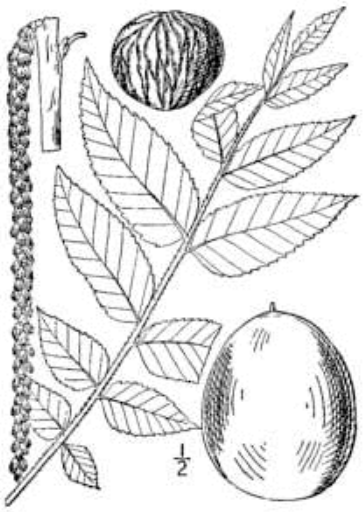
Ink: Walnut



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March Crown Practical Sciences: Tinctures
(Dyes and Inks) AS XXXIX
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[1] Line Drawing of Juglans Nigra L
http://plants.usda.gov/

I. Introduction

This paper discusses producing ink from walnut husks. While walnuts trees were cultivated in Roman times and spread to the European and English countryside, there is no historic recipe pre-1650 of using walnuts as a source of tannic acid to make ink that I was able to find. There are numerous recipes for oak gall ink, both with and without the addition of iron. There are other recipes for tannic acid ink. That said, I opted to try to make walnut ink as an adjunct to dyeing with walnut hulls.

The black tones of the tannic/iron ink should work well for calligraphy or outlines in illumination, having many of the same characteristics as the oak gall ink. The warm brown tones of walnut may lend themselves to illumination or the lining of the pages for writing.

II. Notes on Tannic Inks

The numerous recipes that include oak gall frequently include mention of the addition of vitriol (iron), wine, and gum resin. While the oak gall produces large quantities of tannic acid, it is still basically a brown color.

When ferrous sulphate/vitriol, also called copperas, is added to oak gall tannin dye there is a chemical reaction and the ink takes on a more black tone. Theophilus[2], for example, calls for the addition of a piece of hot iron if the ink is not black enough.

The addition of wine (red wine) serves 2 purposes. One is to add more tannin to the mixture. The other is the addition of the alcohol as a preservative.

The addition of the gum – gum arabic serves to help the ink adhere and to clarify the color. The use of gum of the acacia tree dates to early Egypt[3]. The acacia is a type of thorn tree and may be one of the types of trees referred to by Theophilus. Theophilus prefers the use of the gum from a cherry or plum tree[4] for his pigments, although makes no mention of adding gum to his ink. The Mappae author prefers gum from maple or almond.[5]

Gallotannate is the tannic acid contained in the galls. There are 3 methods of extraction – powdering the galls to which water is then added, boiling the galls for several hours until the tannic acid is released into the water, or fermenting

[2] Theophilus pg. 42-43
[3] Forty Centuries of Ink – Chapter VII
[4] Theophilus pg. 32-33
[5] Smith: Mappae Sec. 193

the galls such as leaving them to mold. Gallotannate produces a deep brown color. [6]

While there are undoubtedly many recipes for Tannic Ink here are the ones I came across during the process of this research and the ingredients as far as I can determine –
Theophilus[7], Italian - 12th C.– Book 1: Art of the Painter Ch. 38 – Thornwood[8], water, wine, vitriol, iron
English – 1596 - A Booke of Secrets[9] – galls, water, wine, vinegar, gum arabic
French – 1600-50 - The cooching and receipes book by D'Erp[10] - iron, gall, gum arabic
Italian - 1555 - Secreti del reverendo donno Allessio Piemontese[11] - gall, gum arabic, iron
Unknown – 14th/15th C. Latin - Manuscript from University Library Uppsala[12] - gall, water, iron
Unknown Dutch – not dated - Manuscript from University Library Utrecht[13] - gall, water, iron, gum arabic
English – 15th C. - Strasburg Manuscript[14] – gall, iron, gum arabic, water, vinegar
English – 1558 - The Secretes of the Reverende Maister Alexis of Piemount[15] - galls, white wine, gum arabic, iron
French - 1393 - Le Menagier de Paris[16] - gall, gum, iron, water

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[6] Ink Corrosion Website: iron gall ink: ink recipes
http://www.knaw.nl/ecpa/ink/make_ink.html
[7] Theophilus: On Divers Arts
[8] The author translator of the Theophilus book suggests that Theophilus meant Hawthorn, but the author of the Forty Centuries of Ink Chapter VII suggests that there were 2 "thorn trees" – Pomegranate from which the tannin was extracted and the Acacia which produced the gum.
[9] The Ink Corrosion Website: Historical Ink Recipes
http://www.knaw.nl/ecpa/ink/make_ink_history.html
[10] The Ink Corrosion Website: Historical Ink Recipes
http://www.knaw.nl/ecpa/ink/make_ink_history3.html
[11] The Ink Corrosion Website: Historical Ink Recipes
http://www.knaw.nl/ecpa/ink/make_ink_history4.html
[12] The Ink Corrosion Website: Historical Ink Recipes
http://www.knaw.nl/ecpa/ink/make_ink_history5.html
[13] The Ink Corrosion Website: Historical Ink Recipes
http://www.knaw.nl/ecpa/ink/make_ink_history6.html
[14] Reference found http://www.geocities.com/CollegePark/Library/2036/ink.html
[15] Reprinted in 1975 by Theatrum Orbis Terrarum, Ltd., Amsterdam: ISBN 90 221 0707 8. Reference found http://www.geocities.com/CollegePark/Library/2036/ink.html
[16] Reference found http://oak.atlantia.sca.org/19/inks.htm

In each of these recipes there are multiple steps in the preparation of the ink. These recipes share a common set of ingredients. Some require multiple additions of some of the ingredients and others are more straight forward. Each, however, relies on combining the ingredients and the chemical reaction that results to make the ink black.

III. The Project Notes

For this project, this is the process I followed to make 5 types of ink.

Take black walnut nuts and break up with a mallet. Remove the nut meat.

Take 4 oz of the walnut hulls and place in cheese cloth and tie shut. Place into 1 gallon of water in a stainless steel pot. Let soak 1 hour to soften up the shells. The stainless steel pot was chosen so as to not add an additional chemical into the mixture. While I was not trying to ferment the walnuts, it was important to try to extract the most possible tannic acid.

Simmer with the top on the pot. Periodically test the color of the liquid to determine if it has reached the depth of color desired. This was about 8 hours.

Remove 1 quart of liquid to a separate pot. Bring to boil. Add ¼ teaspoon ferrous sulphate – Iron. Let simmer until the salts are well incorporated into the ink. Then continue heating to reduce to about ¼ the amount of liquid to concentrate and thicken the ink. This step was about 1 hour. Add ¼ teaspoon gum Arabic powder to keep the iron in the suspension.

Jar – Walnut with Iron and gum arabic Reduced

Remove 1 cup of liquid to a separate jar. Add ¼ teaspoon ferrous sulphate and ¼ teaspoon Gum Arabic. Mix well.

Jar – Walnut with Iron and Gum Arabic

Bring the remaining ink to a boil and reduce until the liquid is sufficiently concentrated. Test the liquid with a dip pen periodically to see if it has reached a usable thickness for writing. It was about 1.5 hours to reduce to about ¼ the original amount of liquid. Divide into 3 samples. Add red wine to one and vinegar to another.

Jar – Walnut only

Jar – Walnut with 1 tablespoon red wine

Jar – Walnut with 1 tablespoon red wine vinegar

IV. Project Conclusions

Walnut Only — The reduced walnut creates a thin ink that darkens as it dries on the paper. It is a warm brown tone.
Walnut with Red Wine —The wine addition seem to make no difference to the walnut ink either in color or in viscosity. The longer term preservation effect is unknown.
Walnut with Vinegar — The vinegar addition seem to make no difference to the walnut ink either in color or in viscosity. The longer term preservation effect is unknown.
Walnut with Iron and Gum Arabic — The walnut with iron and Gum Arabic in its unreduced state is very thin and does not penetrate well.
Walnut with Iron reduced and added Gum Arabic —This reduced version also is very thin and does not penetrate well. However, when the batch was tested before it was reduced, it produced a beautiful black ink. The cause for the change is unknown.

V. Bibliography

Brunello, Franco. *The Art of Dyeing in the History of Mankind*. Venice, Italy: Neri Pozza, ed./publisher. English Edition 1973
Rosetti, Gioanventura. *The Plictho of Gioanventura Rosetti: Instructions in the Art of the Dyers which Teaches the Dyeing of Woolen Cloths, Linens, Cottons, and Silk by the Great Art as Well as by the Common*, trans. Sidney M. Edelstein and Hector C. Borghetty. Cambridge, Mass.: The M.I.T. Press, 1969. (cover gif is from this treatise)
Smith, Cyril Stanley & John G. Hawthorne. Transactions of the American Philosophical Society, Vol. 64, part 4, 1974 — *Mappae Clavicula: A Little Key to the World of Medieval Techniques*. Philadelphia: The American Philosophical Society. July 1974. ISBN 0-87169-644-4.
Theophilus. *On Divers Arts [De Diversis Artibus]*, corrected edition, trans. John G. Hawthorne and Cyril Stanley Smith. New York: Dover Publications, Inc., 1979. ISBN 0-486-23784-2.

Websites:
Black in Period: The use of black as a dye, ink and paint between 1150 -1250
http://www.geocities.com/Area51/Lair/5459/bliaut4.html
Colors, Dyestuffs, and Mordants of the Viking Age: An Introduction by Carolyn Priest-Dorman http://www.cs.vassar.edu/~capriest/vikdyes.html
Dye Recipes from the Innsbruck Manuscript
http://costume.dm.net/~drea/dyes/

Forty Centuries of Ink by David N. Carvalho
http://www.worldwideschool.org/library/books/tech/printing/FortyCenturiesofInk/chap0.html
Making Walnut Ink by Elizabeth de Nevell
http://home.insightbb.com/~denevell_books/making_walnut_ink.htm
Medieval Illumination Recipes
http://www.jcsparks.com/painted/recipes.html#Walnut_ink
Medieval Writing http://medievalwriting.50megs.com/tools/ink.htm
Recipes for old writing and drawing inks by Evan Lindquist
http://www.clt.astate.edu/elind/oldinkrecipes.htm
Period Inks by Lad Margritte of Ravenscroft
http://www.tirbriste.org/dmir/ScribalArts/period_inks.html
Some Ink Recipes by Claes G. Lindblad
http://www.algonet.se/~claesg/inkrecip.htm
Tannic Inks by slaine niChiarain
http://www.geocities.com/mary_m_haselbauer/Ink.html
The Gabriel Guild Newsletter Vol 1, Number 1. Winter 1992-93. Oak Gall Ink Recipe by Karen Gorst
http://www.manuscriptarts.net/Ave_VIN1_spirituality%20of%20ink%20making.htm
The Ink Compendium by E. Boucher
http://www.geocities.com/CollegePark/Library/2036/ink.html
The Ink Corrosion Website: How to Make Ink by Cyntia Karnes
http://www.knaw.nl/ecpa/ink/make_ink.html
The Ink Corrosion Website: How to Make Ink/A Booke of Secrets by W. Philip transcribed by and from Manuscript Inks by Jack C. Thompson, 1996 Caber Press
http://www.knaw.nl/ecpa/ink/ink_booke.html
The Ink Corrosion Website: How to Make Ink/ Historical Ink Recipes by Birgit Beibland & Ad Stijnman
http://www.knaw.nl/ecpa/ink/make_ink_history.html
Two Basic Black Inks by Rebekah of Samandar
http://oak.atlantia.sca.org/19/inks.htm
USDA Natural Resources Conservation Service
http://plants.usda.gov/