

Making Iron Gall Ink

From *A Booke of Secrets*:...

Geffrei Maudeleyne

Primary source for this recipe.

The section describing Scribal and Painter information is

translated from Dutch into English by W. P.

A
BOOKE OF SECRETS:
Shewing diuers waies to make and prepare all
sorts of Inke, and Colours: as Blacke, White,
Blein, Greene, Red, Yellow, and other Colours.
Also to write with Gold and Silver, or any kind of Metall
out of the Pen: with many other profitable secrets,
as to colour Silke and Parchment of
any colour: and to grave with
strong Water in Steels
and Iron.

Necessarie to be knowne of all Scriueners, Painters,
and others that delight in such Arts. Translated out of
Dutch into English, by W. P.

Hereunto is annexed a little Treatise,
intituled, *Instructions for ordering of Wines:*
Shewing how to make Wine, That it may continue
good and faire not, Neither become lower, nor loose colour. And
how you may remedie faire Wine, take away the heati-
nesse, with other instructions for the pre-
seruation of the same.

*Written first in Italian, and now newly translated
into English, by W. P.*



LONDON,
Printed by Adam Illip for Edward
White, and are to be sold at his shop
at the little North dore of Pouls,
at the signe of the Gun.

1596.

Original Printed Version

From the second printed page

A Booke of Secrets,
create the same, as in this treatise you shal read,

To make Inke to write vpon paper.

Take halfe a pint of water, a pint wanting
a quarter of wine, and as much vineger, which
being mixed together make a quart & a quar-
ter of a pint more, then take six ounces of gauls
beaten into small powder, and sifted through a
sieve, put this powder into a pot by it selfe, and
poure halfe the water, wine, and vineger into
it, take likewise foure ounces of vietriall, and
beat it into powder, and put it also in a pot by it
selfe, whereinto put a quarter of the wine, wa-
ter, & vineger that remaineth, and to the other
quarter, put foure ounces of gum Arabike bea-
ten to powder; that done, couer the three pots
close, and let them stand three or foure daies to-
gether, stirring them euery day three or foure
times, on the first day set the pot with gauls
on the fire, and when it begins to seeth, stie it
about till it be thoroughly warme, then straine it
through a cloath into another pot, and mixe it
with the other two pots, stirring them well to-
gether, and being couered, then let it stand three
daies; till thou meanest to vse it, on the fourth
day, when it is settled, poure it out, and it wil be
good inke. If there remaine any dregs behind,
poure some raine water (that hath stand long
in a tub or vessel) into it, for the older the water
is, the better it is, and keepe that untill you
make more inke; so it is better the clear water;

To
To

The manuscript transcribed to modern typography.

To make Inke to write vpon paper.

Take halfe a pint of water, a pint wanting a quarter of wine, and as much vineger, which being mixed together make a quart & a quarter of a pint more, then take six ounces of gauls beaten into small powder, and sifted through a siue, put this powder into a pot by it selfe, and poure halfe the water, wine, and vineger into it, take likewise foure ounces of victriall, and beat it into powder, and put it also in a pot by it selfe, whereinto put a quarter of the wine, water, & vineger that remaineth, and to the other quarter, put foure ounces of gum Arabike beaten to powder, that done, couer the three pots close, and let them stand three or foure daies together, stirring them euery day three or foure times, on the first day set the pot with gauls on the fire, and when it begins to seeth, stir it about till it be thoroughly warme, then straine it through a cloath into another pot, and mixe it with the other two pots, stirring them well together, and being couered, then let it stand three daies, till thou meanest to vse it, on the fourth day, when it is setled, poure it out, and it wil be good inke. If there remaine any dregs behind, poure some raine water (that hath stand long in a tub or vessell) into it, for the older the water is, the better it is, and keepe that vntill you make more inke, so it is better then clean water.

To make Inke for parchment.

Make it in all points like to the inke aforesaid, only take a pint of water, & of vineger and wine a pint more, that is of each halfe a pint.

The manuscript transcribed to modern typography

To make to write on paper.

Take half a pint of water, a pint wanting a quart of wine, ($1 \frac{3}{4}$) and as much vinegar, which being mixed together make a quart and a quarter of a pint more. (five cups). Then take six ounces of galls, beaten into small powder, and sifted through a sieve. Put this powder into a pot by itself and pour half of the water, wine, and vinegar into it.

Take likewise four ounces of vitriol, and beat it into powder and put it into a pot by itself, then put a quarter of the wine, water, and vinegar that remains.

To the other quartet put four ounces of gum arabic, beaten to a powder.

Cover the three pots closed and let them stand three or four days stirring them three or four times a day.

On the first day set the pot with galls on the fire. When it begins to seethe stir it is thoroughly warm. Then strain it through a [linen] cloth into another pot and mix it with the other two pots, stirring them well together and being colored. Then let it be for three days. When it is settled, pour it out and it will be good ink.

If there remains any dregs behind, pour some rain water (that has stood in a tub of vessel) into it, for the older the water is the better it is, and keep that until you make more ink, to it is better than clean water [to use instead of water in the recipe above?]

To make ink for parchment: make as above, only take a pint of water and of vinegar and a pint of wine that is a pint of each.

That is half a pint of each. My math says this should be half a pint text mentions a pint each.

1 cup of water

I started this project by collecting rain water. All of the recipes I have studied mentions *faire water* or *cleare water*. They mean the same thing.

Several texts mention rain water. To me I think the writers were attempting to keep readers from using stagnate water stored in barrels and lake water. I wanted water free of modern contaminants/additives including derogation of plastic containers in bottled distilled or modern portable water bottles.



I redacted this recipe in half both to reduce the amount of finished ink but to also make a batch for parchment.

1 cup of water

I bottled this water in glass with as period of a stopper as I had available. This is my second collection of water as my first fell victim to sunlight that allowed algae growth.

NOTE: My camera reset the date every time I remove the battery to charge it. I did not catch this in all of the pictures. I would prefer no date at all but Photoshop can only do so much.



1 $\frac{3}{4}$ cups of wine.

I bottled this water in glass with as period of a stopper as I had available. This is my second collection of water as my first fell victim to sunlight that allowed algae growth. I chose a European wine with a preference to what I would consume with the remainder of the bottle. I also wanted that shape of bottle for future use.



1 $\frac{3}{4}$ cups of vinegar.

I chose this brand of red wine vinegar as I personally doubt distilled vinegar was available in period. I took in consideration that red wine has a slightly higher tannin content. The major point of the recipe is to extract tannin from the oak galls.

I also chose a vinegar that was not a herbal infusion. This was all that was available at Food Lion, where I normally shop.

Since I was redacting and producing both paper and parchment ink, labeling became very important.



6 ounces, by weight of oak galls.

Oak apple is the common name for a large, round, vaguely apple-like gall commonly found on many species of oak. Oak apples range in size from 2–5 cm in diameter and are caused by chemicals injected by the larva of certain kinds of gall wasp in the family Cynipidae.^[1] ~~The adult female wasp lays single eggs in developing leaf buds.~~ The wasp larvae feed on the gall tissue resulting from their secretions. Considerable confusion exists in the general 'literature' between the oak apple and the oak marble gall. The oak marble is frequently called the oak apple due to the superficial resemblance and the preponderance of the oak marble gall in the wild. Other galls found on oak trees include the Oak artichoke gall and the Acorn cup gall, but each of these has its own distinctive form.

Some common oak-apple-forming species are the *Biorhiza pallida* gall wasp in Europe; *Amphibolips confluenta* in eastern North America;^[2] and *Atrusca bella* in western North America.^[1] Oak apples may be brownish, yellowish, greenish, pinkish or reddish.

(I realize Wikipedia is not always a trusted source, but this information is a little more detailed than my other texts.)

http://en.wikipedia.org/wiki/Oak_apple



http://en.wikipedia.org/wiki/File:Oak_Gall.jpg

Crush the oak galls

Different texts call for crushing the galls just enough to break the shell; some call for powdered. This text calls for small powder which makes more sense to me as it increases the surface area to react with the vitriol.

When this chore became bothersome, I cheated and started the crushing process in a small food processor that goes in the dishwasher well before returning to the mortar and pestle.



6 ounces of powdered gum arabic by weight.

“... gum [arabic] is the actual exudation of the acacia tree in the form of pebbles without any additional processing.”

http://www.naturalpigments.com/detail.asp?PRODUCT_ID=510-52GAPbS

NOTE: My students qualify for a 10% discount if they call in an order and mention that you are a student of Bill Mauldin in North Carolina.

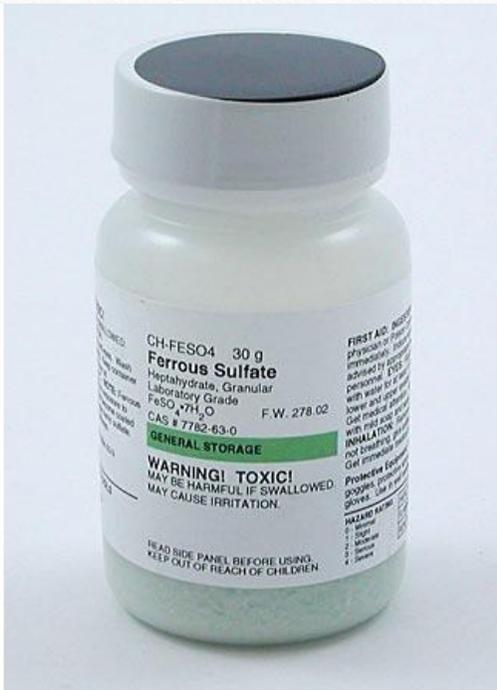
NOTE II: Officially, I advise wearing a dust mask while dealing with these powders, even if they are not period.



Grind until the granules can flow freely through a sieve or strainer. Gum arabic is easier to grind than galls, thus I didn't take any shortcuts.



Green Vitriol/ $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$



“**Ferrous Sulfate** or iron(II) sulfate is most commonly encountered as the blue-green heptahydrate, known since ancient times as copperas or green vitriol. Ferrous sulfate can be found in various states of hydration, and several of these forms exist in nature. At 90°C ., the heptahydrate form loses water to form the colorless monohydrate.

Ferrous sulfate was used in the manufacture of inks, most notably iron gall ink, which was used from the middle ages until the end of the 18th century. The ink was generally prepared by adding ferrous sulfate to a solution of gallotannic acid. The tannic acid was usually extracted from oak galls (also known as "oak apples" or more correctly "oak marble galls"), or galls of other trees; hence the name. Fermentation or hydrolysis of the extract releases gallic acid, which yields a darker black ink. The fermented extract is combined with the ferrous sulfate and a binder such as gum arabic.”

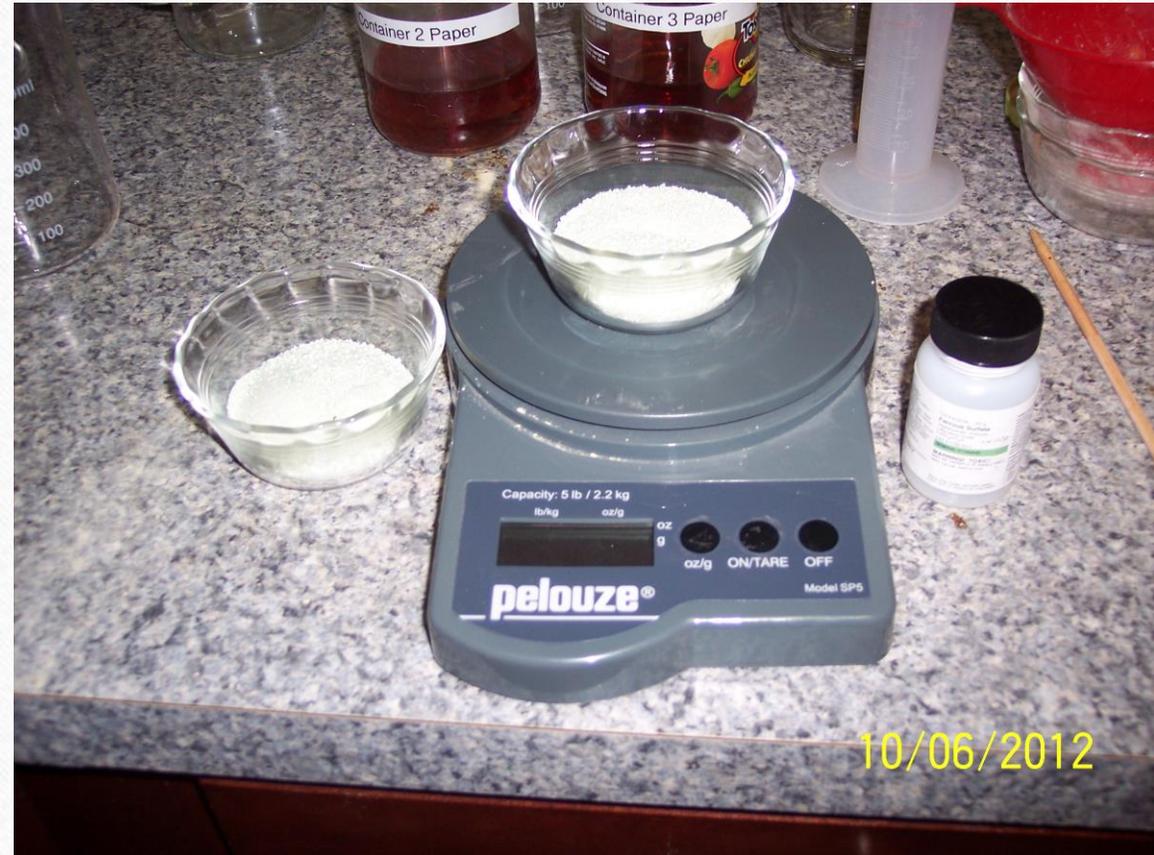
http://www.naturalpigments.com/detail.asp?PRODUCT_ID=500-22FES50

Picture from www.HomeScience.com

All dry ingredients are measured by weight.

Deviation from period: Modern scales are much more accurate than medieval ones. Plus I do not own period scales.

Glass bowls are also not likely used for this purpose in period.



This process has the potential to make a mess both on your hands and counter. Tile-X was the only thing, of many that I tried to clean up a spill. An old cookie sheet and gloves became necessary.



Mixing ingredients

Combine:

1 cup water

1 $\frac{3}{4}$ cups of vinegar

1 $\frac{3}{4}$ cups of wine

Divide this mixture in half.

In one of the jars of half of the liquids, add the galls.

In one jar take $\frac{1}{4}$ of the liquid and add the vitriol.

In a third jar take the remaining $\frac{1}{4}$ of the liquid and add the gum arabic.

Letting the liquids stand/seep

Cover all three of the jars and let them stand for three or four days, stirring three or four times a day.

To try to do something else as was done in period, and to not contaminate my cooking utensils, I stirred with wooden sticks.

Note that the jar with the vitriol was already turning black when mixed with the liquids.



After the containers have stood for three or four days

Warm the contents of the jar that has the galls in a double boiler, simmer being careful not to let it boil or boil over the rim of your upper pot.

There are glass pebbles under the flask and only a moderate amount of water.

For those that are not frustrated alchemists, a metal bowl over a sauce pan with about an inch of water is a more practical way to accomplish this.



The second step of the first day after the jars have stood for three or four days.

Strain the jar with the galls and heated liquid through a piece of wool cloth. My only wool cloth was a suit weight and gravity alone could not let the liquid through. Though different than as directed in the original, fairly fine linen will accomplish the same thing. I went totally modern and used strainers that I keep just for crafting.



Separating the galls from the fluid they steeped in

Due to being totally un-coordinated, I placed the beaker I wanted to collect the strained gall mixture in a non-porous bowl. Despite my attempt at not making a mess, I did manage to spill some permanent black ink on my counter top. The coffee strainer that has been retired from food service works a lot better than the one I was given to catch kidney stones.



Let stand again.

Once the liquid from the galls has been strained, combine all three liquids.

Let the whole mixture stand without stirring for at least three days and you will have good ink.

To make future batches of ink, take the powdered galls that did not go through the strainer in a jar with water. Let it sit for a few days, stirring occasionally. Let it sit a few months, or whenever you went through more than a quart of ink. Strain this liquid and use the results as the water to start the recipe over.

Gallic ink darkens with age. If you feel the ink is too diluted, open the jar and let some evaporate.

If the ink is too thick, do not add water. Add some more vinegar.

If you wanted ink that is immediately black, though I have lost the source citation, add a small amount of lamp black to the inkwell you are using. Do not add to your main supply of ink as it will change over time.

Do not be alarmed if there is a scum floating on top of your stored ink. You can skim it off, or stir it back into the ink.