

# Gold Leafing

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## MATERIALS

Cotton-tipped swabs or makeup applicators  
Scissors dedicated to cutting gold  
Tweezers  
Gesso (for raised effect only) (see recipe below)  
Glare or gloss (for flat or raised) (see recipe below)  
Size  
Gold  
Paint brushes  
Burnisher  
Glassine paper  
Paper of parchment  
Pen and ink

## PROCESS STEPS

- 0.1. Prepare design—pencil or ink exactly where gold is to go
1. Prepare materials and work area
2. Apply each under-layers as desired, allowing each layer to dry before adding the next layer
  - a. Gesso (Optional)—to raise gold
  - b. Glare or gloss as a smooth surface for gold and in some cases as a size
  - c. Size or other source of adherence for leaf
3. (Optional) Shape raised surface by burnishing or layering
4. Repeat as necessary for complete coverage
5. Apply gold
  - cut leaf pieces roughly size and shape of areas to be covered
  - breathe lightly on dry size; humidity from breath will enhance tackiness
  - set gold in place and press lightly for adherence
6. Burnish
7. Brush away excess leaf
8. Repeat steps 5–7 as needed
9. Outline gold in ink or dark paint

## **Gesso Recipe**

4–6 t. Slaked plaster—see below for recipe  
1–1.5 t. Fish (Mucilaginous) glue  
0.5–1 t. Sugar or honey  
pinch Armenian bole or red ochre gouache  
Water (distilled)  
Dab of ear wax if needed to eliminate bubbles

Proportions may need adjustment depending on environmental conditions such as humidity.

Some recipes call for *white lead*. This is used to whiten the gesso and also enhances malleability. For most purposes, the lead can be left out without noticeably effecting the results.

The *glue* in many gesso recipes is not generally sufficient to use the gesso as a source of size except under the most ideal weather conditions. Mostly it binds the gesso itself, so that it does not brush away when dried on the scroll. *Mucilaginous school glue* (not rubber cement, although it looks similar) is essentially fish glue and can be used, as can some forms of hide glue.

### **Slaked Plaster**

Take *plaster of paris*, mix several tablespoons in a large quantity of water (two or more cups) and stir for 15 minutes to prevent clumping. Stir for a few minutes per day for at least two weeks. Drain and pile or mold to dry in small blocks. Grind on *glass cutting board* with *glass mortar* into fine powder. Some recipes call for merely mixing the plaster in water. The powder thus generated is usually less fine and slightly chemically reactive, which may lead to deterioration over time.

### **Glare Recipe**

Whip one egg white until stiff peaks form.

Sprinkle approximately 1/3 egg of water over peaks (“1/3 egg of water” means eggshell of water, that is, the volume of water that would fill, in this case, the smaller half of the eggshell).

Let stand over night.

Egg whites will become frothy and liquid will separate out; pour this liquid out from under the froth into a jar. This is the glare. Discard frothy stuff.

Stored in the refrigerator, the glare will last for months. It may discolor and get a little more yellow or brown. It will also get smelly. So long as the liquid remains clear, it is fine; the older the better for good consistency. If the liquid gets cloudy or milky, the glare has spoiled and is breaking down chemically—discard and prepare a new batch.

### **USE OF GOLD**

A little gold can greatly enhance illumination. Many small spiky leaves can give the appearance of vast amounts of gold, even though it may require no more than a single leaf or page of gold to cover the area. Expense, therefore, need not be a limiting factor. Still, a book of 25 real gold leaves can cost \$40 or more and may be a large investment for some. Fortunately, there are many alternatives, several of which are discussed below.

Gold was not used in the Book of Kells; however, it was used even earlier on the continent and is appropriate for use with most types of illumination. For a period look, study carefully where and how the gold was used with each style of calligraphy and illumination. Depending on the style and period, gold maybe appropriate for use in calligraphy, on capitols, borders, or as frames for miniatures. It may be raised or flat, textured or smooth, gold leaf or shell gold (ground shell used in a paint). The same page may include more than one form of gold.

To determine where and how the gold was used, and whether the gold came from leaf, powdered gold in a paint suspension, or shell gold, and even whether the gold was raised or flat, it may be necessary to dig through the text accompanying sample pages and facsimiles. Sometimes it is possible to tell by looking at a picture; however, some printing methods may be misleading. “Full color with gold” usually means that gold has been added in the appropriate places; however, a flat printing method is used, even when the original gold would have been raised and textured. The use of shading within the gold generally indicates that shell gold was used and paint mixed in to provide the shading. In some cases, black and white photos may be more revealing, as highlights and shadows indicate where the gold was raised.

## **MATERIAL OPTIONS AND HANDLING, ORGANIZED BY PROCESS STEP**

0.1. Prepare design. Plan and draw exactly where the gold is to go. Calligraphy can be applied to the scroll if allowed to dry thoroughly prior to applying gold, but if leaf is to be used, do not paint until afterwards. Gold will stick to paint or damp ink.

- On *parchment or vellum*, pencil adheres poorly, and inking the design is highly recommended.
- On *paper*, some people prefer to just use pencil, because it is usually necessary to re-ink after the gold has been laid. Ink, however, has the advantage that it helps hold liquid layers in place, and does not rub off.

### **1. Prepare materials**

- Gold sticks to just about everything so a clear, clean area is important.
- Metal and other washable tools should be cleaned with *alcohol*, and dedicated for use with the gold.
- Gesso, gloss, and size are hard on *brushes* so don't use your good paint brushes. For the size, a small paint brush whose hairs have begun to spread works, because the size pulls the hairs back into a point.
- Gold sticks to fingers, too, and floats on the slightest breeze, so have *cotton swabs*, *tweezers*, and other handling tools ready at hand before you pull the gold out of its packaging.

### **2. The under layers**

a. For raised gold, or to raise gold paint for a leafed look, the first layer is some form of *gesso*. *Acrylic gesso* works, but dries very hard and cannot be burnished or otherwise shaped; therefore, it is not recommended. Recently, some stores have begun to carry non-acrylic, period-style gesso. These or a homemade gesso are preferred, because they can be shaped and burnished. (See recipe above.) Mix in a little yellow or red ochre paint. This enhances the color of the gold and makes it more obvious where you have put the gesso.

Regardless of the type used, gesso is thick and cannot be treated like paint. To avoid ridges and valleys, do not let the brush contact the paper or vellum. Rather, **puddle** the gesso and **drag** the brush over it to spread the gesso to the appropriate areas. This technique can also be used to spread into new areas or blend into sections of gesso that

are already dry. The gold will take on whatever shape the gesso has when it is finished, so getting a smooth surface is very important.

b. **Glare or gloss** is used to make the surface paper or parchment for flat gilding (or gesso for raised gilding) shiny; this will result in a shinier gold when completed. It can also be used to provide a nonabsorbant surface under gold paints, such as enamel, to prevent bleeding and enhance shine.

*Acrylic gloss*, like acrylic gesso, dries quite hard and cannot be reshaped after it has dried. It is also somewhat thick and should be applied without the addition of water in the same drag-the-puddle method as the gesso. Two layers may be needed, because it will shrink when it dries, pulling away from small spots and edges.

The period version of gloss is *glare*. Unlike, gesso, it is very thin and can be spread like paint. The shininess will show you where you have painted. Usually two or three layers are needed for thorough coverage; more if the glare is freshly made.

c. *Size* comes in many forms. Essentially, they are specialized glues to which the gold adheres. Period sizes include *garlic juice* and some forms of *hide glue*. Most modern sizes are oil based and designed for use on wood; therefore, they are not appropriate for scrolls. Look for *water-based sizes*. Most of these are closely related to white glue; the primary difference is that the tackiness can be reacquired by the addition of a slight amount of moisture, such as from a puff of breath.

Size can be used directly on paper and vellum; however, the gold will show the grain of the paper or artificial parchment and a layer of gloss or glare under the size is recommended.

Sizes are typically very thin, with a consistency similar to glare. Add a small amount of red ochre paint to see where you have placed it. Usually two or three layers are needed for thorough coverage. Thin coverage will result in tiny spots where the gold does not adhere. Most sizes can sit on a scroll for weeks and still be used. Some sizes, such as garlic size, are very sensitive to moisture, and gold may come off easily in humid weather.

**3. Gold and gold leaf** comes in many forms. Here are a few of the most common. A detailed description of the application process for patent gold and composite leaf follows the discussion of the various types. (Please note that this expands somewhat on the “process steps” noted at the beginning of this paper.)

**Gold leaf** Loose-leaf gold is the most common form in period. Modern gold leaf tends to be thinner and can be quite finicky to use. A special leather pad known as a *gilder's pad*, and a dedicated *gilder's* or *exacto knife* are needed for safe cutting. Gold leaf should be handled only through the use of metal implements or *cotton swabs* (a *cotton-tipped makeup applicator* works well) because gold will adhere to fingers.

**Patent leaf** is also real gold leaf, but it is very lightly stuck to a piece of paper, and this can be a great aide in handling the leaf. **Scissors** (clean scissors dedicated to the job of cutting gold leaf only) can be used to cut both gold and paper, and with a little care, a small paper ‘handle’ can be made available to help control the leaf. Touch only the paper,

and only as much as necessary. Mostly *tweezers and cotton swabs* are used for handling the patent gold, just as with the loose leaf. See below for detailed instructions on laying the gold.

**Composite leaf** is not real gold but rather a blend of metals used to simulate gold leaf. It is thicker and can be handled more easily than gold since it does not stick to skin; however, skin oils can increase tarnishing, so handling should be minimized. Light polishing may be needed to reduce tarnishing. The instructions for laying composite are much like those for patent, as described below.

**Shell gold** Contrary to some reporting, period shell gold is not powdered gold, but rather a powdered sea shell. Powdered gold, however, has been used in a similar way, causing some confusion. Both shell gold and gold powder are mixed in a medium and used as paint. Like other paints, other colors can be added to create shading and shadows. This effect is most common in the 15th-century style known by several names including ‘squashed bugs and flowers’. The intent is to display realistic flowers and bugs as if they are hanging in front of a gold or other border, casting shadows on the background as if they were 3-D. Shell gold is virtually always flat rather than on a raised surface.

**Pearl gold gouache** is a modern substitute for leaf or shell gold. It is somewhat more finicky than other gouache paints and must be stirred frequently to keep metals in suspension. **Glitter gold** has larger metal fragments and will give a more sparkly, less leaf-like effect. Some brands may use other terms to differentiate ‘pearl’ and ‘glitter’ forms.

**Gold enamel** Until recently, most scribes hesitated to use enamel, because it was all oil-based and could bleed into paper. However, gesso and/or gloss under the enamel will protect the paper, and recently water-based enamels have become available. Enamel is generally more shiny than gouache but also harder to control. Some polishing or a protective coating may be desirable to prevent eventual tarnishing.

**Gold foil for fabric** is another modern alternative to gold leaf. It generally comes on rolls, and special glue and protective coating are available for purchase. It is applied much the same way as gold leaf, but can be stubborn about sticking if the glue is too dry or too damp. The result is an impressive (though not very period) mirror-like finish.

**Yellow ochre paint** (sometimes mixed with brown or white or possibly small amounts of other pigments) was a common period substitute for gold, especially for the technique called *trompe l'oeil*, where highlighting and shading on yellow ochre were used to give the illusion of shiny gold leaf. If there are very fine lines of gold, or golden objects that have fine degrees of shading to indicate depth, there is a very good chance that yellow ochre was used. Depending on the color and print quality of the book you may have as a reference, yellow ochre and real gold leaf can be very difficult to differentiate.

### **To lay patent leaf or composite leaf:**

For most steps, these two are the same. Though the composite leaf can be handled with the fingers, it is better to handle both with a tweezers whenever feasible. All metal tools should be cleaned with alcohol to prevent sticking. Though gold is known as a heavy metal, leaf is light and is picked up by even the slightest breeze. Good air circulation is not desirable at this stage!

- a. **Cut** a piece or strip of leaf just wide enough to cover the area to be leafed. For example, the width of a bar or the size of one leaf in a leaf-and-vine border.
- b. After the size has dried to the barely tacky stage, **lightly puff** on the area to be covered with gold. Some people suggest a *paper straw*, to control the direction of the moisture and limit bending; don't use plastic because moisture droplets may condense and drop on the scroll, causing water spots.
- c. **Lay the leaf**, paper side up for patent, shiny side up for composite, on the area of moistened size and gently press into place with a *cotton-tipped swab/applicator*. Press all over the area to be sure that gold adheres. Gently pull away the paper or trailing ends of leaf. Some bits around edges or on corners may cling—this can be brushed away later, or larger pieces can be maneuvered to another area with the aide of a tweezers.
- d. **Burnish** on a padded surface, not a hard board. Burnishing on a hard surface may cause fine cracks in the gold, resulting in a matte rather than a shiny finish. Gilder's pads, some lap pads, or a fat leg covered in a blanket make good surfaces; be careful not to crease the scroll.

Several kinds of burnishers are available on the market, but cheaper alternatives also work. Store-bought burnishers are generally gem-quality *agate and hematite* on a handle. These gem-quality stones can usually be used directly on the gold.

For those with a limited budget, *agate and hematite rocks* are often available at nature and science stores for \$1–\$2. These are not gem-quality, even though they are polished, and can scratch the gold surface. Also skin oils will cling to the surface when handled. Therefore, burnish by first laying a piece of glassine paper over the gold, then gently rubbing with the stone. *Dogs teeth* (in period, dogs, in modern times, *coyote teeth* can be purchased) is another alternative to burnishing stones. They should also be used with *glassine paper*. Glassine paper is not “trace glaze” (a tracing paper), which is thinner and courser, but rather a very smooth, glossy paper used for protective envelopes as well as for burnishing. If your local craft store does not carry it, try the post office, which uses glassine envelopes for stamps.
- e. **Brush** away excess gold with a soft brush dedicated to this purpose. *Large makeup brushes*, such as those for blush, work well. Hand vacuums can also be used on the composite leaf—be careful not to press so hard as to scratch the surface.
- f. If there are small spots where the leaf does not adhere, lightly blowing and laying more leaf may be sufficient to cover. More often, however, this indicates a spot where there is

insufficient size, possibly due to shrinkage, and more size will need to be added prior to laying additional leaf.

g. For a thicker layer of gold (at least two are recommended for patent; one is usually sufficient for composite), lightly puff on the gold already on the scroll and lay another piece of patent leaf on top. **Gold will stick to itself if sufficiently pure.** For a second layer of composite, additional size must first cover the composite already present, because it does not stick to itself.

**4. Outlining** Outlining gold brings it out visually and makes it stand out from the background. It also helps smooth any rough edges that may have developed. If gold dots and leaves are standing alone on a bare background, the outline is usually in black ink. This is a good time to add ink flourishes such as curlicues off of the design points, and wiggles or spirals off of dots and vines. If the gold is immediately next to a painted color, for example, part of a bar or capitol or the center of a flower, the outline may be done in a dark shade of that color.