

# JUST PAINT

## SPECIAL CANVAS PREPARATION ISSUE

### A Remarkable Way to Stretch Canvases (and Other Essentials of Canvas Preparation)

By James Bernstein



I am going to present a stretching procedure that may sound heretical and very much at odds with what artists are taught about canvas preparation from their earliest studio days. I ask that readers please suspend disbelief and give a try to some of the special techniques that follow. If these procedures are embraced, artists will find the results astounding, almost revelatory. Like so much in our lives, the truth is in the details. Pay attention to the details and beautiful results occur. But please be forewarned: once stretching a canvas according to the procedures that follow, there may be no going back to ways used before.

The concepts I will describe are not entirely new or unknown. But a lot of times we do things out of habit, convenience or because we were shown to do them a certain way. Some of the techniques will require extra effort, care and preparation. I believe the results will speak for themselves and will be well worthwhile, insuring maximum longevity for canvases beautifully prepared.

My experience is based upon 40 years in art and conservation from the viewpoint of a lover and student of art, art materials and techniques, a practicing painting conservator, and as an educator. Much of my understanding of canvas preparation came from my graduate school training under legendary conservators, Caroline and Sheldon Keck at the Cooperstown Graduate Program in the Conservation of Historic and Artistic Works (now the Buffalo Art Conservation Program). My initial learning has been modified by years of further research and observation.

#### STRETCHED CANVAS

The stretched canvas has been the painting format of choice for close to 500 years. Alternate formats, such as painting on wood panel and wall installations (lime plaster fresco or canvas glued to wall) offered their own advantages; they also had the limitation of being site-specific, weighty, unwieldy, or difficult to move. The introduction of stretched canvas allowed for paintings of appreciable scale that could be stretched onto open wood grid frames, producing pictures of light-to-moderate weight that could readily be transported and relocated.

Of course, as with any format, the success and longevity of the artwork will depend upon how fine the preparation is, how sound the construction is ... and if the art is properly displayed, stored, cared for and handled over time. One after another, stretched paintings reveal their history: how and why they age, and favorably or not.

#### GOALS OF CANVAS PREPARATION

There is a direct correlation between proper canvas preparation and painting longevity. For canvas paintings, the suspension of the fabric is of paramount importance. A well-stretched canvas is a well-suspended one. If well suspended, well painted and well cared for, a painting may go quite some time before intervention is needed.

If canvas suspension is not uniform throughout, variations in tension result. Extremes in canvas pull (overly tight or overly loose) and planar distortions (sags, puckers or draws) will have adverse effects over time. Strain is transferred to the sizing, ground, paint and varnish applied atop the fabric. These forces lead to cracking, lifting, buckling and flaking of the design layers. We are all too painfully aware how physical and visual alterations may conspire to detract from the appreciation of a treasured artwork. (See image 1)

My goal is to share with you *a technique that insures beautiful, uniform canvas spring and tension*, very much like

#### FROM MARK GOLDEN

With the dramatic decline in materials and technique education amongst numerous significant institutions, most artists learn even the most basic concepts of canvas preparation from the same people they learn about the birds and the bees ... their buds ...

The situation is not much better on the information superhighway. We've attempted in this issue of 'Just Paint' to fill in some of these gaps. By providing best practices, we are hopeful that more accurate information might be passed on. We are delighted to be able to present in this issue, James Bernstein's article, "A Remarkable Way to Stretch Canvases". Jim served as Co-Director of Conservation at the San Francisco Museum of Modern Art. After 15 years there, Jim has continued a distinguished career as a private paintings conservator and teacher, specializing in paintings and mixed media as well as offering master classes to other paintings conservators. We are also delighted that David Headley of Downtown Stretchers in Brooklyn has provided his professional insights and tips for preparing your own strainers in the article, "Stretchers and Strainers." Finally, our own Bill Berthel, Laboratory Administrator and Chairman of the Acrylic Paints and Materials Task Group in the ASTM D01.57 Subcommittee has provided common language for grounds and promotes the critical need for standards for these materials in "Uncommon Grounds".



1. Puckers in canvas due to wide tacking intervals.

that of a trampoline. Previous failures that may have been experienced in achieving flat, planar, and taut canvases that hold up over time may be largely mitigated with this system.

I usually like to start discussion with preparatory steps before getting to the



2a. Traditional stretching: the centers are marked and aligned.



2b. Stretching and pinning continues from the centers outward.



2c. Locked central passages limit corner stretching.

actual fabric stretching. There are numerous fine points that contribute to first-rate canvas preparation. Due to space limitation, I will confine this discussion to the stretching procedure itself. I then encourage artists to explore the additional materials and references offered at the close of the article (see: “*Canvas Stretching Resources*,” page 5). Additionally, go to [goldenpaints.com](http://goldenpaints.com) homepage for “Information Sheets.”

Let’s begin by looking at how canvases are traditionally stretched.

#### “STRETCHING FROM THE CENTERS OUTWARD”: THE MISTAKEN TRADITIONAL TECHNIQUE

The most often used method for stretching has been to mark the canvas centers (top, bottom left and right), stretch and tack the center points, and then to proceed stretching, working from the centers outward. Some artists do this a few tacks at a time, moving onwards to opposite locations, until reaching the outer corners. Other artists will tack a half a side at a time, working from the centers outward, and rotating a quarter turn at a time, as if making a pinwheel. *All techniques that restrict the center body of the fabric, leaving the outer regions until last, guarantee an unsatisfactory stretching dynamic.* The central threads are locked in place at the outset. As stretching and tacking continue, the fabric is resistant to respond as it is restricted in the middle and can only be stretched in the region



3. Corners cannot be pulled into place due to overall restriction of fabric.

not yet tacked. Increasing tension is built as the corners are approached. In fact, by the time the corners are reached, tension is so tight there is very little stretching that can be done at all. (Images 2a, 2b, 2c)

If one were to take a canvas and make parallel lines every inch in both the warp and weft directions, stretching from the centers out would reveal a very observable distortion. The lines would be parallel as stretching begins in the centers, but as the corners are neared, the lines would be pulled inward and it would be very difficult to bring the outside line to the stretcher edge. (Image 3)

This sets up an overly tight corner tension. Now, skip a few years ahead and imagine the side or corner of the painting being knocked. This is sure to induce diagonal cracks across the over-stretched corner.

Then, imagine the painting becoming slack at some point, especially in the soft middle. When corner joins are expanded by keying by an eighth to quarter of an inch, a tremendous tension is produced in this short distance across the join. This same eighth to quarter of an inch width is insignificant across the much larger distance of the canvas middle. Thus, in order to bring up a soft belly, an extreme amount of keying has to take place at the corners where additional tension can barely be withstood. No wonder painting canvases often break at the corners and paint forms classic mechanical crack patterns traversing the corners. (Image 4)



4. Classic stretching tension crack patterns on 19th century painting.

#### REVERSE FORWARD: STRETCH FROM THE CORNERS INWARD!

My recommendation is to reverse the procedure, to perform the stretching *working from the corners inward*. I realize that people have been burned at the stake for lesser offences but I’m confident once you try this you will become a believer as well!

#### STEP-BY-STEP PROPER STRETCHING TECHNIQUE

- Select a workspace with good light and maneuverability. Prepare a clean large worktable, sawhorses or floor area. If using the floor, be sure to lay down a clean piece of polyethylene sheeting to prevent dirt transfer from the floor.

- *For successful stretching, the studio space must be closed off sufficiently so that some semblance of a constant, moderate environment may be maintained throughout the procedure.*

Ideal conditions for painting materials lie in the ranges of 64-76°F and 44 to 55% relative humidity. A small dial or digital thermometer/hygrometer enables the reading of room levels at a glance.

Stretching will be much easier if the room is on the warm and humid side; materials will be far less flexible and plastic if the room is cold and dry.

- For expediency in this demonstration, I recommend a roll of commercially prepared, primed canvas (ready-to-go, since basic alignment, sizing, and priming have all been taken care of at the factory). Handle the pre-primed canvas carefully; though generally durable, it is very easy to put permanent crimps or breaks in the continuous priming.

- Unroll the canvas, study the fabric and determine the orientation of the weave. Ideally, the fabric should be equally firm in both the warp and weft directions. Invariably, one direction is found to be tighter than the other direction that is found to be stretchy. Plan the painting orientation so that the tight direction of the canvas will run vertically, top to bottom on the stretcher. This will guard



against inevitable sag from the pull of gravity over time.

- Now temporarily lay the stretcher on top of the fabric. Assess the amount of margin that will be needed beyond the stretcher dimensions and add an ample margin, say 3 or 4 inches of working fabric, beyond each side. Do not be stingy, maxing out the fabric and leaving only a ½” beyond the stretcher. This will make stretching difficult. (Image 5)
- Line the stretcher as best as possible parallel to the weave and faintly mark the fabric, tracing the extreme edges and corner of the stretcher with a pencil. Don't forget to mark the 3 to 4” beyond the stretcher as well. Set the stretcher aside.



5. Insufficient tack margin allowance makes stretching very difficult.

• Next, draw weave indication lines to assist stretching accuracy. Lay the point of the well-sharpened pencil in the groove of the weave at one of the corner marks, and draw a continuous line that follows the weave, extending to the corresponding other side. Often times, the weave has a distinct curve to it and the line indicating the weave will not line-up with the equivalent mark by the time one gets across the fabric, being off an inch or two. *It is the true line of the weave we wish to follow.* I often draw a second line one-quarter inch in (or out, if the first line is way off base) from the first line, so that I may observe parallelism and any inaccuracy very quickly. My preference is to have the lines inside the outer marks, so that the lines remain visible on the front of the canvas as I perform the stretching (face up). If the plan is to stretch with the fabric face down, the lines will need to be outside the perimeter marks, so that they may be observed on the sides of the stretcher.

Drawing pencil lines of the weave is usually easier in one direction than the other; the latter weave direction can be trickier to follow and the pencil may wish to jump threads, not following an easy straight line. Please note, it is



6. Set each of the corners with two pins per side.

impossible to draw careful lines if pressing against a rough floor or table; the surface under the fabric must have a smooth cardboard, panel or laminate surface, otherwise the pencil will jump out of the weave groove every time an irregularity is traversed.

If the weave is too fine or filled with gesso, the indication lines may be lightly drawn using a straight-edge as a guide.

#### STRETCHING FROM THE CORNERS

Place the fabric on the stretcher and line up the parallel pencil lines with the outer wood bead. If reluctant to totally abandon the center point marks, you may temporarily set the canvas with pushpins in the stretcher sides at each of these points. Now set the four corners of the fabric, placing push pins (See Note 1) along the outsides of the stretcher to the immediate left & right of each corner. Prejudge as best possible the tension anticipated when all the pins would be in place. Now remove the center pins, leaving the entire middle of the canvas free, as this would have restrictive effect upon the canvas during stretching. Starting from the corners, use the canvas pliers (See Note 2) to gradually coax and stretch the fabric. Avoid fast, forceful movements; these could break the priming or threads. Secure margin with pins, advancing two or three pins at a time. (Image 6) Keep moving to opposite locations and continue stretching from the corners inward, bringing up no location



7. Continue stretching from corners inward, pulling with pliers and setting with pins. Centers remain unrestricted until the end.

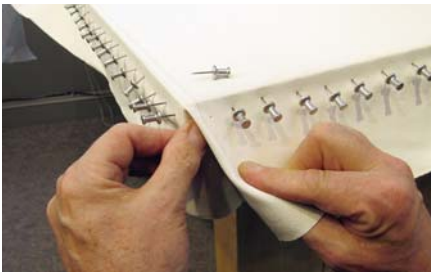
significantly in advance of any other. (Image 7) The central region will remain untacked and loose until the last pins are placed. Pay attention to the pencil guidelines throughout the stretching process; they should align straight and equidistant (parallel) to the outer bead, indicating that the canvas has been pulled up uniformly true and even.

When a canvas is stretched and pinned starting from the corners, the unset center portion is unrestricted. As stretching continues, the center is gradually pulled up, but with no undue, irregular tension. I am sure readers may be worrying, “what if I end up with a big welt of fabric left over in the middle with nowhere to go?” Please do not worry. This simply will not happen.

What does happen however is that, once entirely pinned, the parallel reference lines adhere to their parallelism throughout. More importantly, the canvas now exhibits an unrivalled suspension, uniform in tension, on the order of a trampoline. (Image 8) This can be observed if the stretched canvas is stood along its long side and if a strong tamp is made with the hand at one end of the canvas. This will create a wave which may be observed to follow clear across the canvas and then, like ripples in the water, this wave will echo back and return to the sender. This phenomenon will not occur with a painting stretched from the centers outward because differentials in canvas tension will absorb and stop the wave movement. Awesome, huh?



8. Painting stretched face up and pinned.



9. After overall stretching / pinning, corner fabric is folded neatly and tucked beneath.

## SECURING STRETCHING MARGINS TO THE STRAINER/STRETCHER

It is wisest to set aside the stretched canvas pinned on its stretcher for a day or more before setting with staples/tacks (See Note 3). With climatic shifts and the passage of time, the canvas will relax and settle onto the stretcher, giving a true indication of how even or not the stretching is. If puckers, draws or slack passages appear, the pins may be removed from those locations and the canvas re-stretched as needed. When the desired canvas suspension is achieved, the canvas may be placed face down against a clean wall or floor. If the latter, lay clean paper, glassine or polyethylene sheeting on the floor, to be sure grit does not become embedded in the priming.

For the cleanest painting edge look, the fabric may be wrapped around to the rear and tacked with staples to the stretcher reverse. This also keeps most of the tacking well away from the frontal image plane. Do not remove or trim extra fabric. Remember to leave generous canvas margins to provide work edges for when the canvas needs re-stretching or conservation in the future. Never cut away fabric at the corners. Finish the corners, neatly folding and tucking the fabric under and to the back. (Image 9) Some artists distribute the fabric over two folds; others choose to gather the fabric in a single fold.

The pins should not be removed from the stretcher edges until the canvas is completely stapled or tacked. (Image 10) While the pushpins are holding the front of the canvas under tension, the fabric should still be pulled with finger grip just prior to setting each staple on the reverse.

## CONCLUSION

I realize that many of you at this point are non-believers, thinking, "I've always stretched from the centers outward, that's the way it's always been done. Besides, it is too many steps and I don't think it could make that much



10. The canvas is secured with staples on the reverse.

difference." Once you try this procedure, however, you'll be convinced it is a truly superior way to prepare your canvases. This is one time *stretching the truth* really is so! I wish you the best in preparing beautiful supports for your painting.

## NOTE 1: HUNDREDS OF LITTLE HELPERS

Aluminum pushpins are invaluable for temporarily setting stretched locations as one moves along. Metal head pushpins with long pin shafts work beautifully; shorter, more commonly found plastic head ones, are awkward to use and often pop out, releasing attachment points. Purchase several packages of the Moore® 100-5 Aluminum or Stainless Steel pushpins (quantity: 100 per package; pin length 5/8"). They may be used again and again.

When inserting pushpins, tilt them upward slightly to counteract the pull of the canvas so they won't pop out. Spinning the pins while pushing helps to drive them into the wood. If dealing with a dense, hard or aged wood, a plastic head hammer (clear yellow) may be used to tap the pins into the wood. Do not set the pins too deeply; this will make removal difficult and will limit easy readjustments (you may use a staple gun as well but make sure you set the staples at a similar angle as the pins and again, do not set too deeply).

My preference is for pins to be evenly placed at *1-1/4 inch intervals*. The 3-inch to 6-inch interval between staples or tacks that is often observed on modern paintings is simply *inadequate*; a few lone points of tacking are asked to carry a formidable load. This results in uneven canvas tension, undue slack and cusping (a scallop-like appearance a la Viennese curtains) of the fabric.

## NOTE 2: STRETCHING PLIERS DESIGN

Fingers and hands are unable to grab onto canvas and pull with the strength that well designed stretcher pliers are able to. Pliers come in a variety of types but



11. Stretcher pliers provide grip and pulling leverage.

examples available in art stores are often limited. It is worth researching suppliers online and asking artist colleagues which pliers they use and how effective they are in practice. (Image 11)

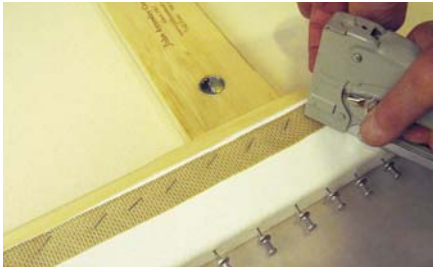
The most commonly available pliers are ones with small rectangular jaws with interlocking "s"- wave profiles (reminiscent of crinkle-cut french fries). This design increases surface area of contact and guarantees a powerful lock against slippage. Unfortunately, the sharp jaws often also guarantee crushing and weakening of the ground and fabric, sometimes to the point of breakage.

My preference is for pliers with relatively flat-faced jaws; sometimes the face surface is cast or tooled with a mild textural pattern to insure against slippage. The jaws must be good-sized in surface area and of superb quality and leverage to grip sufficiently. I use ones with stainless steel jaws that have been filed and sanded smooth along edges so as not to break or cut the fabric. Most pliers have a central heel protruding just below the jaws. This heel serves as the leverage fulcrum. It is braced against the stretcher wood, the pliers are rotated (pushed forward and downward), and the fabric is pulled tight. Plier handles may be set at different angles, depending upon if the pliers are designed for face-up, sideways or face-down stretching. It is helpful to have pliers for different jobs; a super-sized canvas requires pliers different from those designed for smaller canvases.

## NOTE 3: STAPLES AND TACKS

There are arguments pro and con for both heavy duty and lightweight staples. I try to select those that are suited to the demands of the project at hand.

- Heavy-duty staples have a nice flat wire profile that grips fabrics nicely. It does not usually cut across the long flat face, but it makes good-sized holes at the two points of staple entry.
- Lightweight staples of fine wire size make very fine entry holes, but have



12. Stapling through a woven band cushions the canvas and facilitates future staple removal.

the potential to cut into the fabric if driven too far.

Any staple, really, has the potential to crush the fabric if the wood is very soft and/or the staple gun delivers with too much power. Whether manual, electric or air-compressor driven, a staple gun that offers tacking power adjustment is best. Also, it is not necessary to go overboard with the staple length. A 5/16 or 3/8 inch long staple is plenty deep. A 3/4 inch long staple is overkill and anyone removing these deep staples will be cursing whomever did the stapling.

Always take great care when removing staples. Use a tapering, tongue-shaped staple remover tool, gripping it firmly and gradually working the tongue under the staple, prying upwards. Never pull upward on the canvas itself to remove staples. And never rush staple removal or allow a tool to slip. Shortcuts or accidents result in punctures or tears to the all-important tacking margins.

One technique for reducing staple crushing and cutting is to introduce an interleaving strip of fabric banding (cotton strapping, linen tape, polypropylene strapping, etc.) as cushioning between the staples and the canvas. This system is particularly suited to paintings that require repeated unstretching and re-stretching. (Image 12)

When it comes time to remove the staples, bands may be pulled upwards, pulling the staples out of the wood as well. If not completely freed, the partially lifted staples may be readily gripped and removed with a linesman, bent-nosed or other pliers.

If using tacks, I recommend copper plated steel tacks. They will not corrode the fabric as steel tacks do, and they will respond nicely when using a magnetized head tack hammer for setting. When hammering, grip the wood handle as far as possible toward the base of the hammer (away from the head). This produces a more tangential, 90-degree angle, encouraging tacks to go in straight and flat, not tipping at various angles.

# Canvas Stretching Resources

## INFORMATION SHEETS

Environmental Conditions for Successful Canvas Stretching  
 Selecting Artist Canvas for Painting  
 Stretching Unprimed vs. Pre-Primed Canvas for Painting  
 Stretcher / Strainer Frame Options for Canvas Painting  
 Stretching Canvas Face-Down, On-Edge or Face-Up  
 Unstretching and Restretching Existing Canvas Paintings  
 Protective Backing Boards for Canvas Paintings

## MATERIALS CHECKLIST

Thermometer/hygrometer  
 Tape measure  
 Graphite pencil  
 Straight edge  
 Stretcher pliers  
 Moore® 100-5 Aluminum or Stainless Steel Pushpins  
 Plastic head hammer (small, e.g. 5 oz.)  
 Staple gun w/adjustable power  
 Staples  
 Copper plated steel tacks  
 Tack hammer (small, 5 oz., magnetized steel)  
 Tongue-shaped staple remover  
 Linesman and/or bent-nose pliers  
 Primed linen or cotton canvas; Unprimed linen or cotton canvas

## SUPPLIER

Custom stretcher/strainer support manufacturer, canvas pliers, and canvas goods.

John Annesley Company  
 259 Brandt Road PO Box 181  
 Healdsburg, CA 95448  
 (707) 433-4238 (888) 471-4448  
 Fax (707) 433-1831  
[www.johannesley.com](http://www.johannesley.com)

## SELECTING A CONSERVATOR

American Institute for Conservation of Historic and Artistic Works  
<http://aic.stanford.edu/>  
 AIC Selecting a Conservator  
<http://www.aic-faic.org/guide/form.html>

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An Encyclopedia of Painting Materials,  
 NY: Dover Publishers. 1942/1966. 333 pp.

Gottsegen, Mark David.  
The Painter's Handbook - Revised and Expanded,  
 NY: Watson-Guptill Publications. 2006. 357 pp.

*Per James Bernstein, [www.jamesbernstein.com](http://www.jamesbernstein.com)*



# Uncommon Grounds

## *Acrylic Dispersion Grounds:* a.k.a. Gesso

By Bill Berthel

This article is an attempt to establish a common language and an understanding of acrylic dispersion grounds, the attributes of the grounds and how those attributes function within the painting. This article will conclude with a very needed but mostly ignored effort to understand the development and necessity for a quality standard for grounds.

### COMMON LANGUAGE

Contemporary materials referred to as “gesso” or “acrylic gesso” could be more accurately described as “Acrylic Dispersion Grounds”. Acrylic dispersions are the binders most commonly used in artist acrylics. Mistakenly called “Acrylic Emulsions” by many people for many years, acrylic dispersions are much more widely used in artist materials than emulsions. For technical clarity and use in this article we will only use the descriptor “gesso” to describe the very traditional, chalk-filled, hide glue grounds.

The following definition from “[The Artist’s Handbook](#)”, *Ralph Mayer Fifth Edition Revised and Updated*, serves as an excellent reference to describe “gesso”.

*Gesso is a viscous or liquid material applied as a coating to surfaces in order to give them the correct properties for receiving painting, gilding or other decoration.*

Mayer goes on to describe the general makeup of gesso:

*It is made by mixing an inert white pigment such as chalk, whiting or slaked plaster of Paris with an aqueous binder such as a solution of (animal protein) glue, gelatin or casein.*

For this article, I will call the contemporary material widely used by artists to prime and prepare most substrates as an “Acrylic Dispersion Ground”. This, might be confusing at first, as nearly all manufacturers, including Golden Artist Colors have called their products “Gesso” or “Acrylic Gesso”.

For clarity: Gesso is (animal protein) glue, gelatin or casein based while Acrylic Dispersion Grounds are those grounds made with acrylic polymer.

We also commonly refer to the process as, “To gesso a canvas.” This description will be technically confusing when we need to discuss Acrylic Dispersion Grounds as “gessoing”. “Gessoing” more strongly references the chalk-filled hide glue material. For our new common language, we may consider the idea of “priming” and the use of that word and action to describe what artists do with Acrylic Dispersion Grounds to prepare a substrate. Priming is the action of coating a substrate for additional coatings and finishes. Priming is a much more fitting description and so we’ll utilize that term for this article and in future references to what we formally knew as “gessoing” a substrate.

It needs to be understood however, that the market cannot make changes to its language and communication very quickly. Not even Golden Artist Colors can change rapidly enough to avoid confusion and some level of conflicting information in the marketplace. We will continue to see labels and literature for a long time to come that will reference Acrylic Dispersion Grounds as Gesso. We now have an opportunity to initiate that change within this conversation so that we may begin creating more clarity and technical accuracy in our language.

### THE PURPOSE OF A GROUND

Nearly all substrates such as canvas, linen, paper, wood and other panels require additional preparation before painting. The preparation differs, depending on the desired aesthetics of the work, the painting media being used and the qualities of the particular substrate itself. Generally speaking, the need to protect substrates from waterborne paint systems is much simpler compared to the technical requirements when using solvent or oil systems. Water migrating from sizes, primers and paints can affect some substrates, causing such problems as buckling papers and shrinking textiles. However, the impact on longevity compared to the need to protect canvas from oil differs.



Most substrates and thus artwork, can benefit from proper size and ground preparation if the aesthetics of the piece allows.

Size and ground layers are employed to prepare substrates so that they are protected, more stable and consistent for accepting paint and other media. Although this article will not address all of the attributes of sizes, it is important to mention that sizes are typically applied directly to the substrate. “A size sinks into the support’s surface without forming a separate layer, whereas a ground is a distinct layer that gives the paint a toothy coating to grip and makes the support more evenly absorbent,” from “[The Painter’s Handbook](#)”, by Mark David Gottsegen.

Paintings are typically comprised of multiple media or materials. Not to confuse this idea with “multi-media art” or “mixed-media art” however most paintings should be thought of as composites of diverse materials. Assuming a “traditional” painting format of a stretched textile such as cotton canvas or linen and putting aside the stretcher bars as one material of the whole, we must consider the following relationships: the textile and size have an intimate relationship, forming the very foundation for a ground. The size and ground are the next layers in sequence and must be compatible both physically and chemically. Next the colored paint layers, are the most obvious portions of the painting, and also serve to support the structure of the painting. And finally, the protective coatings such as an isolation coat and a varnish when employed need to be considered as an integral part of the painting. When considering the complexities of such combinations, it is important to understand the relationships between each material, how they are applied, their

movement over time and ageing properties of each to assure the longevity and stability of the painting.

#### ATTRIBUTES OF ACRYLIC DISPERSION GROUNDS

Perhaps, originally, the intent of making “acrylic gesso” was to offer something very similar to a traditional gesso. It seems reasonable that the need to emulate the properties of gesso for oil and acrylic painters began as a very specific focus that naturally broadened due to the immense diversity available in acrylics. A new way to think about primers and gesso is that a gesso for oil paint mindset need not apply to acrylics. The attributes afforded by acrylics started to address many of the shortcomings of traditional gesso such as its brittle nature, limitations to stiff or rigid substrates, the inconvenience of mixing and preparing the gesso and the ease of application with minimal technical requirements.

As a category of materials, acrylics provide many diverse attributes. There may be no other artist material that has such diverse possibilities. These variables allow formulators to create many unique products for the artist with highly specialized performance attributes. Acrylics may range from very soft and flexible to very hard and brittle, easily cracking when flexed. Some acrylics formulate well with a wide range of pigments and additives while others have limitations. We'll limit our discussion here to the attributes of acrylics most related to grounds. This limited discussion is in no way complete as there are many alternative uses for Acrylic Dispersion Grounds and many acrylic products that can be used as a ground.

#### PIGMENT VOLUME CONCENTRATION (PVC)

An acrylic's capacity to carry pigment and filler solids is technically referred to as pigment volume concentration (PVC). As a category, acrylics provide a wide range of PVC. Some acrylics have higher PVC tolerances than others. How much and what type of solids are loaded into the acrylic directly influences attributes like tooth, sheen, opacity, color and flexibility. While the artist will likely never think about PVC as an attribute, it is an important concept to understand related to other binders such as oil and alkyds, which carry solids differently, resulting in different attributes and performance when compared to acrylics.



Cross Hatch Adhesion Test - Right: Oil paint is easily removed from a smooth ground. Left: Oil paint is adhered well to a toothy ground.

#### TOOTH

Physical adhesion is largely accomplished through a “lock and key” mechanism commonly referred to as “tooth”. A toothy surface has adequate micro-texture to allow a subsequent coating to physically conform to that texture. When the coating is able to conform and create an intimate interface with the toothy ground, good mechanical adhesion is accomplished. In contrast, a very smooth and glossy surface such as glass, which has no tooth and provides minimal physical adhesion unless sandblasted or etched. Tooth of a ground should be uniform and consistent, as to not interfere with the artist's end results.

#### FLEXIBILITY

When employing flexible substrates, flexibility of the painting media and supporting materials are likely necessary to avoid such defects as cracking, and possibly delaminating adhesion failure of the paint. Acrylic Dispersion Grounds are typically formulated with relatively flexible acrylic polymers so that they can maintain some level of the flexibility of the substrate and not crack themselves. This flexibility of the ground is well suited and generally matches the physical dynamics of acrylic paints and mediums on cotton canvas duck. Flexibility of the ground is important for stretching or re-stretching already primed/painted substrates. It must be mentioned that there are some concerns about the flexibility of acrylic grounds for use with oil paints, especially as the oil paint films become harder and more brittle with time. The acrylic ground maintains its flexibility over time rather well compared to linseed oil primers and paints. These materials may not provide the support a less flexible oil paint requires without a size or multiple coats of acrylic dispersion ground to stiffen the canvas.

#### WHITENESS

The color of a ground is important aesthetically to both the artist and the artwork. A consistently colored ground is important so that there is minimal influence on color perception and color mixing while painting. The color (typically white) creates a visual reference point for the artist that could otherwise confuse or distract accurate color usage. Equally important, having an equitable colored surface creates uniformity in the aesthetic affects of the final piece. Acrylic Dispersion Grounds can be easily tinted with acrylic color, presenting the artist more opportunities. A less obvious feature of a white ground is that it is typically more color stable than the substrate. Many substrates, especially those containing cellulose such as vegetation fiber (cotton and linen) or wood and paper have tendencies to yellow and discolor over time. Grounds protect this discoloration from affecting the aesthetics of the artwork.

#### ABSORBENCY

Acrylic Dispersion Grounds, like all grounds are formulated to provide enough absorption to allow some level of penetration of paint to promote adhesion as well as allowing the artist to begin her process with washes if so desired. Absorption and adhesion are related because the physical penetration of the binder-rich acrylic paint into the substrate or ground provides good anchoring of the acrylic. More importantly, when using oil paints, the absorption needs to allow enough linseed oil to penetrate without starving the paint layers of the vital binding oil. When employing washes, standard grounds provide enough absorption to allow a fair amount of wash and layering.



Linseed oil absorption into ground layer facilitates adhesion to an acrylic gesso or ground.



However, the level of absorption a ground provides can be adjusted through formulation. An alternative ground such as GOLDEN Absorbent Ground can dramatically increase the staining of a wash into the substrate.

#### SUPPORT INDUCED DISCOLORATION

Abbreviated as SID, water miscible components of the substrate may be wet out by the water in grounds or paint layers, becoming transferred and lodged in the ground and paint during the drying process. Drying of acrylics is largely due to evaporation of water and other volatiles. The wicking action that occurs during evaporation can transfer these water miscible components from the substrate into the paint, resulting in a discolored, typically yellow or tan cast of color. SID is most noticeable with white and very light colors as well as with clear gels and mediums.

Grounds may or may not block SID from occurring. Many grounds do not. The use of a size such as GAC 100 will help



SID: Support Induced Discoloration. Discolored water miscible impurities migrate from the support through the ground and become trapped in the acrylic film as seen in half of this image. The other half has a ground / size combination that blocks the migration.

reduce the affects of SID. GOLDEN Technical Support suggests the use of GAC 100 as a size for cotton and wood substrates followed by a minimum of three coats of White Gesso. If the substrate is suspected of being highly concentrated with water miscible components such as questionable grades of cotton duck canvas, hardboards and certain species of wood, additional coats are recommended. It is also possible to pre-wash cotton or linen to dramatically reduce the yellowing affects of SID.



Oil is seen here staining right through the back of a poorly prepared dispersion ground.

#### OIL BLOCKING

Related to the ability of an Acrylic Dispersion Ground to absorb oil, it must not allow oil to fully penetrate through to the substrate. This is especially important when painting on canvas as the acidity of the linseed oil increases as it oxidizes and will “burn” the cotton duck canvas. Most grounds do not block oil completely and require the use of a size to further protect the cotton duck canvas. The same recommendations for SID apply to oil penetration protection.

#### ALTERNATIVE GROUNDS: BEYOND “GESSO”

Because acrylics are so adaptable and diverse, there are many opportunities to utilize products not commonly thought of as a ground, as a ground. Generally, artist acrylics are flexible and adhere very well to one another, practically eliminating any rules or limitations often experienced with other painting media. Gels, Molding Pastes, Mediums and Colors such as Heavy Body, Fluid, Matte, and High Load Acrylics can be and often are, used as grounds.

There are also specially formulated acrylic grounds to consider. Each one provides a certain property that may be valuable for some artwork or experimentation in a new area of application.

#### ABSORBENT GROUND

Originally formulated to mimic the absorbency of watercolor paper, Absorbent Ground has been used in many unique applications. The special fillers in this formula are highly absorbent and will lend to watercolor-like effects with acrylic paints, watercolors and other dilute, thin washes. This ground requires the use of a primed substrate for adequate adhesion.

#### ACRYLIC GROUND FOR PASTELS

Designed and formulated to allow the artist to transform most substrates into pastel paper-like surfaces, Acrylic Ground for Pastels is a very unique product. Special functional fillers chosen for optimized particle size and shape and formulated with the appropriate solids loading, allows this ground to produce a surface suitable for pastel, colored pencil, paint and other drawing media.

#### TRANSLUCENT GROUNDS

Translucent Grounds are still considered “experimental,” meaning they are only available from the GOLDEN Custom Lab. These grounds tend to be good drawing and painting grounds. Golden Artist Colors has optimized the use of specialized functional fillers in a ground formula allowing very translucent, practically clear, toothy grounds that accept painting and drawing media very well. These grounds hold pencil, charcoal, pastel and paint allowing distinction of line and blendability of the media.

#### QUALITY STANDARD DEVELOPMENT

It is obvious that given the importance of sizes and grounds to the overall stability and success of a painting one would think that there are already standards that define the very specific relationships and performance attributes of these materials. The ASTM D01-57, subcommittee for Artists Paints and Related Material, have developed several standards over the last 30 years, many of which have become commonplace within our industry. The Artists Materials ASTM subcommittees are composed of manufacturers, consumers, educators, students and special interest participants such as scientists and other experts in various markets and disciplines. This dynamic mix of participants helps to facilitate collaboration and assures the development of valuable standards that serve all parties involved. One would be hard-pressed to buy a tube of paint without seeing the ASTM Lightfast Standard, or D4236, the Safety Standard for Chronic Toxicity. These standards have been developed to assure artists of at least a common





Random surface quality due to inconsistent particle size of pigment solids.

language for these materials and a minimum level of performance. These documents prescribe test methods to assure desired quality attributes are achieved for a particular product or family of products. The American Standardization of Tests and Materials International (ASTM) is a standard development and writing organization in which Golden Artist Colors participates.

It is critical to understand that there are currently no quality standards in place for gessos or grounds. There are architectural primer standards that are used for reference while developing an artist ground standard, however, for manufacturers of artist materials, there are no specific guidelines or standards. The fact that such a foundational product does not have a quality standard does a disservice to artists depending upon these materials to perform. Through the ASTM D01.57 “Artist Paints and Related Materials” Subcommittee, GOLDEN is specifically interested, and has been leading the efforts in writing the first quality standard for Acrylic Dispersion Grounds. It must be recognized that GOLDEN does this work with tremendous collaboration from colleagues and competitors within the subcommittee.

The focus of the Acrylic Dispersion Ground quality standard is to identify and assure the most critical attributes for a ground are met. The attributes mentioned earlier are all considered in the testing and development of a quality method. Standard development is a process, which takes time. The testing and work is carefully conducted and repeated to assure purposeful accuracy. The subcommittee is required to vote for ultimate approval of the standard



Consistent surface and tooth of a well made acrylic gesso.

document. Therefore, the scientific approach of testing and publishing the work for critique is essential. The design of the experiments is proactively agreed upon at the subcommittee level, reaching consensus for experimentation and expected results. As work is presented, ideas and perspectives are shared and thus the process develops over time.

Currently, a fairly comprehensive quality survey of commonly available “gessos” has been conducted. This survey has uncovered a large amount of variability in several attributes such as tooth, sheen and viscosity. While quality standards do not need to make all offerings in the market identical, significant variations may or may not be an indicator of highly variable performance and quality. There are likely reasons and needs to have grounds as thin as heavy cream and as thick as heavy pastes. However, knowing that the mechanical adhesion of paint relies on the tooth of the ground, identifying and standardizing a range for tooth may be necessary.

With the common language agreed upon and understood, we can move not only the current products and applications forward for improved longevity and quality, we can continue the quest toward assuring these improvements through robust standards. As newer grounds and more and more pre-primed canvases come onto the marketplace, it is more critical than ever that the arts community supports and demands these standards. It is true that standardization development is a slow and careful process, but it is one worth the investment in time and resources in order to serve the artist and our shared legacy. Your painting success rests on the ‘Ground’.

## Advisory Notice Concerning Pre-primed Canvas Supports

Over the last year we have seen a sharp increase in the number of adhesion failures associated with the use of pre-primed canvases made by a variety of manufacturers. Obviously this has alarmed artists and raises potentially serious issues around the long-term stability of artwork done on these supports. In addition, because the failures have involved a multitude of paint brands, the concerns range far beyond the use of Golden Artist Colors alone.

In response, GOLDEN feels strongly that more is needed than simply alerting the community to this issue. To that end, we are actively conducting research to establish the best ways to test for this problem and provide recommendations that can minimize concerns whenever pre-primed supports are being used. By going to our Web site, artists will be able to access the most recent results and information resulting from these efforts. However, we would caution against expecting any easy, broad solution to this matter until there are clear standards of quality and performance that the manufacturers of these products are willing to endorse through such organizations as the ASTM. Until then, we will continue to advocate for the need artists have to trust in the reliability of all the materials they use in creating permanent works of art.

For additional information call GOLDEN Technical Support at 1-800-959-6543.

# Stretchers and Strainers:

## *Secrets of the Trade*

By David Headley

An artist's stretcher can be expanded to tighten a loose canvas. An artist's strainer cannot be expanded to tighten a slack painting. That is the only functional difference between the two major types of painting supports. But this is the point where all the trouble begins: whether a painting support expands or does not expand has limited bearing on its underlying structural integrity. The straightness and strength of the wood used to make the stretcher bars and crossbars determines the painting's end result flatness.

Selecting wood to make your strainer will take the greatest amount of time. You need to hand-pick each and every piece. 'Sight' each length of wood to see if it is twisted or warped. Look at the length of wood 'end-on' to select straight lengths. When you have chosen what appears to be useable wood, lay the wood flat against a level floor to double check. If the length of wood 'wobbles' as you try to rock it from side-to-side, reject it. It's not flat and therefore, will never make a flat strainer. (One bad piece of wood will ruin the three good pieces and you'll end up with a warped painting.) With good wood you can build a flat strainer with little skill; but with bad wood you won't be able to build a flat strainer with great skill. The secret is all in the wood.

You will need a flat work surface to assemble your mitered stretcher bars. Even your flat lengths of wood will have a slight bow or 'crown.' Lay your bars on the work surface with the crown side up: this will cause the four corners to make contact with the work surface (and eventually the wall when the painting is hung.)

The secret to strainer construction is to not begin by nailing or screwing the mitered corners together. Doing this invariably throws the strainer out of square and twists it out of flatness. Instead, begin by applying wood glue to the mitered surfaces and join the corners with firm pressure, drawing them together with masking tape wrapped around the outside edge to hold the joint together. Use a tape measure to take a diagonal measurement in both directions to 'square-up' the strainer. As it lays flat on your work surface, the freshly glued and taped-up strainer can be gently squeezed diagonally until you get the same measurement in both directions. If it jumps out of square, put weight on one corner to hold it until the glue sets.

Allow the glue to dry overnight; rushing this technique will compromise your results. The next day, pre-drill and screw together the mitered corners from the

outside edge. It is not advisable to hand nail mitered corners because the pounding action may crack the glue joint (wood glue has poor 'shear' strength).

If a strainer is larger than 30" you may need to add a crossbar. Cut the crossbar to fit snugly and glue it in place with 'crown' side up using a pipe clamp to secure it to the strainer bars. Once again, allow the glue to dry overnight.

To add a lip to a strainer or stretcher bar, glue and nail lattice stripping around the outside edge of the strainer. This method will increase the strength of the strainer to resist warping. (The usual method of nailing quarter-round molding on the surface of the strainer does not increase the strength.) Lattice stripping can be purchased in a variety of widths and thicknesses to accommodate the size of your strainer.

Executed properly, this procedure for fabricating a strainer will create flat and strong strainers every time. It is time consuming and tedious to make good strainers. And it's understandably a process painters hate to waste time on; you just want to start painting ASAP. Who wants to spend an hour selecting wood? Who wants to make a dusty mess in their studio cutting wood? And I've seen very few studios with large flat work surfaces, which are essential for making large strainers. What's a "pipe clamp," anyway? Everyone wants to paint on a perfectly flat and square canvas, but few want to spend the time and effort making one. What to do?

Stretcher bars can be bought at art stores in standard lengths. If you follow the wood selection instructions I've presented, you will get flat and perfectly square stretchers with art store quality stretcher bars. By putting a drop of glue on the finger-jointed miter when you assemble it, the stretcher will stay in square when you stretch the canvas. Later, if it needs to be keyed out using the wooden keys, the drop of glue will shear loose and the stretcher will expand in the normal manner.

Custom made strainers and stretchers are also available from many companies if you need lengths not available at art supply stores, heavy duty stretchers requiring many crossbars, extra deep profiles, or irregular shapes. They will cost twice as much as making your own.

Custom made strainers can be extremely strong if they are joined together with dowel pins, corner triangles and lap-jointed crossbars screwed together on both sides. The strongest stretcher bars are fabricated from two pieces of wood: the lip and bar. This system creates a stretcher bar having the increased strength of an I-beam. Stretcher bars milled from one piece of wood will not resist bowing. Stretcher bars fabricated like an



Left: Hanger bolt with Knap & Vogt® ball  
Right: Complete Knap & Vogt® Tite Joint Fastener

I-beam will be difficult to bow even with tight stretching.

Expandable stretchers with mechanical hardware are widely used. They were developed in the 1950's by James Lebron when he employed a type of fastener used for formica counter top installations, permitting long coffee shop counter substrates to be seasonally adjusted to prevent cracking of the formica surfaces. Mr. Lebron's use of the patented Knap & Vogt® Tite Joint Fastener for stretcher construction was presented by the Museum of Modern Art as an innovation to expand large-size post war paintings.

A major conceptual flaw mars this 'innovation.' Tite Joint Fasteners are designed to draw joints together, not to expand them. A better solution is to use the "ball" component of the Tite Joint Fastener and mate it with a "hanger bolt" (instead of the "tightening bolt" and "locking ring" provided by Knap & Vogt). This eliminates the flaw in the original design. Now the joint can be expanded and have mechanical strength by virtue of the hanger bolt being securely screwed into the stretcher bar. (By contrast, the "tightening bolt" provided with the Tite Joint Fastener floats in an oversize hole imparting no strength to the joint when it is expanded.) While Mr. Lebron's 'innovation' was ingenious, the Knap & Vogt Ball/Hanger Bolt method I've described is the only way this hardware should be used for fabricating mechanical stretchers.

### Footnotes:

1. Instructions for adding a lip to strainers, "The Painter's Handbook" by Mark David Gottsegen
2. For building wood panels, "The Art of Encaustic Painting" by Joanne Mattera
3. Author's conversation with Lebron in 1975, See also "The New York Times" March 31, 2005 for James Lebron Obituary

## Golden Foundation Awards Grants

The Board of Directors of The Sam and Adele Golden Foundation<sup>SM</sup> for the Arts, Inc. recently celebrated its 10th year by awarding grants to ten cultural organizations. Family members formed the Golden Foundation in 1997 as a way to give back to the artist community that had been such a great support for so many years.

"I am delighted to announce the ten organizations chosen by the Board of Directors to receive an award from The Sam and Adele Golden Foundation<sup>SM</sup> for the Arts," said Mark Golden. "These cultural organizations are valued for their outstanding commitment and capacity to provide services to artists."

**Vermont Studio Center** received a full fellowship to support a 4-week residency for an artist working in paint. The Center is the largest and most international artists' residency program in the U.S. The fellowship includes a private studio, housing, meals, and interaction with the visiting artists.

**Triangle Arts Association** sponsors an annual series of workshops, a national and international residency program and exhibition opportunities for emerging and mid-career artists in New York City. The Foundation Award will provide support for a New York based artist working in paint.

**CUE Art Foundation**, located in NYC was founded in 2002 to provide a substantial, ongoing transformation in the careers of gifted, but still under-recognized artists. The award will serve to support visual artists who work in paint participating in CUE's 2007 Solo Exhibition Program and Studio Residency Program.

**Women's Studio Workshop (WSW)** maintains an artist's workspace in Rosendale, NY. WSW encourages the voice and vision of individual women artists by providing professional opportunities and employment for artists at various stages of their careers. The Golden Foundation Award will support an artist-in-residence working in paint.

**Weir Farm Art Center**, located in Wilton, CT was designated as a National Historic Site in 1990. It was founded to protect the farm, home and studio of American artist J. Alden Weir. One of its core programs is the Artist in Residence. The majority of its resident artists are

painters. The award will support stipends for four contemporary painters.

**Chicago Artists Coalition**, a service organization for visual artists, received an award on behalf of its work with painters, including career development workshops that teach painters how to promote their work, document it in the technology age, and create strategic plans for the future of their careers.

**A Gathering of Tribes**, located in the Lower East Side of New York City has evolved into a meeting place for artists in a multi-cultural environment where artists exchange ideas, create peer relationships and find mentorship. Their gallery features mature artists as well as emerging ones, often displaying work that would not be seen in mainstream galleries. The award will assist with a series of art shows called "The State of Painting in the 21st Century".

**ArtsNow** is a new initiative of Edmonds Community College in Seattle, Washington. Based on a lack of professional development opportunities, especially for visual artists ArtsNow was created to meet this need. The Golden Foundation Award will provide funding to implement the infrastructure for a database to disseminate information about workshops, exhibits, special art

events and will also help build ArtsNow as a sustainable benefit to visual artists.

**Asian American Arts Center** takes pride in serving Lower Manhattan with art programs for 32 years. For the past five years they have sponsored 'Art Slams' for emerging Asian American artists and artists significantly influenced by Asia. The 'Art Slams' provide a rare opportunity for artists to show and discuss their work with peers, art critics, collectors, curators, professors and the public. The Golden Foundation Award will provide support for the artists' and moderators' honorariums participating in 'Art Slams'.

**New York Foundation for the Arts (NYFA)** received a sponsored project award from the Golden Foundation to provide early support for artist Jackie Battenfield. Ms. Battenfield is developing the materials from her professional practices classes and workshops into a comprehensive resource book for visual artists. Written from a working artist's point of view, this book will provide the information and techniques necessary for developing and sustaining a professional life. This investment will give artists the tools they need and is critical at this time.

## FOUNDATION GRANT CHANGES

Dear Artists, Friends and Colleagues,

We are delighted to share that during the past ten years, awards totaling more than \$120,000 have been granted to artists in recognition of their work and to cultural organizations for their commitment and capacity to provide services for career artists.

In keeping with our mission, to be a meaningful resource for the professional visual artist, the family members are envisioning a new way to continue supporting artists. A beautiful quiet country setting consisting of 140 acres has been purchased by the Golden's for an artist residency. The historic barn will be converted into artist studios and workspace. What makes this residency program unique is its close proximity to Golden Artist Colors, Inc. Golden Artist Colors, Inc. has a long proactive history of providing technical support to individual artists working in paint. Their expertise and custom formulating capabilities for artists is recognized worldwide. The artist workspace is located just a few steps (across the road) from the factory. This location and partnership will distinguish this artist workspace from any other residency program, providing the artist with freedom for artistic experimentation and exploration with the materials expertise available at Golden Artist Colors, Inc.

We have chartered our course and are ready to direct our focus on the artist and the continuation of the artist's creative process. We have a proven history of dedication and direct financial support to artists and will continue awarding grants by establishing an annual Golden Foundation Fellowships. This year a Golden Foundation Fellowship has been established at four nationally recognized institutions: Atlantic Center for the Arts, Bemis Center for Contemporary Arts, Headlands Center for the Arts and Vermont Studio Center.



# Golden Foundation Benefit

## *Save the Date*

On Saturday, October 6, 2007, from 5:00 to 8:00 pm, the Sam & Adele Golden Foundation<sup>SM</sup> for the Arts, Inc. will be holding a Silent Art Auction Benefit in celebration of its 10th Year. The evening will be dedicated to honoring our Foundation Director, Lucy Tower Funke on the occasion of her retirement.

Silent Auction Artwork has been donated by the friends of the Sam & Adele Golden Foundation<sup>SM</sup> for the Arts, Inc. Included are artists who have received the Golden Foundation Award as well as others with significant international acclaim and honors. Many are represented in important collections both public and private throughout the world.

There will be a preview of artwork on Friday, October 5 from 10:00 am – 4:00 pm.

We invite you to visit [goldenfoundation.org](http://goldenfoundation.org) and select the Benefit Art Auction Gallery to preview the artwork of the contributing artists. Artwork will be added weekly to the site. You need not be present to bid on the artwork. See the Silent Auction Benefit Bid Fax Form for more details, also located in the Benefit Art Auction Gallery. Faxed bids must be in by 4:00 pm on the day of the auction.

Reservations for the event at GOLDEN, which will be a wine and hors d'oeuvres reception, are \$30.00 in advance. Please RSVP at 607-847-8158 by September 21, 2007 or go online at [goldenfoundation.org](http://goldenfoundation.org).

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[goldenpaints.com](http://goldenpaints.com)

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