



GO FOR THE

Gold!

BY FRANCIS S. LESTINGI

A craftsman's guide to gold leaf.

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From antiquity to the present, the element gold (chemical symbol "Au", from the Latin *aurum*) has been revered as a precious metal because of its dazzling brilliance. Some have even called it the closest thing to "solidified sunshine".

Granted, some of the materials used today differ from the boiled sheep and calf skin adhesive mordants used eons ago, but contemporary gilding techniques are still achieved entirely by hand, not by machine. Apparently, technology will not be automating this age-old process for some time to come, if ever.

THE GOLD LEAFING GUIDE

Typically, a sheet of gold leaf is about 1/100,000th of an inch thick, or about 1/400th the thickness of a sheet of typical paper. Because of this remarkable thinness, gold leaf cannot be touched by hand without having it "dissolve". Yet, despite its fragile thinness, gold leaf is virtually impervious to the elements and is all but non-reactive.



Gold leaf is available in a variety of alloy grades ranging from pure 24-karat on down. We use 23.5-karat for exterior work.

Karat Ratings

Pure gold leaf is rated as 24 karats, but it is generally too soft for most applications. Various alloys of gold with silver and copper provide a more workable leaf. Two popular gold alloys are 23.5-karat (98% gold; 1% silver; 1% copper) and 23-karat (96% gold; 3% silver; 1% copper). Other alloys, which have less gold and more silver, are called Moon Gold (21-karat) and Lemon Gold (18-karat). The best choice for exterior gilding is 23-karat or higher. The other alloys should be used only for interior projects.

Size

To gild, or to attach gold leaf to a surface, requires the application of an adhesive mordant. There are two types of binders, or "size": water-based and oil-based. There is historical evidence that water gilding dates back to 5th century B.C. Egypt and oil gilding to 15th century Florence.

Today, water size is used in glass and window gilding as well as furniture and picture-frame gilding. This article will deal only with the techniques of oil-based gilding, which is appropriate for professional exterior signage.



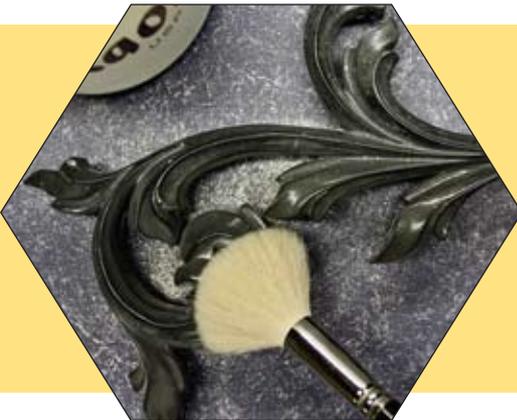
Oil size is available in slow and fast formulations from a variety of manufacturers.



A smooth glossy surface will produce the best gild. We use high-gloss black enamel on all letters and appliqué so that potential holidays will be evident and fixable.



Kaolin, USP, is a pure ultra-fine powdered form of the mineral kaolinite. Size cuts through it very easily but does not alter the properties of size. Kaolin is also helpful in preventing "shiners", those specks of gold that adhere to places they should not.



Using an artist's mop brush, we spatter the item to be sized with kaolin powder, spread the kaolin into a fine film and then vacuum the excess. The black surface now appears gray.



Size is applied over the powder layer with an artist's white sable brush, which gives the illusion of "painting" with gloss black paint.



A quill lettering brush is best when applying size that requires a clean, sharp edge such as the edges of this hand-carved Renaissance scroll.

After oil-based size is applied to a surface, it must be given time to cure to achieve a proper tack to attract gold leaf. Two types of oil size are available today and are known as "fast size", which has a cure time of one to three hours; and "slow size", which can be gilded after 12 hours. Slow size will produce a more durable and more brilliant gild, the longer it is allowed to cure.

SURFACE PREPARATION

The surface that is to be gilded should be as smooth as possible to produce a brilliant gild. After appliqué or letters have been carved on a substrate, they should be primed and top-coated with high-gloss enamel. Some gilders prefer a top coat of yellow to hide any voids, or "holidays", during the gilding process. But this is a fallacy. Yellow or any other color paint can

never mask a holiday. We use high-gloss black paint so voids will be most evident and we can fix them with gold leaf or, if necessary, with size and then gold leaf.

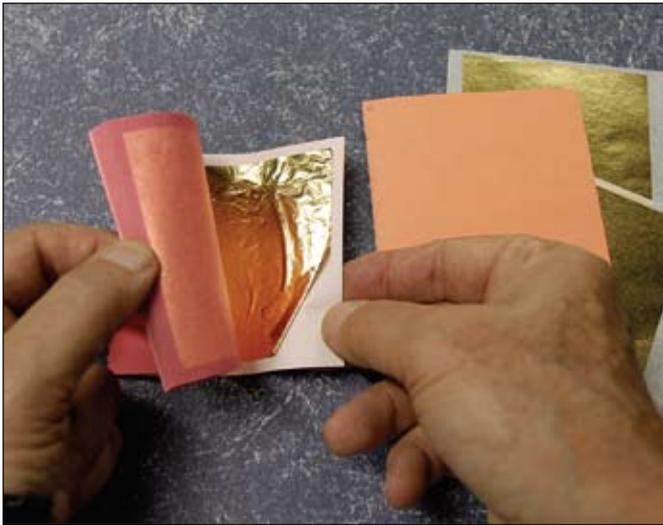
Because oil size is colorless, it is difficult to discern as it is being applied. A color tint could be added to the size to improve its visibility. But since any additive such as lettering enamel, universal paint tint or dye can alter the physical and chemical nature of the size, we use a less-contaminating technique that involves dusting the surface to be sized with an extremely fine powder called kaolin, USP.

DUSTING

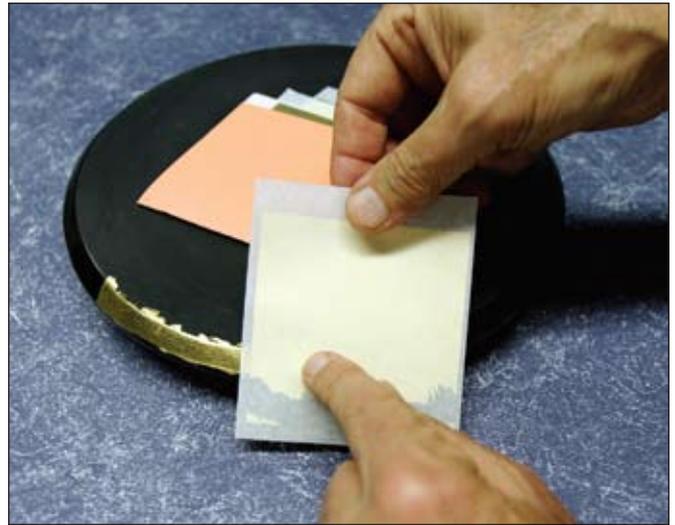
After vacuuming off the excess dust, an infinitesimally thin layer of kaolin remains, and the black paint now looks gray. As the size is applied on the gray kaolin surface,

it appears that one is "painting" with high-gloss black paint. All strokes are readily visible; one can readily determine if coverage is complete, and the integrity of the size is maintained. This dusting technique can be used in all sizing situations including masked carved letters, masked flat letters and high-relief appliqué.

Another advantage to using kaolin powder is that very often gold leaf has a tendency to stick where you do not want it to stick, such as on a newly painted substrate. When this does occur, the gold spots are referred to as a "shiners". Dusting any surface with kaolin powder that potentially could produce "shiners" will prevent specs of gold from adhering where they should not. Later, the kaolin powder can easily be removed with a water-moistened paper towel.



Loose leaf gold, shown on the left, comes in booklets of 25 sheets. The gold leaves do not stick to the tissue sheets because the tissue is dusted with a kaolin-like powder called rouge. Patent gold leaf, on the right, is attached to the tissue sheet.



Gilding the sized edge of this disk with patent gold leaf is accomplished by lightly pressing on the back of the tissue sheet.



An artist's soft white sable brush is used to clean up the edges of the gild and to press the gold to the size where necessary.



Loose leaf gold requires a few application tools as shown here: the gilder's tip, mop, knife and lip balm.

SIZE APPLICATION

One of the secrets to achieving a brilliant gild is to apply the size in as thin a manner as possible. This does not refer to thinning or diluting the size, which should never be done, but to the manner in which the size is applied. Where careful edge work is required, a lettering quill is a must. In most other circumstances, an artist's red or white sable brush works very well. These brushes are fairly rigid and can be used to "thin" the size as it is being applied. If the size coating is too thick, the gold leaf will "drown" in the size and the gild will be dull. "Paletting" the brush on the pages of a glossy magazine before application will help to produce a thin coat of size.

TESTING

Size must cure to a proper tack in order to produce a good gild. Some gilders test the tack of the size by touching it with a knuckle. If there is a slight stickiness with no residue on the skin, the size is ready to gild. But the real secret to producing a brilliant gild is to apply the gold leaf after the slow size has cured for at least 48 hours. Run a test with a number of swatches of fast and slow size and gild at successive time intervals, keeping a careful record of the times. We found that fast size requires a mere 55 minutes and never needs testing for tack. It works every time (given the same shop environment conditions).

PATENT GOLD

In addition to the variety of grades from 24-karat down, gold leaf is available in formats referred to as "patent gold" and "loose leaf gold". For relatively simple applications such as gilding flat surfaces or cove borders, patent gold works well. Each leaf of patent gold is attached to a tissue sheet, which can be handled without the need for additional tools. One attaches the patent gold to the sized surface by gently pressing on the tissue side. To ensure that the gold has indeed contacted the size, we use a very soft artist's white sable brush. Some gilders use a ball of cotton to do this, but we have found that the soft white sable brush works well and is more versatile. Although patent gold leaf is novice-friendly, it does have its drawbacks.

In comparison to loose leaf, patent gold has a weight of 12-18 grams per 1,000 sheets, while loose leaf weighs 18-20 grams per 1,000 sheets. The lighter weight means that a gild done with patent gold will display less luster than one done with loose leaf gold. In addition, it is all but impossible to gild certain intricate applications with patent gold leaf. For example, attempting to gild a detailed high-relief carving with patent gold will yield a holiday-laden eyesore.

LOOSE LEAF GOLD

If one wishes to produce an impressive professional gild even on the most complex of objects, it is imperative to employ loose leaf gold. Gold in this loose leaf format comes in booklets of 25 sheets, measuring 3 3/8" by 3 3/8". Each gold sheet is sandwiched between tissue sheets that have been dusted with a powder called "rouge" to prevent the gold from adhering to the tissue.

Transporting the gold leaf from the booklet to the sized area cannot, of course, be accomplished by directly using hands. A variety of tools are available to assist in the loose leaf gilding process, including the gilder's tip, gilder's knife, gilder's mop brush, lip balm and white sable brushes.

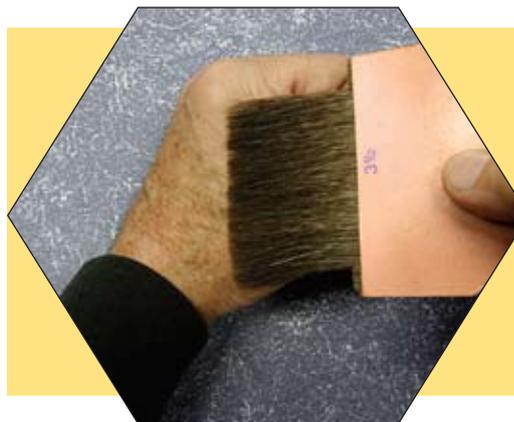
Since a gold leaf booklet is somewhat floppy, we make it rigid by inserting a 3 3/4" square piece of poster-board after the last page. We cover the card with a sheet of paper towel taped to fit to soften its surface. While holding the booklet in the left hand, expose the last sheet of gold and work from the last sheet to the first. To move the gold leaf from the booklet to the sized area requires a gilder's tip, a flat 3 1/2" brush typically made of Siberian squirrel hair secured to a cardboard ferrule. First, the tip must be "charged" to make it capable of attracting the leaf to its brush hair.

Here we have a widely held, but apocryphal, belief concerning how this is accomplished. It is erroneously believed that when a gilder wafts the tip across temple hair that he is trying to create an electrostatic charge. Actually the gilder is attempting to place some hair oil on the tip. The oiled gilder's tip, said to be

CONTINUED



To make the loose leaf booklet more rigid we insert a card covered with a piece of paper towel at the back of the booklet.



"Charging" the gilder's tip simply means applying a small amount of oil on the hairs of the brush. We use lip balm lightly rubbed on the hand. As the gilder's tip is gently wafted across the lip-balmed hand, the hairs pick up some oil and is said to be "charged." The lightly oiled tip will now be able to attract a sheet of gold leaf.



A "charged" gilder's tip is used to remove a full sheet of gold from the booklet.



While cutting the gold leaf into smaller segments, the gilder's tip may be "stored" under the gold leaf booklet.



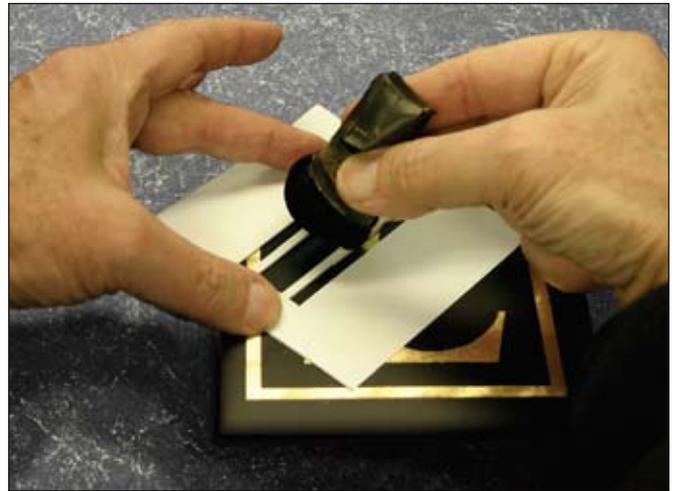
An artist's white sable brush is used to "burnish" the gild, which cleans up the skewings, to place gold where needed, and to lightly press the gold into the size.



A final "burnish" can be done with a gilder's mop. Note: Keep "burnishing" to a minimum to produce a more brilliant gild.



The simplest etching technique on gold leaf is "engine turning." It is accomplished by rotating a rounded piece of velvet cloth on the freshly applied gold.

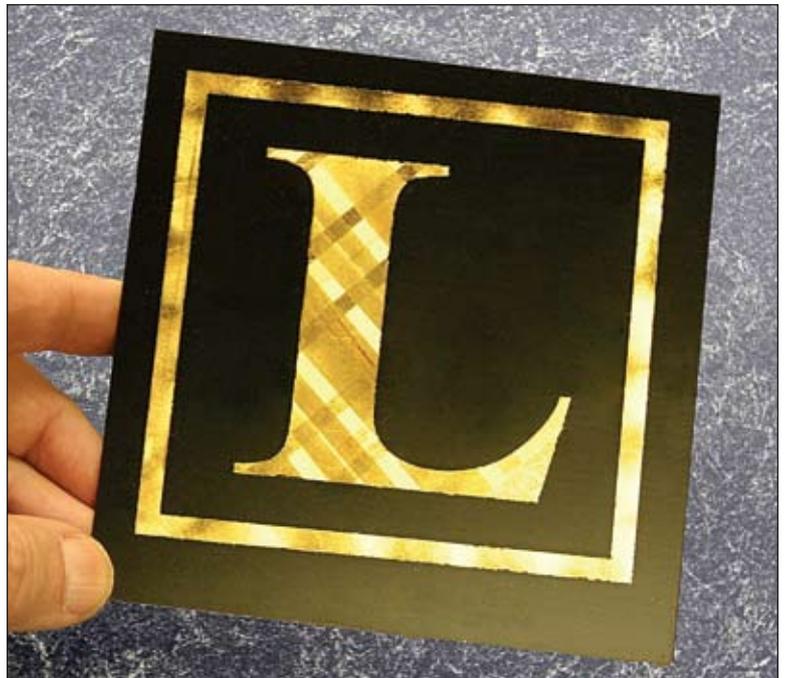


Patterned etching can be achieved by stroking velvet over a cut template in straight lines.

"charged", can now be used to attract and hold onto the gold leaf so that it may be transported to the sized location. The oil has attracted the gold leaf to the brush, but the size will have a greater attraction and the leaf will be attached to the size.

Rather than rely on the oil content of hair, which may be variable, we rely on the oil content of lip balm. Just a few light dabs to the hand is sufficient. Now to "charge" the gilder's tip, just swipe it lightly across the hand. Caution should be paid to avoid over-oiling the tip. If this is done it will cause gold leaf to stick to the gilder's tip and not transfer to the size.

Since applying full sheets of gold leaf is not always necessary or desired, the leaves should be cut into narrow strips down to 1/4" wide. Some gilders are able to cut gold leaf using a well-trained fingernail. But for those of us who are less dexterous, there is the reliable gilder's knife.



An example of a letter with patterned etching and a border with engine turning.

KNIFE AND TOOLS

Remembering that a sheet of gold is 1/400th the thickness of a piece of printer paper, the gilder's knife need not be super sharp but it should be smooth, clean and without burrs. If the knife snags, tears or rips the gold leaf, it is time to clean the blade with a ScotchPad and 320-grit emery paper. If this does not help, the knife may need a little sharpening. Using a household knife sharpener to ease the edges, we re-clean the blade. With the aforementioned card making the booklet rigid, the gilder's knife will neatly separate the gold leaf into strips one at a time. A good procedure to follow while cutting the gold is to "store" the gilder's tip under the leaf booklet to facilitate its easy access once the cut is made and the knife is placed down.

With care and a little practice, it will become possible to cut gold leaf sheets in halves, quarters and eighths. In covering size, having this variety of widths, which can be transported with a gilder's tip, gives the gilder a decided advantage over using patent gold, especially in complex situations. In circumstances that require an even smaller piece of gold leaf such as for a holiday or void, an artist's white sable brush may be employed. The brush is fairly rigid, so it can be used to "tear" off a small piece of the leaf. The gold is then moved to the sized area with the same brush and applied.

BRUSH AND CLOTH

Once all the size is covered, the white sable brush is used to "burnish" the gold. With a very light touch, the brush is used to press the leaf to the size, where needed, to ensure that it is in contact with the size. Some gilders use a ball of cotton to do this, but the white sable brush works well and can also be used to remove overlaps of leaf and excess "skewings" of gold. A soft brush, called a gilder's mop, also may be used for "burnishing", but this method should be kept to a minimum in order to maintain a brilliant gild.

"Burnishing" should not be considered "polishing" the gold; gold leaf neither needs to be, nor can it be, polished.



Etched gold can produce a type of *trompe l'oeil* effect ("trick the eye") as in this mailbox. The numbers are two-dimensional but appear 3-D.



"Gorilla Glue" can be used as size to produce a very different kind of gild. The glue is spread evenly over a vinyl-masked letter. After 10 minutes, it is stippled using a chopstick and after another 10 minutes, the mask is removed and the gold is applied.



As the glue cures, the gold leaf fuses to it in a unique stippled, textured fashion. A white sable brush may be used to burnish the gold, resulting in a stippled gild that may have some very interesting applications.

The less a brush touches it, the better. And, of course, the gold should never be touched by hands as the size will take several weeks or more to fully cure, and if it were touched at this point, smudges, finger oil or fingerprints could be deposited on the gold. Any "veining" of the gold, which is actually infinitesimally small skewings, will eventually self-burnish after the gold is outdoors for a while.

Now that we have duly warned everyone against touching a freshly gilded surface, we will proceed to illustrate how one can "creatively scratch" gold leaf. The implement employed to accomplish this deed is velvet cloth. The knap of a good piece of velvet will scratch gold in a uniform manner. If this scratching is carefully controlled

and the results are aesthetic, we may refer to this technique as gold leaf "etching".

ETCHING

At this point, the questions could be raised: Is this necessary? Is this gilding the lily? *To etch or not to etch?* Gilded incised carved letters or prismatic or rounded dimensional letters need not be etched. Light plays with the gold within the gilded facets of carved letters and on the surfaces of three-dimensional letters. And just as light plays with shadows in a high-or low-relief carving, it will do so after these objects are gilded. So they need not be etched. But what can be etched to improve its interaction with light, is gold on a flat substrate surface.

Gold!

A PRECIOUS ELEMENT

Artists and craftsmen throughout the ages have been inspired to employ this soft metal to adorn and decorate works of art ranging from delicate jewelry and coinage to graceful statuary and soaring architectural domes.

Golden artifacts date back to about 2600 BC in Egypt and Mesopotamia. European cities abound in countless treasures of gilded art that date back several hundred years. Today, gold is employed in disparate fields such as electronics and astronautics.

Gold leaf was even used in the early days of the American development of thermonuclear fusion weapons, but not for aesthetic reasons. A weapon component needed additional radiation shielding like the silvering on a thermos bottle. The least absorptive metal found was gold. So the scientists called in an unnamed "sign painter" to gild a golden mirror. It worked.

In addition to its "license to shine", gold possesses some other properties that make it valuable to artists.

Gold is highly malleable; it can be hammered thin enough to be virtually translucent. Theoretically, one cubic inch of gold could be malleted out to produce a banner 12 feet wide and the length of a football field.

Gold has excellent resistance to oxidative corrosion and therefore does not require a coating of any kind. Rather, it should never be coated unless absolutely necessary—as in the case of truck lettering, where washing, finger-traffic or other abrasive activity is common. Because no man-made clear coating is as good as gold, any coating will immediately lessen the luster and will eventually crack, lifting the gold leaf with it.

A well-designed gold leaf sign shimmering brilliantly in the sunlight distinguishes any business or professional office from all the rest. It communicates elegance, élan and success.

But we must all beware: *"To gild refined gold, to paint the lily ... is wasteful and ridiculous excess."*—William Shakespeare. Moral of the story: Don't overdo the gold; let it be graceful, not disgraceful.



This finial and cap illustrates three gilded surfaces: spherical at the top, curved at the upper band, and flat on the bottom stripe. The latter is etched to help light interact with the gold. The other two curved surfaces need not be etched because light naturally interacts with their gilded curved surfaces.

A very simple etching technique is called "engine turning" and is accomplished by twisting a circular pattern on the gold leaf. This effect is achieved from the use of a ball of cotton wrapped in velvet.

Another kind of creative etching can be achieved by preparing a mask cut from an index card. The mask can then be placed on the gilded area in a variety of ways and etched with the velvet. It will soon become apparent that horizontally etched lines direct light to the observer whereas vertical etchings make the gold look darker. Using this principle (as master sign artist Bruce Deveau has done), an illusion can be produced that fools the eye into seeing a three-dimensional number or letter.

GLUE

And finally, something a bit different, a technique from renowned gilder Joe Balabuszko. A vinyl mask is attached to a substrate. Instead of using oil-size, we apply Gorilla Glue to the masked area and spread it uniformly with a chopstick. We wait 10 minutes and "stipple" the glue with the stick, moving it up and down. We wait another 10 minutes and remove the mask carefully. Now proceed to gild using loose leaf with a gilder's tip, being careful to avoid getting glue on the tip. (Patent gold will not work in this application.)

The time values are not critical and can certainly be experimented with. The glue will cure in a matter of minutes with the gold fused to it in an extraordinary, unique, attractive stippled gold effect. At this time, a white sable brush can be used to burnish the "stippled gild". From informal durability testing, we have concluded that stippled (Gorilla Glue) gold is comparable to that of oil-size, but it has the added feature of producing a textured gild.

There *is* something new under the sun... SB

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