Hey Buddy, Can You Spare Some Gum?
Getting Up Front and Personal with Gum Printing

Always be careful when handling chemicals. Read the health and safety instructions.
TOP
Assembled is round up of the usual suspects that comprise some of the gum printing supplies in my workflow. In addition to the block of watercolor paper shown, I also use 22 x 30 (inch) sheets whole or gently torn to the desired dimension.

ABOVE
These three gum prints were made from photographs shot with an inexpensive point & shoot camera. The images were placed in Photoshop and given simple burning, dodging, and contrast adjustment. Then, with watercolor paper right out of the package, and using inexpensive paper negatives printed on a plain paper copier, these tricolor prints were exposed using no-cost sunlight. Note: The paper was preshrunk using warm water. It’s fun being able to render quality prints from a variety of subjects and lighting conditions in a short time with a minimum of fuss and expense.

Let me state right at the start, information presented in this article is offered primarily as a description of my working methods, not necessarily as prescription for your gum work. As a follow-up to my previous introduction essay, this writing will attempt to give my response to questions posed to me along the way, lend a few ideas to save time and money, and offer some food for thought as you advance in your own work. Take and leave what you wish. If this essay helps you, even in a small way, then the effort has not been wasted.

Gum Printing is a Funny World.
A Person’s Lucky to Get Out Of It Alive!

I remember it all so clearly. It was Michael Langford’s, The Darkroom Handbook, that ignited the urgent and enduring desire within me to pursue gum bichromate printing. Mr. Langford's textbook was part of the standard issue of materials divvied out for a darkroom course I attended at a local Dallas college back during the Reagan administration. My particular copy was the fourth printing 1988 edition. Those unexpected treasures in the back of the text brought more than just a slight fascination. Step out of the way, boys, I’m off to the races! Right then and there, I was determined to create images just like those in the text, maybe even better — well, I certainly would try my level best. It was like a conversion experience. Sure, I would still continue to pursue the main street of photography complete with the usual fare of lighting, exposure, and printing. However, behind the scenes, I was spending all my free time figuring out just how to apply that classroom knowledge and practical experience to my new found love for gum bichromate. Just in case, let me state it again. In my mind, the usual black and white photos and C-prints are a big part of the commercial world. Sure, they were, and still are, fun and enjoyable. I especially relish viewing a light table full of perfectly exposed chromes. But gum bichromate — that’s magical. You, too, must have a magical feeling about gum printing or you probably wouldn’t be spending time reading this essay. Good for you!

For a long while, I only consulted Langford’s text and one other popular volume I found at a used bookstore during the early years. With my work space confined to a small, sacred spot in my home, and having small children to consider, I made a few preliminary workflow decisions. Actually, they turned out to be more like official decrees. First, I decided the sun would be the only UV source for all my prints. It just seemed like the right thing to do. Second, again, partly with my children in mind, I would eliminate toxic sizing while using only the bare minimum of dichromate that would meet my exposure needs. I must confess, I did become a bit errant and sized my paper with a gelatine/formaldehyde cocktail for a brief period of time. Well, that’s how it all started for me and what a journey is has been!
I Came to Gum Printing for the Waters.  
The Waters? What Waters? We’re in the Desert.  
I Was Misinformed . . .

If you take time to read the scores of articles and book chapters devoted to gum printing both on the web and in print, you cannot help but notice a wide range of conflicting opinions on the subject. Seeming contradictions, rumors, supposed fables, half truths and reports of half truths seem to lurk in every paragraph. Some might label it misinformation. In fact, you will note some sharp differences between my manner of work and those of my accomplished colleges on this same web site. Differences in pigments selections, dichromate choices and ratios, negative preparation, print processing, and a multitude of other various and sundry items provide much fodder for wild and woolly discussion throughout the web. Although most of the discussion is healthy, what is the discerning gum printer to make of all the divergent dichromate doctrine disseminating from every direction?

A simple answer can perhaps be expressed in the oft told proverb, “There’s more than one way to catch a rabbit.” Although the goal is the same, that is, to catch a rabbit, there are predictably as many ways to accomplish that task as there are rabbit hunters. The method a hunter chooses may depend upon, among other factors, available resources, personal preferences, and physical abilities. Indeed, talent and ingenuity alone can provide a valid account for the varied ways of the hunter and gum printer alike! I’ve seen more than one gum artist produce wonderful work from means that seem to defy logic. Catching that rabbit, like producing beautiful prints, might also require a keen eye.; yet, not all keen eyes see alike.

Stated further, among the aesthetic choices made by each artist, the overwhelming number of process variables inherent in gum printing, and pragmatic practices or preferences each printer holds dear, just to name a few, can also provide useful insight for the seeming grocery list of discrepancies. Did I just mention the term process variables? Yes, process variables, as briefly listed in my previous article, are far reaching and verge in the infinite. Even if a contentious printer in, say, Anchorage, Alaska were to master every variable and technique to perfection, however one might define perfection, the same system would most likely need a few alternations, if not a complete overhaul, when practiced in Atlanta, Georgia, Arles, France, or Auckland, New Zealand, especially if one chooses sunlight for their exposure method. Just changing a printing location can affect important process variables such as humidity control, material availability, and a range of others, not to mention creating havoc among gum printers as they attempt to lend a helping hand to each other across the globe.

When we factor pragmatic preferences into the big picture of gum printing, that same printer from Anchorage might, to his dismay, find his very next door neighbor, even when using the very same workflow, producing prints of a significantly different quality than his own — and here’s why. I use pragmatism in the sense that we, as artists, tend to approach our work in a manner that feels comfortable to us, that fits our mood, our personality and our sense of intuition. Even when we carefully follow the instructions of another printer, we will invariably be variable in our adherence to the written text - and gum printing is prone to be rather sensitive to subtle changes. We will each brush the gum coating using a different flow and style. Our measuring habits will differ. Our preparation of sizing, our handling of the print, our methods of developing will not be exactly the same. All of those subtle factors can add up to frustration and finger pointing as we attempt to apply or replicate the procedures provided to us by other well-intentioned artists.

Sufficed to say, the above writing is intended to make the following suggestion. Consider the approach and instruction of each printer you encounter through their writings on the web or in print as the workflow that performs best for their purposes in their environment, not necessarily yours. However, go ahead — try following their recipes and methods for yourself. See if their workflow meets your purposes, realizing you most likely will need to make adjustments at your end to meet the goals and visual objectives you have in mind. That’s part of making the gum printing process your own.
**Why, a Four-Year Old Child Could Understand Gum Printing.**  
**Quick! Someone Run Out and Find Me a Four-Year Old Child!**

If you’re like me, beginning something new, especially with no previous reference point, can be a reason for procrastination. How does one begin gum printing? Can the learning curve be reduced? Might a fast-track be found to get you going in the right direction with a minimal of waste and disappointment? Let me offer two suggestions to those often asked questions.

**Find a Mentor**

Thanks to the World Wide Web, you can easily find ample examples of wonderful work and the writings of many competent, talented gum printers — some can be found on this very site! Look at the work of those printers and try contacting an artist whose work speaks to you, one who motivates you to begin your own gum printing journey. I think you will find that many artists will be open to giving you a few pointers and, perhaps, a word of insight or encouragement. A mentor, keep in mind, is a trusted guide, not a spoon-feeding nanny. Remember to respect their time and not expect them to hold your hand through every detail and disappointment.

**Just Put Your Hand to the Wheel and Your Foot to the Pedal!**

Stop making excuses. Go and photograph some images. What images? I believe virtually any subject that would make for a good photograph would make a good gum print. After all, gum prints, in my view, are **quintessentially photographs**. As such, use competent camera skills when photographing your subject. Make a negative or two (read further on) and then go get some paper, some pigments and dichromate, a bottle of gum, a few other odds and ends (see my first article for a supply list) and get busy! Of course, it will help if you have handy someone’s instructions — **anyone’s instructions** — and use them as a starting point. Although, before you shift into gear, have a notebook and pen ready to record what you do and the results that follow. Don’t be afraid to even write on the back of each print to record how you produced that particular piece. Information might include the dichromate and gum ratio for that print, exposure time, pigments used, daylight conditions and time of day (if using the sun), and sizing characteristics. I’m sure you’ll discover other points of interest worth recording as you travel down the road. Oh, and one more suggestion: print, print, print, and **print some more**! Practice brings intimate knowledge and Improvement. Most of all, practice will eventually yield confidence!

**Fifteen Prints of a Stouffer Test**

Yo, Ho, Ho, and a Bottle of Gum

A bottle — or rather, a bottle of ready-made gum arabic is one of several items on the supply list you will need for printing. There are many brands on the market, several of which are produced by major pigment manufactures. Others are made by lithographic supply companies and alternative photography specialists. I have found the gum produced by lithographic suppliers to be of high quality and the best value for my money as you can purchase it by the gallon or more. It is what I use for all my gum images. If you just want to experiment with gum printing to see if it is right for you, a small bottle of gum from Windsor and Newton or Daniel Smith would be a great choice. In fact, some established artists have settled on those brands for their work.

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You can, of course, make your own gum arabic solution. Although, having stated that, you can also grind your own pigments, produce your own paper from scratch, construct your own brushes, even glass blow your own storage jars. While I would commend anyone for pursuing those tasks, the purpose for writing this essay is to provide you with cost-effective, result-oriented solutions for your consideration. Much commercially produced gum is consistent, convenient, usually of high quality, and more than adequate for professional work. However, if you prefer, a common recipe for making gum solution is to add 300 grams of powdered gum arabic to 1000 ml of distilled water. That recipe however, just like grandma’s secret gravy, is subject to many interpretations and modifications. Check with other artists in the literature who make their own gum solution to find the recipe best suited to your tastes. Keep in mind that choosing to make your own gum solution introduces a new set of variables to your work and you must now devise your own quality control system.
You'll also need a solution of dichromate. I use a 5% solution of potassium dichromate which is reasonably fast for daylight conditions in Texas where I print. If you can manage with a dilute solution such as that, you will save money and waste. However, feel free to use a saturated solution, which is around 12-13% for potassium, if you need the additional strength. Still, you just might discover a lower concentration works just fine for your needs. I should also mention that other artists use the ammonium dichromate variety in their work with equal success. Both come in a crystal form which is dissolved in warm distilled water for use. I keep the solution stored in a brown glass bottle with a label describing safe handling. Consult a Material Safety Data Sheet (MSDS) for that information and keep it handy.

If You’re Gum Printers, Where Are Your Brushes? We Ain’t Got No Brushes . . . I Don’t Need to Show You No Stinking Brushes!

The truth is, many to most gum printers use a brush to coat their paper. The Jack Richeson 9010 Signature Series flat wash brush is my implement of choice for spreading gum dichromate mixtures onto paper. It is available in a variety of sizes up to four inches. The brush holds a nice charge of gum and releases the same fast and smooth. For small prints (8 x 10 and smaller), I sometimes use an Isabey 6421 Squirrel Wash just for the pure fun factor. It’s a comfortable brush that is a delight to hold. It’s chief drawbacks for gum printing are that Isabey only makes the brush as large as two inches, and some of the brushes tend to shed profusely depending on the batch. Thankfully, I have a few Isabey 6421 brushes that do not shed at all.

Hair shedding is the reason I usually do not recommend hake-style implements for gum work. In fairness, most of the time, strands of stray hairs stuck in the coating during the spreading procedure simply dislodge and float harmlessly away while the print is soaking as it develops. However, stray hairs have proven to be a nuisance to me when printing portraiture in gum. In the past, a stray hair or two has occasionally left a disfigurement on crucial facial features, such as the eyes or mouth, that even retouching could not fully correct to my satisfaction. After that happened to me a few times, hakes were banished from my gum printing practice in favor of the Richeson brush. Perhaps you will have a better experience with hake brushes; I do know of other artists who report using them regularly and with apparent success.


It’s true. Your creative dreams for gum printing can ultimately depend upon two crucial factors: paper choice and the quality of your negatives. For me, paper plays a dual role as I both print on paper and, quite often, produce negatives on paper. In both cases, however, they are not ordinary papers.

When I began my journey in gum printing, my very first efforts were rendered on an Arches cold press paper that came in a tear-off pad. I distinctly remember the cover of the pad had a white and blue design. I purchased it at a local paper specialty shop in Dallas and immediate printed on it, adding no additional size and not even taking the time to shrink it. Ignorance was bliss. The prints which resulted, to my utter amazement, were fantastic. I was thrilled by my first efforts and the apparent success encouraged me to investigate further. However, for some now forgotten reason, perhaps at the advice of a publication I read at the time, I switched to another French paper. The results this time were simply dismal. I remember feeling frustrated and discouraged. In an effort to make corrections, I began to experiment with size, trying everything from a gelatine/formaldehyde combination, to starch, to arrow root, and even diluted glue. I switched back and forth with dichromates, and experimented with pigments. Slowly the images improved more to my liking, although every time I reviewed my original work, I longed to return that simpler, almost carefree, approach that yielded snappy, bold prints. A few years had passed and when I once again searched for that Arches paper from the past, of which I knew little about, none was to be found. Oh, the pain and regret . . . Then, something appeared on the scene which changed everything!
These handful of images, drying on the floor and in various stages of process, were printed on Fabriano paper.

. . . It’s a Bird! It’s a Plane! It’s Fabriano Uno!

I couldn’t have been happier if it came dressed in tights and a red cape! There is still a copy of the large provocative label framed and hanging in my work area serving as a reminder of a crucial turning point in my work. Fabriano Uno certainly revolutionized my gum bichromate printing — almost overnight. I could tell just by the feel of the paper that it held promise for making my printing life much easier. It was now the Clinton administration, so I wrote an email to Fabriano in English asking about their sizing technology. Their prompt reply in Italian confirmed that Fabriano Uno contained alkyl ketene dimmer (AKD), a synthetic size that was rapidly making it’s way into many kinds of paper.

Today that technology can still be found in Uno’s replacement, the Fabriano Artista papers. I use the extra white hot press variety for almost all of my work. Artistico papers come in a wide variety of sizes and surfaces, and are readily available in North America along with other parts of the world. It can be a bit expensive, but the money I save using paper negatives, sunlight, and by limiting my pigment choices, helps to subsidize the purchase of this wonderful paper. AKD sizing is durable and, when properly formulated for art paper, adequately allows pigments and moisture to cling and release in a reliable manner. Now here’s the best part. While adding additional gelatine size to the surface of art paper is helpful and even encouraged for those inclined to do so, high quality, beautiful prints are possible by simply using Fabriano paper right out of the package! Of course, if you do multiple printing, you will still need to preshrink the paper by soaking it in warm water for a period of time prior to use — but that’s no big deal.

AKD is just one of many additives used by the paper industry to create sheets that will perform according to certain specifications depending upon the application. In my personal correspondence with many paper manufacturers, some are very open to sharing details about their sizing formulation. Others regard sizing as part of their proprietary secrets and only release what amounts to some sketchy clues. As of this writing, here is a short list of papers you might try which are either confirmed to contain AKD, or purported so: Fabriano Artista, Strathmore Imperial, Twinrocker, Cartiera Magnani Acquerello, Ruscombe Mill Buxton, and Somerset.

Rose Detail, 2008 ©
Preshrunk Fabriano paper was used for the above image. Carefully chosen pigments helped to capture the dirty warm white texture while maintaining the bright white portions in the rose sign attached to this old garage in Texas.
Darn It Jim, I’m a Gum Printer, Not a Chemical HAZMAT Specialist!

Yes, it’s true. You can make great prints without adding any additional sizing to the paper, especially paper already sized my the manufacturer with AKD. If you are hesitant about handling formaldehyde or glutaraldehyde and the like, desire to simplify your printing life, or wish save some time and expense while eliminating one more variable to manage, then read on.

The main reasons for applying additional sizing to the surface of a paper include providing a means to use the maximum selection of pigments in your printing arsenal. Some artists need or desire a huge selection of shades and pigment choices to achieve their goals. Supplemental sizing will significantly improve the performance of your paper by preventing pigments from staining the surface. When pigments stain, you damage your highlights and lower the contrast. Sizing also helps to create a smooth surface which somewhat enhances the possibility of a more detailed, tonally smooth image. Nevertheless, some artists choose NOT to add size and still manage to create some fantastic work with ample tonality and detail.

If you are willing to limit your pigment choices and, in some cases, accept a bit more visual grain in your gum prints, you don’t need to size. Hey, life is full of trade-offs, and gum printing is no exception. Only you can determine if omitting supplemental sizing is right for you. However, the information below and some practice on your own can help you make that determination.

One way to start out is to choose an AKD-sized paper of your choice (or a non-AKD paper of your choice if you wish). Then, obtain as many watercolor and/or gouache pigments as you can find, in as many brands as you can find. Contact local watercolorists, art clubs, or even area community colleges and inform them of your desire to test small dabs of pigments. Perhaps for a small fee they might let you come and conduct your sampling. I did that many years ago by attending an art club meeting after obtaining prior permission. I applied a small amount of pigment from a huge selection of paints brought by several artists onto some paper in an orderly fashion, carefully labeling each dab, and letting them dry in the car on the way home. Arriving home, I rinsed and evaluated the results. The pigments which rinsed off the paper cleanly without leaving a residue were my first choices to purchase and use for printing. With few exceptions, they have remained in my repertoire. The idea here is to find pigments to test without having to purchase them all. Otherwise, you might go broke in a hurry and have pile of unwanted pigments. Many will stain severely, some moderately, some lightly, and still others — not at all! When you consider all of the available brands and selections within each brand, you should eventually acquire a rather sufficient collection of pigments to meet most of your needs. You will probably find that most blacks stain hopelessly. I produce my blacks by combining two nonstaining pigments, usually a brown combined with a blue. Note that a pigment that lightly stains one brand of paper, might not stain at all on different brand. I encourage you to test and compare for yourself. Conducting simple pigment tests such as this is something I continue to do periodically as I acquire new pigments.

One additional advantage of this method is that when a printing fault appears in your image that looks like pigment stain, you can usually automatically rule out that cause and investigate other factors such as overexposure or insufficient density in your negative.
Two Pears, Variant 3, 2005 ©
Both of the above pear images began on film transparencies; both were printed from paper negatives. Again, only simple burning, dodging, and contrast adjustments were made in Photoshop. Pigments which displayed moderate stain in my pigment/paper testing were used for Variant 3.

Two Pears, Variant 1, 2005 ©
Here I used pigments that displayed no stain in the simple pigment/paper testing previously described. Note the difference that stain, or lack thereof, plays in the interpretation between the two variants. Can stain sometimes be desirable?

Two Apples, Variant 2, 2005 ©
Again, pigments that demonstrated moderate staining in my testing were used in this print. The staining caused the green leaves to become too dark. I carefully used a green watercolor pencil to bring the color back while the image was still damp.

Two Apples, Variant 1, 2005 ©
Here the same set of negatives were used, but with different pigments. No retouching was done with Variant 1.
Print It . . . Print It Again, Sam. For Old Time Sake.

Not being independently wealthy, the idea of paper negatives became appealing to me quite some time ago. Creating film negatives and using transparency material such as Pictorico can be a bit pricey, although highly effective. Using paper, in my thinking, also introduced it’s own drawbacks and quality issues which required careful consideration. Paper is prone to tearing. Paper has a tendency to leave a mottled look to an image as the actual fibers within the paper can be imprinted in the finished piece. While that in itself can be beautiful and expressive, I desired a more photographic, more defined look in my work. Paper can be pin registered, but the registration holes are fragile. Paper can also lengthen exposure times. Each of those obstacles gave me considerable pause for adopting paper negatives in my workflow.

Eventually, all the worries were resolved to my satisfaction with Bienfang Graphics 360 100% Rag Translucent Marker Paper. It can run through most any printer; I run mine through a Konica-Minolta photocopier in addition to an occasional trip through a Roland printer. It comes in a variety of sizes and can be spliced together for larger printing needs. Image definition is favorable compared to transparency material. Exposure times are virtually identical, too. Registration holes on Bienfang translucent paper can be reinforced with plastic tape. If the holes become worn, I simply create new ones in a different location on the paper. I have never, ever had an issue with misalignment using the Bienfang product. The relatively lower cost of the paper negative material also gives me more freedom to experiment with images without worrying as much about the cost. As both I and my wallet are quite happy, thank you, I offer translucent paper as an option for your for consideration as well.

You Got Gum, We Got Gum, All God’s Children Got Gum!

Each of my gum printing days begin and end by adhering to a consistent, deliberate procedure being ever careful to mind the variables and maintain the constants. Here are just some of my particular constants:

- always producing my tricolor in a yellow-red-blue order
- always using Fabiano Artistico extra white paper
- always printing with a 5% potassium dichromate solution
- always printing with the same brand of gum solution
- always measuring my pigments in the exact same manner
- always applying the yellow layer in the morning using the sun
- always printing the red layer in the afternoon using the sun
- always printing the blue layer the next morning using the sun
- always brushing the gum mixture using the same brushing style
- always remembering to start the timer when the print is first brought into the sunlight

Pictured is one of my contact printers in action. Note the pin registration and paper negative in use. This photo is for illustration purposes only. Here you can see the clip casting a small shadow in the printing area. Normally, I prevent the spring clip from casting any shadow on the print.
Remember, those are my constants and on rare occasions I might fudge on one or two. Feel free to use them for yourself, but I suggest that you create a set of constants to fit your own printing objectives. Some of yours may coincide with mine, others might not, and that is as it should be! The variables I use to for making printing adjustments involve altering the negatives I produce to interpret an image, my pigment choices, and my dichromate/gum/pigment ratio. I tend to tackle my negatives using intuitive, if not old fashioned methods of burning, dodging, and contrast adjustment — both in the literal darkroom and the computer darkroom. Whether from a scanned film image or a direct digital shot, I have worked in that fashion since well before the notion of using preset Photoshop curves became popular, and simply have stuck with it over the years.

One other tweak I sometimes use is the posterization feature in Photoshop. Posterization reduces the tonal range while increasing contrast. This helps to give an image the snap and boldness I seek in my work. Posterization is also a carryover from my darkroom days where I spent many an hour posterizing color transparencies using Kodalith and Kodak LPD4 films. I recommend posterization be used judiciously — just enough to give a contrast boost without showing obvious banding.

Let me say a word about the sun. The sun is an effective, no-cost, maintenance-free, UV source for gum printing. If you are blessed to live in a part of the world where it makes a regular appearance, it might be a viable UV source for your work. I have used the sun exclusively for all of my gum and casein printing needs from the beginning. The sun, what I refer to as the constant variable, is faithfully there during the day, but it may vary in its demeanor. Sometimes the sun is in full view showing off all the blistering glory for which it is famous. Other times it’s hidden behind a wall of gray and rain, while still other times one can spot it frolicking about fluffy white clouds like a child playing hide and seek. Fortunately, here in Texas, the sun is usually up and about, big as life, just ready to inflict its’ awesome UV rays on my prints. There is also a more subtle variable at work for which the sun printer must take note. The sun’s UV strength varies while it traverses across the sky each day, and from season to season as a result of the changing position of the earth in relation to the sun. An average printing day in Texas is about four hours (10AM until 2PM) - more during the summer months and less during the winter. By adhering to my self-imposed yellow-red-blue printing schedule indicated above, I can more easily keep track of those subtle changes and minimize exposure testing. Watch out for those pesky clouds, the occasional slowly creeping haze, and the odd ladybug that lands and casts a shadow portrait on your print!

We’ll Always Have Paris

By many accounts, it was the Parisian, Robert Demachy, who was among the first to recognize the value of gum bichromate printing in fine art over a century ago. His ethereal imagery is certainly full of the dreamy stuff we tend to admire in work of that nature. Today, the visionary oeuvre in gum continues to amass at an accelerated pace by artists everywhere, thanks in part to our age’s ubiquitous technology explosion. It seems at every turn, one can find stunning examples of gum prints. More than a few are produced through state-of-the-art dexterity, while other delightful pieces continue to be born of more humble stock. As we each explore this fascinating gift of gum printing and truly make it our own, in some manner we become gum rebels with a cause — a noble cause — one that both follows and improves upon a rich tradition.

Dried Roses in Tarnished Bucket, Variant 3, 2004 ©

This image was printed from paper negatives. The negatives were generated through separations from the CMYK channels in Photoshop. A black pigment was used for the final layer. I believe expressive images can be produced via RGB and CMYK separations. Both can be appropriate; neither one is a holy grail.