwise, they'd keep darkening, and fog the photograph.

In fact it wasn't until John Herschel discovered that sodium thiosulphate dissolves silver halides and gave the news to William Henry Fox Talbot that practical photography could begin. Before then, Talbot had to keep his photographs in the dark, because fixing was only so-so. (Now ammonium thiosulphates are also used for rapid fixers, but "fixer" and "hypo" are still general terms for all.) As it happens, however, fixer is itself bad for photographs — if you don't get it all out of the print, it will, in time, fade the metallic silver image. Long washing in plain water will get rid of the hypo, but "hypo clear," (sodium sulfite plus), makes the wash quicker, saving time and water (which is why it's also called "washing aid"). Hypo eliminator, incidentally, is something else. It was in favor for a while, then out of favor, and last I heard was still out.

In other words, you fix a silver gelatin print with fixer, or "hypo," or sodium thiosulphate — they're all the same thing with different names — then use hypo clear to help clear the hypo out of the print. The chemistry of Vandyke brown is different in many ways, but the image is still silver, so you still have to wash the fixer out, and hypo clear still speeds up the process.

When did sodium hyposulphite become sodium thiosulphate full time? Apparently after 1911. Cassell's 1911 Cycloped-i-a of Photography has an entry for sodium hyposulphite that describes the chemical, its use, and lists for synonyms "hypo" (which it puts in quotes, to show it's a kind of lingo), sodium thiosulphate, and hyposulphite of soda. For sodium thiosulphate it says only, "See Sodium Hyposulphite."

Q Do you have any good tricks?

A Here's a good one: You can tone factory-paper prints blue with the A and B
solution from plain cyanotype. Put 10 cc each of A and B into 300 cc (10 ounces) water, add 65 cc 28% acetic acid (or 20 cc glacial), and stir. It’s quite strong when it’s fresh so you may want to dilute the working solution. Agitate the print in this bath until you like the color, then wash for about 10 minutes.

Since the blue intensifies the silver, this is a good trick for a print that’s a little bluish. But if the blue gets too intense, try agitating it in a weak Dektol, which should bring it back toward black. Or put it in a weak borax solution (1 teaspoon to a litre) to send it toward brown. This toner, by the way, is the same as store-bought “Blue Toner,” only lots (about 100 times) cheaper.

PS: If you’re a printer and have nitric acid, but not acetic acid, use that instead. Proportions are very flexible (as they are for the acetic acid version above). Formulas range from 5 cc each A & B with 3/4 cc nitric in 8 ounces of water, to 7 cc each with 1/2 cc nitric in 10 ounces of water, and 10 cc each with 3/4 cc nitric in 14 ounces of water. For the metrified, an ounce of water is about 30 cc, so that would come to (about) 250 cc, 300 cc, and 400 cc. But if you want to know why these old formulas mix ounces and cc’s, you’ll have to refer that to a Level Two Research Technician.

Meanwhile, if you’re either a photographer OR a printer, you know about adding acid to water instead of water to acid, so there’s no

__Q__

What will happen to photography as we know it?

__A__

Photography-as-we-know-it is a fiction, because for every minute of its life “photography” has been slipping and sliding into the next photography. One tiny example that comes to mind is that for a long time 35-mm photography was defined as “miniature photography.” Learned articles were written to explain why this wasn’t “real” photography, and why you couldn’t possibly make a decent picture without a tripod. Then there came some learned articles explaining why you couldn’t possibly make a decent picture with a tripod, but there weren’t so many of those, because the change was taking charge of itself. True, the 35-mm film we have is much better than the 35 mm film of those times – but just imagine a day at the races, or the Superbowl, or the subway, or the moon, with that tripod.

As digital breathes down our necks, there’s a tendency for the “learned” to again cite the rules of photography (as if they were paying the paper), or dismiss variations of form as not real photography. But rest assured, p-a-w-k-i will continue its ameboid existence forever. And surely we will all rejoice in a time when we can take dust, “noise” and scratches OUT of a picture with one filter in a software program, and ADD dust, “noise” and scratches with another filter in the same program, and even soon, perhaps, should your heart so desire, do both at once!

Send questions to Answer Person,
Post-Factory Press, 61 Morton St, NYC 10014, USA.

Sense & Sensitometry Part 3, cont. from page 41

no negative. Nor is there much help at hand.

Manuals of “new” photography, of which there are now many, dwell mostly on printing. They may have only a line or two about negatives, and that either cryptic or wrong. One current book, for instance, recommends a negative for gum printing that looks “over-exposed” and “underdeveloped” or “flat”; another recommends the opposite, a “strong, vigorous negative of high contrast and minimum density.” Vigorous and minimum density in the same negative? That demands explanation, which is not forthcoming. A third book says negatives should be “normal” and leaves it at that, although “normal” in some quarters is highlighted to step #9 on the guide, in others to step #10 or #11.

Clases are often no better. In some, the negatives are made first and used interchangeably for all emulsions. A print of sorts is arrived at, but the full depth, richness and delicacy of each medium are lost. Since beginners are likely to lose tone in other ways, their prints may be so anemic they see no reason to bother.

Well beyond the negative, the step guide is a key to joys of paper. Let’s say you’ve made a print on a piece of paper picked up off the sidewalk in the East Village (as one hotdog printer liked to boast), or found at the bottom of a drawer (an ever-popular source). If you include this little strip in the first print, you can zero in on perfect exposure in the next, even define the ideal negative/paper combination. (The paper itself may break out in blotches the next year, but then again it may not.) From this step test, unless you’ve done something gross, like staged a major contamination, or dried the paper in the Jacuzzi, you’ll see right away whether it’s worth printing on. Here again, the 21-step is an all-points bulletin.

We may dream of a computer program that calculates emulsion and paper, plots the perfect negative, and then spits it out. Someone is probably working on it. But as long as we use silver film at all there’s the “curve” to contend with. Even with digital negatives, there’s no escape: As noted, most non-silver emulsions have curves as well.

Let us, therefore, embrace our little realm of fact. We may forever argue about what we should have done in Bosnia, or whether art should be purely for pleasure or Sunday school by other means, but we can see the numbers on a step print with our own eyes. This quantification in an uncertain world is satisfying, and occasionally, when a discovery is made, thrilling. JS


For further reading on sensimetry, there are many classic reference works, including Photography, Its Principles and Practice, by C. B. Nebel; Photography, Theory and Practice, by L.F. Clerc (both out of print, but available used or in libraries); Photographic Facts and Formulas by E.J. Wall, revised 1968 by John S. Carroll (also out of print and rare, although earlier editions can be found for $25 to $50 at flea markets). Beyond the Zone System by Phil Davis is still in print. Kodak’s Publication M-1, Copying and Duplicating in Black-and-White and Color, is also available.
Nippon Photo Clinic, 212/982-3177
NuArc, 800/962-8883
NY Central Artists Materials, 800/950-6111
Pass & Co., 1212/333-7474
Pearl Paint, 800/451-Pearl
Philen, 212/255-7820
Photo Warehouse, 800/922-5484
Photographers' Formulary, 800/922-5253
Pinhole Resource, 505/536-9942
Porter's Camera Store, 800/553-2001
Professional Camera Repair, 212/382-0550
Rockland Colloid, 914/359-5559
Rosetta Lighting & Supply Co., 212/719-4381
Samy's, 800/321-4ASM
(The Science Shop, 408/543-5616
Silvertone Ltd., 611-620-0844
Sprint, 800/356-5075
Stouffer Graphic Arts, 212/234-5203
Stylecraft Fabrics, 212/354-0123
TALAS, 212/219-0770
Tessar, 607/264-3480
Tri-Ess Science Services, 800/274-6910
United States Plastics, 800/537-9246
University Products, 800/628-1912
Utrecht Mfg. Corp., 800/223-9132
Voltar Tech, 203/255-2633
Wilken Scientific, 800/766-5676

A bullet [*] in front of an entry indicates an over-the-counter NYC facility. Most of these also do mail and phone order; some have other branches.

Comments in quotes are customer reports. Further comments, contributions, and corrections invited.

### 1 Archival Materials


Light Impressions, PO Box 940, Rochester, NY 14603-0940, orders: 800/826-6216, fax: 800/826-5539. Emphasis on materials for photo display and storage: all archival materials incl. mat board, film sleeves, print case albums, frames, framing tools & supplies; also books, and a raft of interesting incidentals and services. Catalog.

**TALAS**, 568 Broadway (Prince St), NYC, 10012, 212/219-0770 Fax: 212/219-0735. Another voyage of discovery: archival materials for book arts, calligraphy, libraries, photographers & conservators, including mat boards, portfolio cases, print boxes, archival tape, adhesives, methyl cellulose, PVAs, marbled & printmaking papers, backgrounds, foils, solvents, formaldehyde, gums, thymol, hopsheys, waxes, resins, xylene, etc. Catalog, $5.


### 2 Art supplies (paper & pigment)

**Color Craft Ltd.**, 14 Airport Rd, Grafton, CT 06062, 800/243-2712, fax: 203/653-6043. Sells Creatax Colors, pigments in dispersion (not good for gum, but a cheap source of pigment for carbon tissue and other purposes). Also sells colors for textiles, airbrush, marbling, etc. Mini-catalog.

Daniel Smith, 4150 First Ave S, Seattle, WA 98124-5568, 206/223-9599, 800/426-6740, fax: 800/238-4065, international fax: 206/224-0040, daniel@smith.com. Almost every artist's supply known, wide selection paint & paper (minimum order 10 sheets), good house-brand watercolor, prompt mail/phone, competitive prices, great catalog.


**NY Central Artists Materials**, 62 3rd Ave (11th St), NYC, 10003, 212/473-7770, orders: 800/950-7711, fax: 212/475-2542. The "artists' supply store." Fine & commercial art, especially good selection of paper, knowledgeable staff, hard-to-find items; often best retail prices. A nice place to visit in NYC, but phone orders, too, no minimum purchase. See also paper, 8. Catalog.

**Pearl Paint**, 308 Can'l St, NYC (main store), NYC 10113, 800/451-PEARL, fax: 212/431-6798. Chaos, esp. on weekends, but 5 floors of art & craft supplies, including good selection of paper, paint, brushes, craft, framing & printmaking supplies. Lithographer's gum arabic, from half pint to quart. Pearl often has "discount" price, but don't assume it, and staff may or may not be clued in. Catalog.


### 3 Chemistry & Chemicals

Artcraft Chemicals, POB 583, Schenectady, NY 12301, 518/355-8700, orders: 800/682-1730, fax: 602/488-9782. Best time to call, 5:30 pm to 3:30 pm & weekends. Good prices and friendly, well-informed service on both standard and "non-silver" chemicals, eg, amidol, catechol, collodion, ferric ammonium citrate, glyceral (16 oz $22), glycerin, potassium ferricyanide, sulfamic acid, thymol, urea, etc., as well as regular photo chemicals for mix-your-own; popular pyro kit, also custom kits: Will make up any formula from Anchell's "Darkroom Cookbook." Monthly specials, books (including the famed Book of Pyro). For price list, Jacobson@juno.com.

Bryant Labs, 1101 5th St, Berkeley, CA 94710, 510/526-3141, orders: 800/367-3141, fax: 510/526-
2548. Technical grade of most alt. photo chems., inc. ammon., dich., ferrous oxalate, etc. Also, wide assortment of lab equip't & supplies (see 7). “Good people who often cater to photographers and artists.” Extensive and educative catalog.

City Chemical, 100 Hoboken Ave, Jersey City, NJ 07316. 201/653-6900, orders: 800/248-2436, fax: 201/653-4468. Wide stock of chemicals for all purposes. Get cheaper photo or technical grade when possible. 1-lb minimum on many; $50 UPS delivery minimum. Also sells over-the-counter, a short drive from NYC (at the end of the tunnel).

First Reaction, 37 Depot Rd, Hampton Falls, NH 03824, 603/929-3583, fax: 603/929-5023, email firstrxn@aol.com. Wide range of chemicals, among those of interest to alt.-photo, ammon. dich., sulfamic acid, hard-to-find powdered selenium for vintage toner formulas (50g/$5), 100g=1200, 250g=2400, 1000g=5800. Plate burners, aca mercury vacuum exposure systems, bulbs, vacuum cans, etc. Best price may be thru Arkin Medo (Photo Equipment & Supplies, 9).

Photographers' Formulary, PO Box 950, Condon, Montana 59826, 406/754-2891, orders: 800/922-5255, fax: 406/754-2896. Almost every photo chemical under the sun, so speak, including the hard to find, in large or small amounts, a special boon when you need only a few grams. Also, pre-mixed formulas, fabric precoated with cyanotype, kits for toning and for several hand coating processes, related supplies, books, catalog.

Sprint, 100 Dexter St, Pawtucket, RI 02860, 401/728-0913, 800/356-5073, fax: 401/728-0914. Complete darkroom chemistry, including non-allergen print developer ("shadow detail without blocking highlights"), stop & fix: End Run antibubble with anti-static agent; print-embossed emulsions for hand coating (see 11), and a highly regarded Pyro developer base, $6.48/litre, etc. Catalog, data sheets.

The Science Shop, 148 Archer St, San Jose CA, 95112-4504, 408/262-3540, fax: 408/453-5691. Wide range of chemicals and "science" materials, including human grade powder and all the dichromates; recommended for friendly service.

Tri Ess Sciences, Inc., 1020 W. Chestnut, Burbank, CA 91506, 818/848-7838, orders: 800/274-6910, fax: 818/848-3521, out-of-state fax: 800/274-6910. Big catalog with 45 pages of chemicals, from acetamide to zinc sulhide, including ammon., potas., & sodium dichromate; cupric sulfate $5.50/lb; 8-oz lump of silicon $12.50; potassium chloride/1/sul. See also lab things, 7.

4 Exposure lights & systems

BLACKLIGHT FLUORESCENT BULBS
From General Electric, Sylvania, others, F20T12/350 BL, for instance, is the 20 watt, 24-inch bulb. Important: Be sure to get the BL bulb, not the BLB, which costs 3 times as much and puts out a third less light. For bulbs in quantity, see yellow pages for electric supply wholesalers.


to photographic, but won't ship fluorescents longer than 36-inch. The F20T12/350BL noted above is $11.51 per bulb.

Bultronics, Farmingdale, NY, 800/654-8542. UV bulbs by the case. See Voltarco, below.

Just Bulbs, 938 Broadway (22 Street), NYC, 212/226-7820. Retail black-light fluorescent (and others) to go. List prices.

Lamp Express USA, 26 Commerce Dr, Danbury, CT 06810, 203/794-9580, fax: 203/794-1708. US agents of Theimer, high-end pre-press equipment and exposure systems for graphic arts industry, including laser imagesetters, densitometers, printing lights and graphic arts bulbs.

NuArc Company, 6200 W. Howard St, Niles, IL, 60714, 847/967-4400, info: 800/962-8883. Plate burners, aka mercury vacuum exposure systems, bulbs, vacuum cans, etc. Best price may be thru Arkin Medo (Photo Equipment & Supplies, 9).

Rosetta Lighting & Supply Co, 21 West 46 St, NYC 10036, 212/719-4381, or yr local Grainger, Home Depot, K-Mart, etc. for strip fixtures to hold fluorescents.

Voltarco Technology, 400 Captain Neville Dr, W. Waterbury, CT 06705, 203/259-2633. Voltarco's F40T12/2A fluorescent bulb, designed for fish tanks, peak output at 420nm, said to be ideal for the red, but works well for all. Other bulbs include BLB, peak output at 369NM, & new 365NM. Sold through Bultronics (above), others.

5 Film (large format)


*Fotoc Care, 132 West 21 St, NYC 10011, 212/741-2990. Sheet film, including 400 ASA Ilford, 11x14", as well as camera sales, rentals, repairs.

Freestyle, 5124 Sunset Blvd, Los Angeles CA, 90027, 800/292-6137, fax: 800/616-3686. Web site: www.freestylesalesco.com. Cameras, lenses, darkroom supplies, film, in many sizes & types, inc. bulk loading, b&w sheet film, and bargains on lith film (eg., 100 sheets 8x10 Arista ortholith $33), good for continuous tone in dilute dev., all sizes 4x5, 5x7, 8x10, $24, plus rolls. Also film cassettes & odd lots. Catalog.

Photo Warehouse, 120 Bernoulli Circle, Oxnard CA, 93030, 805/485-9654, order: 800/922-5484. Along with standard photo fare, has good prices on "house brands" of hard to find continuous tone sheet film, both ortho & panchromatic (the latter rumored to be FP4 under an assumed name; will cut large sizes to order), lith and direct duplicating film. Not as well-known as Freestyle, but another excellent resource. Catalog.

Samy's, Los Angeles, 800/321-4ASAM. Broad range of regular and large-format film, banquet, panorama and other extra-large sizes in sheet film; favorite of area professionals.

6 Ingredients, Materials

Ammonia, supermarket; be sure to get non-perfumed, non-sudsy. For some uses, this inexpensive 4-5% ammonia will replace ammonium hydroxide, or "strong ammonia," which is 37%, much tougher on eyes & lungs.

Ammonium, potassium, and sodium dichromate, from chemical sources: Artcraft, Bryant Labs, Photographers Formulary, The Science Shop, Tri-

* Argyrotype, save $$$ by mixing your own. Silver oxide, sulfamic acid, etc, from First Reaction, see chemicals, 3.

* Arrowroot, health food store (it's plant starch)

* Bellows, Flexible Products, 14204 60th St North, Clearwater, FL 34620, 813/356-3142, 800/551-3766, fax: 813/535-1295, will build new bellows for your camera, or sell you fabric to fold your own.

* Bregman register pins, NY Central Supply, see 2.

* Bromoil supplies, David Lewis, PO Box 254, Callender, Ontario, Canada POH 1H0, 705/752-3029. All the necessary, inc. paper, brushes, inks, workshops and manual. See also Graphic Chemical, under printmakers' supplies, this section.

* Corentech, supermarket (Argo)

* Cyanotype chemicals, ferric ammonium citrate from chemical suppliers (Artcraft, etc.), potassium ferricyanide from same or regular darkroom sources. Pre-mixed classical cyanotype formula, very economical by litre in A & B solutions from Sprint (3, 11), New Cyanotype from Luminos, Bostick & Sullivan, others (11).


* Foam applicators, at most hardware stores. Note that the kind with wooden handles have better foam than the kind with red plastic handles; best price at New York Central Supply (Art Supplies, 2).


* Formaldehyde, if you must, at pharmacies, which may insist on prescription, also, *Talas, Tri-Ess, others, or the mortuary. Better yet, switch to glyoxal (below).
Gelatin, Knox unflavored, from supermarket, photo gelatin from chemical sources.

Glycol, from chemical suppliers, eg, Artcraft & Fischer Scientific, see 3.

O. Gum arabic. Lithographers gum 14° baume, by gallon; *Philenb, 118 W 22, NYC, 10011, 212/255-7820, their house brand is one of the all-time great gums, and only $16 gallon. Will ship. Daniel Smith, has an excellent lithographers’ gum, see 2. Pearl Paint has pints & litres. Graphic Technologies, Wheeling IL, 800/472-7483, makes an excellent lithographers’ gum, “RB”, but sells only to dealers. Your dealer may be willing to order. Graphic Chemical gum (Seneffelder’s), formulated for etching, iffy for gum printing. See printmakers’ supplies, below. Photographers Formulary sells powder & liquid, TALAS sells powder.

Goldenrod paper for masking; *Philenb Litho Supply, 118 W 22 St, NYC 10011 212/255-7820.

Neoprene sponge, see foam rubber, above.

Parrafin, for “waxed xerox,” or other paper, in 1-lb package at hardware stores, supermarket, also Tri-Ess, 7.

Photoemulsion supplies, Wilkem Scientific, PO Box 301, Pawtucket RI 02862, 800/766-5678, 48 baume ferric chloride by gallon, Autotype gravure pigment sheet, other gravure supplies, inc. gravurephotograph kit catalog. See also Graphic Chemical under printmakers supplies, below.

Plastic: *Industrial Plastic Supply, 309 Canal St, NYC, 212/226-2010. Another great browse. Wide range of plastic supplies; plexi cut to order while you wait; also rolls, sheets, sheets, containers, hinges, tools and most other plastic materials, inc. methylene chloride, solvent adhesive for acrylic & the hydronium water to apply it to, to make your own vertical trays, for instance. Or just get a plastic cast of the Statue of Liberty. United States Plastics, 1390 Neubrecht Rd, Lima, Ohio 45801, tel: 419/228-2242, orders: 800/537-9724, fax: 419/228-5034. Every variety of plastic for every purpose, from tray, tub, tube, tank, jug, and pail, to sheet plastic, rings, fittings, valves, connections, etc., & findings. Good prices, shiny catalog.

Platinum/palladium salts, see Precious Metals, 10.

Printmakers’ supplies, Graphic Chemical & Ink Co, 630/832-6004, 800/485-7382, fax: 630/832-6064, full range of printmakers’ supplies & equipment, including tools, inks, dyes, plates, solvents, varnishes, findings, paper, for etching, lithography, wood cutting and engraving, block printing, silk screen, gravure, and bromoil; also books. Attractive catalog, a printing mini-course.

Septic tanks, see Terragreen, 7.

Silver Emulsion, Liquid Light from Rockland Colloid, Silver Emulsion from Luminos (see 11 for both). Sold by B&H, Adorama, K&M, others (see 9).

Silver nitrate, see Precious Metals, 10.

Silver Recovery, see Terragreen, 7.

Step tablets, see Stouffer Graphic Arts Equip’nt Co, 9. Kodak sensitivity guides are ordered/sold through dealers.

Tones, see Luminos, 11, also Berg & Brown, Kodak toners at your dealers’, or mix your own.

Vanadye brown ingredients, tartric acid, ferric ammon, citrate, & sodium thiosulfate at Artcraft, 3, & other chemical suppliers. For silver nitrate, see Precious Metals, 10. Pre-mixed VDB from Sprint ($/100mls) and pre-mixed Argyrotype from Luminos, see 11 for both.

7 Lab Things

American Science & Surplus (formerly Jerrycro), 3605 Howard St, Skokie, IL 60076, 847/982-0870, fax: 800/934-0722. Mail order “warehouse” with orders taken only from finger costs to army costs, toys, kits, tape, magnets, switches, tools & materials’ tools & assorted corporate errors, with “lab things” that can be just the bottle, beaker or pipette you want for a song. Or not. Either way, the catalog is fun.

Bryan Labs, real lab equipment and apparatus, catalog, see 3.

Dropper bottles, by the gross or more, see Ginsberg Scientific below. By the dozen, see Tri-Ess, below. Single bottles from pharmacy. (Note that for all but minute quantities, dropper bottles are as accurate as syringes, much less mess & fuss.)

Ginsberg Scientific, Rte 2, Bx 290, Macks Creek, MO 65786, 573/363-5366, fax: 573/363-5367, lab glassware, including dropper bottles, in volume to dealers, labs, institutions. Brown glass “dropping bottles” by the gross or more. Recent addition: intensely blue 2-oz dropper bottle.

Magnifying lens: Tri-Ess (below), among others, sells Optivisor, worn comfortably on the head, several magnifications available.

Silver Recovery Collective, see Terragreen, below.

Terragreen: Jim Kosinski, Cherry Valley, NY 13320-0540, tel/fax: 607/264-3480. Silver recovery design for any size facility. Also Clean Lines Septic Saver, bacterial mixture that eats photo chemistry: “8 synergetic bacterial strains, 4-5 billion per gram,” other environmentally useful products, newsletter.


Note that many suppliers sell related lab items, usually expensive per unit, but convenient.

8 Paper for hand-coating

Daniel Smith, Pearl Paint, Utrecht, 2

*NY Central Artists Materials, large selection of papers, knowledgeable, interested staff, many hard-to-find items, no minimum order, great prices. (Inomachi anyone?) See 2.

Graphic Chemical, no minimum order, has a dandy “labeled set of our stock papers at no charge.” & informative catalog. (Did you know Rives BFK in tan is 280 gsm, in white 2509) See 6.

Stephen Kinsella Fine Art Papers, PO Box 32420, Oliveette, MO 63131, 800/445-8865, fax: 314/991-8090, in St. Louis area, 991-0141. Large Selection of artists’ drawing, printmaking & watercolor papers at good prices, big saving on packs of 100. Arches Platine 310 gsm, 22x30”/44.05. Among others: Hahnemuhle, Twinrocker, Fabriano, & Rives in various colors & 15, Japanese papers, mats, boards, etc. Minimum order $35. Price list.

9 Photo Equipment & Supplies

Abbey Camera, 800/292-2339. The “poor-source,” wide selection of cameras, photo gear, lighting, darkroom, factory paper, books, etc, by mail and phone, standard prices, complete catalog.

*Adorama, 42 West 18, NYC, 10011, 212/741-0052, orders: 800/811-4000. Most current cameras & equip’t in stock, all standard photo chemicals, film, darkroom chemistry & equipment, toners, including Halochrome, and “everything else” digital, video, astronomy, optics, etc. Discount prices. 300-page catalog.

Arkin Medo, 30 E 33, NYC, 10016; 212/685-1969. Sheet film in stock, all professional photo supplies and equipment, supplier for schools, dealer for Nuc Arc, Agfa, Kodak, etc. Good prices.

B&H, moved to 420 Ninth Av, NYC 10001, photo: 212/444-6600, orders: 800/947-9981. Electronic, video & other dept’s: 212/444-5000. Similar in stock & price to Adorama, better known, but often more difficult to shop in, deal with. Now much expanded: wait and see.

Calumet, 890 Supreme Dr, Bensenville, IL 60106, 800-CALUMET, fax: 800/577-3688. Most mainstream photo equip’t & supplies. Big on large-format, but cameras in all, Calumet’s own line plus others. Film, paper, bulbs, filters, studio supplies, contact frames, darkroom sinks, print washers, books, etc. Distributor for Zone VI. Catalog.

Contact frame, elegant, strong custom-made at Great Basin Photographic. Las Vegas, 702/363-1900, fax: 702/363-4490, gittner@vegas.in.net (Don Gittner). Ready-made contact frames (Premier, Gravity Works) from Calumet, K&M, Darkroom Innovations, etc. *Canal Rubber Supply, 6, for foam rubber for making your own.


Densitometers, Darkroom Innovations, above, sells
X-Rite Digital densitometers. Lamp Express, see 4. Also, Pass & Co., below, for new and used.

Freestyle, see film, 5.


*Lens & Repro, 33 W 17 St, NYC, 10011. 212/675-1900, fax: 212/999-5018. Professional cameras & supplies in most formats, with focus on large format. New & used cameras, lenses, accessories & darkroom equip’t: back room full of old D2V’s, odd sinks, & Deardorffs.

Pass & Co., 1841 Broadway, NYC, 212/333-7474, sensitometric equipment and supplies, including MacBeth densitometers, new and used.

Photo Warehouse, see film, 5.

Pinhole Resource, Star Route 15, Box 1355, San Lorenzo, NM 88041. 505/536-9942. Eric Renner, “Mr. Pinhole,” publishes The Pinhole Journal, source of continuing info & inspiration, sells pinhole cameras from the $9.95 kit to the $995 hand-made, also pinholes, zone plates, books, etc., including Renner’s own big pinhole book.

Porter’s Camera Store, Box 628, Cedar Falls, Iowa 50613, 319/268-0104, 800/553-2001, fax: 312/277-5254, order fax: 800/221-5329. Fat newspaper catalog of photo supplies & equipment, brand name everything - camera, video, darkroom, plus old standbys & darkroom specialties like Solarol for solarizing & Halochrome for silver plating. Expensive, but if you need the stuff & aren’t in NYC...

Sprint, 800/356-5073 has its own chemistry for developing and printing factory paper, compounded to be kinder to the environment, also pre-mixed emulsions, useful specialties. See sections 3 and 11.

Stouffer Graphic Arts Equip’t Co., 1801 Commerce Dr, South Bend, Ind., 46628, 219/234-5023, fax: 219/232-7989, www.stouffer.net. The invaluable 21-step sensitivity guide, type T2115, $5.40 each (+ shppg). Other resolution guides, gray scales, scanner scales, etc. Discount to schools.

10 Precious Metals (gold/pl-d/silver)

Alfa Aesar, division of Johnson Matthey. 800/343-1990, fax: 800/322-4757. Precious metal salts in larger quantities at great savings. Save on silver nitrate by pound or kilo, gold prices on gold chloride, platinum & palladium, etc. But you need exact chemical name, eg., “auric trichloride” (gold) or “sodium palladium chloride,” perhaps to be found in their improved catalog.

Bostick & Sullivan, Santa Fe, NM, 505/474-0890, fax: 505/474-2857. Well known for platinum/ palladium chemicals & supplies, now developing zinicate, “a variant of platinum,” Related materials include kits, books, & popular platinum papers. Recently added supplies for bromoil & other media. B&S “tech packs” add period flavor with xerox copies of old articles on such processes as platinum, kallitype and pinhole. “Convenient but expensive.” Tech support, catalog.

City Chemical, silver nitrate by oz or pound, see 3.


First Reaction, 603/929-3583, fax: 603/929-5023. E-mail: firstrxn@aol.com. Palladium chloride, ammon. & potass. salts of palladium & platinum, silver nitrate, silver oxide (25g & 34g), hydrogen tetrachlorogold, other “non-silver” chemicals. Note special on silver nitrate for Post-Factory readers: $147 per pound (454 grams). See Also Chemicals, 3. “An excellent supplier, with very competitive prices.”

Goldsmith Chemical & Metal Corp., 909 Pitner Av, Evanston, IL 60202, 847/899-7800. Recommended as “cheapest I’ve ever seen” for gold chloride, silver nitrate, and other precious metals.

Johnson Matthey, see Alfa Aesar, above.

11 Pre-coated and Pre-mixed

Chicago Albumen Works, PO Box 805, Front St, Housatonic, MA 01236. 413/274-6901, albaworks@ecn.com. “Centennial” printing out paper (POP), gold toner, sheet film. Also negative duplicating and enlarging, see Services, 12.

Luminos Photo Corp., PO Box 158, Yonkers, NY 10705, phone: 800/LUMINOS, 800/431-1859, fax: 914/965-0367, web site: http://www.luminos.com. Imported from England: Photospeed toners (inc. odorless sepia); Kentmere photo papers: New Cyanotype & Argyrotype ready-mixed. Silverprint Liquid Photo Emulsion is a projection-speed emulsion for canvas, wood, paper, glass, etc., ($20 for 8 oz); Luminos projection-speed photo-sensitized linen can be stretched like canvas, in rolls 49” by 30 ft, sheets 8x10” & 16x20”; Luminos Art Paper is non-supercoated, suitable for carbro & bromoil, etc. Newsletter, catalog.

Palladio Company, PO Box 28, Cambridge, MA 02140-0001; office & tech support 781/393-0813; orders: 800/562-9018, fax: 781/393-0817. Palladio paper in sheets or rolls, pre-coated with palladium/platinum emulsion, equally popular as toe-in-the-water for hand coating, or as an art form in itself. All necessary chemistry, plus UV Light Systems, pressure frames from $250 to $3000, also N31P enlarging film. Catalog/manual includes clear, detailed instructions for enlarging pos. & neg. for printing on Palladio paper, instructions for building your own inexpensive UV light source, or another, not-so-inexpensive Exposure Unit. Expert, friendly service & tech support.

Photographer’s Formulary sells pre-coated cyanotype fabric and kits. See 3.

Rockland Colloid, 302 Piemont Av, Piemont, NY 10968, 914/359-5559, email: rockloid@aol.com. Liquid Light photo emulsion is a projection-speed emulsion for canvas, wood, paper, glass, etc; sold at most large photo suppliers: 32 oz (960cc) $42 at Adorama, covers approx. 32 sq. ft. (3 m). Requires some learning & experiment (as does Luminos Silver Emulsion), but can do wonderful things. Rockland also makes Halochrome, other toners, and a Tintype Parlor kit.

Sprint, 100 Dexter St, Pawtucket, RI 02860, 401/728-9013, 800/356-5073, fax: 401/728-9014. Premixed sensitizers: Classic cyanotype in A & B solution, total of 2 litres for $20; Vandyke brown sensitizer, 100 ml for $9.77. Convenient, economical, popular with schools. Sprint also has its own darkroom chemistry, see 3.

12 Services


Film/paper testing, Darkroom Innovations. Yes, D1 will read yr neg if you lack densitometer. See Photo equipt., 9.


13 Not in the USA

In London, visit Silverprint Ltd, 12 Valentine Pl, London SE1 8QH. tel: 0171 620 0844, fax: 0171 620 0129. Regular photo equipt., materials, chemicals, as well as good range of supplies for alternative processes: chemicals, paper, and tools; Silverprint Photo Emulsion, films, books, etc. [Recommendations for non-USA are invited.] Info

Kodak Information Center, 800/242-2424, ext. 724 for Graphic Arts, ext. 724 for Professional Products. Whether by design or inattention, it grows ever harder to get info from Kodak on silver gelatin materials. The experts of yore are replaced by new hires with computers. Tell them you KNOW Kodak makes the product and keep trying. The current Kodak Professional Photographic Catalog helps if you can get one. (Publication L-9).

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Thanks

Names of persons especially important in the education of the P-F editor have been dropped throughout the issue (eg., Greg Schmitz, Mike Ware), but several others have made exceptional contributions as well. Bob Schramm contributed an entire section. His early moral support, thoughtful commentary, and constant encouragement were crucial. Jeanne Schramm is also warmly thanked for the Keenest Eye in the East on a copy edit (and both Schramms are due thanks for the up-to-date "gelatins in place of the e-wasting" "gelatine"). Dave Soemarko patiently but brilliantly explained step-by-step management of the Photo CD; his advice on scanning a bunch of wretchedlyscribbly lines caused them to print better than the originals. (Why can't the folks who write manuals be so intelligent?) Dave Fokos also provided essential, but woefully secret, information about translating hard copy to digits, particularly in the fraught matter of adjusting contrast for printing. (Those surly-looking spikes in the "histogram," it turns out, are your friend.) Fokos's guide to dot gain may also, we pray, save grief, although we don't sling that stuff like he does. Another early Photoshop friend was Peter Feldstein, who is thanked as well for the resurrection of Record Holder (stay tuned). Not just in education, but in e-mail conversation over the last three years, a wonderfully wide swathe of photography and sense of "alt" community has become evident. Among these "advisers," first and foremost has been Rae Adams, whose knowledge is as awesome as her library. Other artist-photographers sharing a grand range of ideas, practices, and fellowship include Jonathan Bailey, Bernie Boudreau, Larry Bullis, Art Chakalis, Ron Connelly, Tom Ferguson, Hans/Chia, Galina Manikova, Peter Marshall, Eric Nielsen, Klaus Pellingmeier, Catherine Rogers, Ron Silvers, Jeff Stanford, Al Strauss, Henk Thijs, Carl Weese, Jim Yorke, and a dozen others to be thanked in future. Finally, special thanks to Mark Owen-Greene, the computer expert's expert, to Ig Mata for her unflagging cheer and super-keen design eye, and Cynthia Navaretta for essential small-press advice and feedback. Many of the above-named are among those who have promised written contributions. We're counting on it. JS.

Note: The subscription service is no longer available.

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