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# Recipes for old writing and drawing inks

## Evan Lindquist

Emeritus Professor of Art, Arkansas State University, Jonesboro

I have pulled from my files some old directions for making ink. On this page I share them with students who would like to experiment.

Beware! These inks may be corrosive and harmful to expensive writing and drawing equipment. There may also be toxic environmental effects in mixing them. Before experimenting with these recipes, you must consider the risks and accept responsibility for whatever happens.

### Iron-gall ink (1)

Gallnuts, 5 grams  
Ferrous Sulfate, 1 gram  
Gum Arabic, 1 gram  
Water, 200 grams

Grind the gallnuts to a fine powder and immerse in half of the water. In a few weeks, mold will cover the top surface. Skim off the mold and pour the liquid through a filter. Dissolve gum Arabic in a small amount of water and add it to the liquid. Dissolve the ferrous sulfate in water and add it to the liquid. Add 1 gram of carboric acid to keep mold from forming.

source unknown

### Iron-gall ink (2)

Gallnuts, 30 grams  
Crystallized ferrous sulfate, 20 grams  
Gum Arabic, 20 grams  
Water, 600 grams

Grind the nuts to a fine powder and place into a bowl. Add half the water and let soak. In the remaining volume of water, dissolve the ferrous sulfate and the gum. Into this liquid, pour in the ground-and-soaked gallnuts. The liquid will turn black and can be used immediately, but it will reach its most intense blackness if it is stirred frequently for one or two months. After this, allow it to set for a few days, then filter and pour into the ink bottle. To avoid the formation of mold, add 5% of volume of strong gallnut extract and boil for 5 minutes. Too much of the iron salts will make the ink turn a rusty brown with darker edges, and it may also eat into the paper. Too large a quantity of gallnuts will make the ink lose its intensity, but it will remain resistant to water and alcohol.

source unknown

### Iron-gall ink (3)

To make good ink. Take 5 ounces of the best Nuttgalls, break them in a mortar but not in small pieces, then put the gall into one quart of clear rain water or soft spring water, let them stand 4 or 5 days shaking them often, then take 2 ounces of white gum arabick, 1 ounce of double refined sugar, 1 piece of indigo and put in the same and shake them well and let them stand 4 or 5 days more. Then take 2 ounces of good green copperis the larger the better and having first washed off the filth put in to the rest and also a piece of clear gum, about as big as a walnut to set the colour and it will be fit for use.

source unknown

### Iron-gall ink (4)

"...Copperas is ferrous (or iron) sulphate, which is available from any drugstore as a dietary supplement. In its natural and impure state copperas has a green tinge, hence the incorrect association with copper. Tannin, or tannic acid ... is the brown substance found in the bark and leaves of trees. Medieval scribes had their own favorite sources, however: acorns, walnut shells and, most often, the small protuberances that grow on oak leaves in reaction to the eggs of certain parasite wasps.... one part powdered gum arabic, two parts copperas, three parts crushed galls, and 30 parts water, all by volume...."

Paul Werner, "Dragon's Blood and Ashes", *Calligraphy Idea Exchange*, volume 1, number 2

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### **Standard for Government Writing Ink**

(Federal Specification, TT-I-563, Ink; Writing)

This formula was written originally to provide ink for use in post-office lobbies, where the conditions are devastating to pens. This standard ink is similar to some of the commercial writing inks. ...

The formula for the standard writing ink is:

Tannic acid, 11.7 grams

Gallic acid crystals, 3.8 grams

Ferrous sulphate crystals, 15.0 grams

Hydrochloric acid, "dilute", S.S.P., 12.5 grams

Carbolic acid (phenol), 12.5 grams

Dye (C.I. 707; Sch. 539), 1.0 gram -- (NOTE: *Explanation of this dye is in Appendix, the last page*).

Water (distilled is best) to make a volume of 1 liter at 20 degrees C (68 degrees F).

*From Circular of the National Bureau of Standards C413, "INKS"*

*U.S. Department of Commerce, Issued December 28, 1936*

*By C. E. Waters*

### **Standard for Government Writing Ink Powder**

#### **Ferrous Sulphate Ink Powder, Iron Gallate Inks**

Many formulas exist for making ink powder to produce writing fluid of good keeping quality, low acidity, and satisfactory permanence. Ink will keep longer without depositing sediment if it is made without tannic acid, but with an increased amount of gallic acid. It is possible to replace the usual hydrochloric or sulphuric acid by less than an equivalent quantity of a solid organic acid. ... The weight of ferrous sulphate called for, 15.0 grams, contains 3 grams of iron.

Gallic acid crystals, 10.0 grams

Ferrous sulphate crystals, 15.0 grams

Tartaric acid, 1.0 gram

Soluble blue (C.I. 707; Sch. 539), 3.5 grams -- (NOTE: *Explanation of this dye is in Appendix, the last page*).

Dissolve ingredients in enough water (distilled is best) to make total volume of 1 liter. Variations in the type of dye and the amount of air in the bottle may cause formation of sediment. ...

*From Circular of the National Bureau of Standards C413, "INKS"*

*U.S. Department of Commerce, Issued December 28, 1936*

*By C. E. Waters*

#### **Tannin ink for writing on celluloid**

Ferric chloride, 10 parts

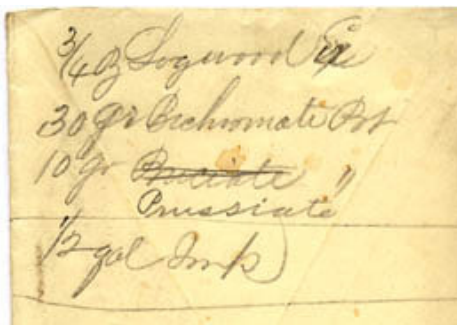
Tannin, 15 parts

Acetone, 100 parts

Dissolve the ferric chloride in a portion of the acetone and the tannin in the residue, and mix the solutions.

Gardner D. Hiscox and Prof. T. O'Connor Sloane, *Fortunes in Formulas*, [New York: Books, Inc.], 1957

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### Would you like to try an experiment in making ink?

This list of ink ingredients was hastily scrawled on the back of a postal envelope that was mailed in Easton, Pennsylvania, in 1874. No procedure was written, just this list of materials. There is no guarantee that these ingredients will combine to make ink. If it works, what kind of ink will it be? Can you decipher the words? The penmanship was done with a graphite pencil in a style of cursive writing called "running hand" or "business penmanship". With the exception of the last word on the first line, the letters are legible and well formed even though they were done quickly. (The writer was a Professor of Penmanship). My guess is that the first line was intended to be "3/4 oz Logwood chips". Don't overlook the important "ditto" mark in the third line. The actual length of the first line is 2.2 inches (55 mm).

Many thanks to an anonymous reader who submitted the following thoughtful observations:

*I believe that the first line in the Easton, Pennsylvania, 1874, ink recipe is logwood extract (not chips as you speculated, although logwood chips are also used for dyeing--the hand looks like an "Ex" rather than a "C"). As a graduate student in English literature, I studied handwriting styles from mediaeval through modern. This does look like an "Ex" to me and would be a logical ingredient. If logwood chips were used for this ink, then I would think rather more than 3/4 oz. would be needed for the amount of ink this makes.*

*Potassium bichromate was also known as potash or potassium dichromate, acid or red potassium chromate. It is a carcinogen, and in susceptible persons, yields a nasty contact dermatitis. Anyone working with dichromate should use extreme caution. The contact allergy it generates is agonizing. It is used now in alternative photographic processes.*

*The potassium prussiate listed in the next line down is probably Potassium ferrocyanide, also known in the 19th century as ferrocyanide of potash and yellow prussiate of potash. In an acidic solution, potassium ferrocyanide can release cyanide gas.*

*Thus, I think the formula reads:  
3/4 oz logwood extract  
30 gr potassium dichromate  
10 gr potassium ferrocyanide  
to make 1/2 gal ink*

*WARNING: Before working with these chemicals, consult a working chemist for an opinion concerning the safety of the formula and safe handling.*

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### Black ink

According to the most accurate experiments on the preparation of black ink, it appears that the quantity of sulphate of iron should not exceed 1/3 part of that of the galls, by which an excess of color matter, which is necessary for the durability of the black, is preserved in the liquid. Gum, by shielding the writing from the action of the air, tends to preserve the color, but if much is employed, the ink flows badly from quill pens, and scarcely at all from steel pens. The latter require a very limpid ink. The addition of sugar increases the flowing property of ink, but makes it dry more slowly, and frequently passes into vinegar, when it acts injuriously on the pen. Vinegar, for a like reason, is not calculated for the fluid ingredient. The best blue galls should alone be employed in making ink. Sumach, logwood, and oak bark, are frequently substituted for galls in the preparation of common ink. When such is the case, only about one-sixth or one-seventh of their weight of copperas should be employed. *[Inks so made possess little durability.\*]*

*Dick's Encyclopedia of Practical Receipts and Processes, [no date] circa 1870*

(\* The observation bracketed appears in an earlier work, *Cooley's Cyclopaedia of Practical Receipts Third edition, London 1856*)

**Article on Ink, COOLEY'S CYCLOPÆDIA OF PRACTICAL RECEIPTS**

Third Edition London 1856 pp 621-628

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**"Writing Fluids" article from COOLEY'S CYCLOPÆDIA OF PRACTICAL RECEIPTS.**

Third Edition London 1856 pp 1319-1320

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2 pages. Tells how to restore faded ink, presents Writing Fluids definition and formulas, including those of Horning, Mohr, Rev.J.B. Reade, Prof. Runge, and Dr. Ure.

**Fine Black Ink.**

Alleppo galls (well bruised), 4 ounces; clean soft water, 1 quart; macerate in a clean corked bottle for 10 days, or even longer, with frequent agitation; then add 1 1/4 ounces gum-arabic (dissolved in a wine-glassful of water); lump sugar 1/2 ounce; mix well, and afterwards further add 1 1/2 ounces sulphate of iron (green copperas) crushed small, agitate occasionally for 2 or 3 days, when the ink may be decanted for use; but it is better if left to digest together for 2 or 3 weeks. When time is an object, the whole of the ingredients may be at once put into a bottle, and the latter agitated daily, until the ink is made; and boiling water instead of cold water may be employed. The above will make 1 quart of beautiful ink, writing pale at first, but soon turning intensely black.

*Dick's Encyclopedia of Practical Receipts and Processes*, [no date] circa 1870

**Cooley's Superior Black Ink.**

Bruised Aleppo nut-galls, 12 pounds; water, 6 gallons; boil in a copper vessel for 1 hour, adding water to make up for the portion lost by evaporation; strain and again boil the galls with water, 4 gallons, for 1/2 hour, strain off the liquor and boil a third time with water, 2 1/2 gallons, and strain; mix the several liquors, and while still hot add green copperas (sulphate of iron) coarsely powdered, 4 pounds; gum-arabic bruised small, 3 1/2 pounds; agitate until dissolved, and when settled, strain through a hair sieve, and keep it in a bunged-up cask for use. This will produce 12 gallons, very fine and durable.

*Dick's Encyclopedia of Practical Receipts and Processes*, [no date] circa 1870

**Black Ink.**

Campeachy logwood chips, 3 pounds; bruised galls, 9 pounds; boil in water, and to the mixed liquors add gum-arabic and green copperas, of each 4 pounds; to produce 16 1/2 gallons of ink. Quality very good, but inferior to the above [referring to Cooley's Superior Black Ink].

*Dick's Encyclopedia of Practical Receipts and Processes*, [no date] circa 1870

**Asiatic Black Ink.**

Logwood shavings and powdered galls, of each 2 pounds; green vitriol, 1 pound; gum, 1/2 pound; pomegranate bark, 1/4 pound; water, 1 gallon; infuse 14 days with frequent agitation, or boil as directed in last receipt. This ink writes pale, but flows well from the pen, and soon turns black."

*Dick's Encyclopedia of Practical Receipts and Processes*, [no date] circa 1870

**Good Black Ink.**

Bruised galls, 2 pounds; logwood, green copperas, and gum, of each 1 pound; water, 6 gallons; boil the whole of the ingredients in the water for 1 1/2 hours, and strain 5 gallons. Good, but not fine.

*Dick's Encyclopedia of Practical Receipts and Processes*, [no date] circa 1870

**Common Black Ink.**

Bruised galls, 1 pound; logwood, 2 pounds; common gum, 3/4 pound; green copperas, 1/2 pound; water, 5 gallons; boil. Common,

but fit for ordinary purposes.

*Dick's Encyclopedia of Practical Receipts and Processes*, [no date] circa 1870

### **Exchequer Ink.**

Bruised galls, 40 pounds; gum, 10 pounds; green sulphate of iron, 9 pounds; soft water, 45 gallons; macerate for 3 weeks, employing frequent agitation. This ink will endure for centuries.

*Dick's Encyclopedia of Practical Receipts and Processes*, [no date] circa 1870

### **Black Steel Pen Ink.**

A black ink, not corroding steel pens, and neutral, may be prepared by digesting in an open vessel, 42 ounces coarsely-powdered nut-galls, 15 ounces gum senegal, 18 ounces sulphate of iron (free from copper), 3 drachms aqua ammonia, 24 ounces alcohol, and 18 quarts distilled or rain water. Continue the digestion until the fluid has assumed a deep black color.

*Dick's Encyclopedia of Practical Receipts and Processes*, [no date] circa 1870

### **Glycerine Ink.**

Take copperas, 4 ounces; nut-galls, 12 ounces; logwood, 8 ounces; vinegar, 8 ounces; gum-arabic, 1 ounce; glycerine, 1/2 ounce; water, 48 ounces; all the solid substances are to be pulverized and boiled for an hour together; they are then set to cool, strained through a flannel bag, and after that filtered through a folded filter. A drop of oil of cloves is added, the whole well shaken and filled into bottles. This ink will copy well.

*Dick's Encyclopedia of Practical Receipts and Processes*, [no date] circa 1870

### **Dr. Ure's Ink.**

For 12 gallons of ink take 12 pounds bruised galls, 5 pounds gum, 5 pounds green sulphate of iron, and 12 gallons rain water. Boil the galls with 9 gallons of the water for 3 hours, adding fresh water to supply that lost in vapor; let the decoction settle, and draw off the clear liquor. Add to it the gum previously dissolved in 1 1/2 gallons of water; dissolve the green vitriol separately in 1 1/2 gallons of water, and mix the whole.

*Dick's Encyclopedia of Practical Receipts and Processes*, [no date] circa 1870

NOTES on Dr. Ure's Ink:

This refers to Andrew Ure, author of *A Dictionary of Arts, Manufactures and Mines*, published in 1858 by D. Appleton and Co.

1. "Bruised" galls may indicate fresh galls, and "green sulphate of iron may refer to crystals, not desiccated. (*Submitted by Jack C. Thompson*)
2. "Bruised" might be interpreted to be "freshly crushed galls". (*Submitted by Alex Carter*)

Download and print a modern transcription of the original book by Dr. Ure. See the next item below.

### **"Ink" article in Dr. Ure's DICTIONARY OF ARTS, MANUFACTURES AND MINES**

Edition London 1853 Vol. I, pp 1055-1059

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6 pages. Includes the following: Black, Gold, Silver, Indelible, Red, Green, Yellow, China, Sympathetic (or invisible ink), Stephens patent Blue, Hornung's Blue, Rev. Mr. Reade's 12 instructions

### **Japan Ink.**

Aleppo galls, 1/2 pound; logwood chips and copperas, each 4 ounces; gum-arabic, 3 ounces; sugar, 1 ounce; blue vitriol (sulphate of copper), and sugar candy\*, each 1/2 ounce. Boil the galls and logwood in 6 quarts water till reduced one-half; strain; add the other ingredients. Stir until dissolved. Clear and bottle. If it does not shine enough, add more gum; also a few cloves, to prevent mould.

*Dick's Encyclopedia of Practical Receipts and Processes*, [no date] circa 1870

\* [Note: The term "sugar candy" is not defined in the recipe. *Dick's Encyclopedia*, in a different location, entry 1368, describes five stages that result in different kinds of candy. Which type would have been used in this ink recipe about 1870? You be the judge.]

1. In preparing sugar for candies, &c., the confectioner requires different degrees of boiling.... Well clarified and perfectly transparent syrup

is boiled until a skimmer dipped into it, and a portion touched between the forefinger and thumb, on opening them, is drawn into a small thread which crystallizes and breaks. This is called a **weak candy height**.

2. If boiled again, it will draw into a larger string, and if bladders may be blown with the mouth through the dippings from the ladle, it has acquired the second degree, and is called **bloom sugar**.

3. After still further boiling, it arrives at the state called **feathered sugar**. To determine this, dip the skimmer and shake it over the pan, then give it a sudden flirt or jerk, and the sugar will fly off like feathers.

4. The next degree is that of **crackled sugar**, in which state the sugar that hangs to a stick dipped into it, and put directly into cold water, is not dissolved off, but turns hard and snaps.

5. The last stage of boiling reduces it to **caramel sugar**, and is proved by dipping a stick into the sugar and then into cold water, when ... it will snap like glass. It has now arrived at a full candy height.

### **Ink Powder.**

For an ink powder take 1 pound nut-galls, 7 ounces copperas, and 7 ounces gum-arabic. Pulverize and mix. This amount of ink powder will make 1 gallon of good black ink. Two or three powdered cloves should be mixed with each pound of powder, to prevent moulding.

*Dick's Encyclopedia of Practical Receipts and Processes*, [no date] circa 1870

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### **Runge's Black Writing Fluid.**

This is a cheap and good ink, and resists ordinary destructive agents well. It is perfectly liquid, scarcely thickens by age, deposits no sediment, and does not corrode steel pens. Digest 1/4 pound logwood in fine chips for 12 hours in 3 pints boiling water; then simmer down gently to 1 quart, carefully avoiding dust, grease, and smoke. When cold, decant the decoction, and dissolve in it by agitation 20 grains yellow chromate of potash; it will then be fit for use.

*Dick's Encyclopedia of Practical Receipts and Processes*, [no date] circa 1870

### **Shellac Ink, or Coathupe's Writing Fluid.**

To 18 ounces water add 1 ounce powdered borax and 2 ounces bruised shellac, and boil them in a covered vessel, stirring them occasionally till dissolved. Filter, when cold, through coarse filtering paper; add 1 ounce mucilage; boil for a few minutes, adding sufficient finely-powdered indigo and lampblack to color it. Leave the mixture for 2 or 3 hours for the coarser particles to subside; pour it off from the dregs, and bottle it for use.

*Dick's Encyclopedia of Practical Receipts and Processes*, [no date] circa 1870

### **Arnold's Writing Fluid.**

Arnold's writing fluid is a mixture of sulphate of indigo and ordinary ink [viz., gallotannate ink]. It flows freely from the pen and at last becomes very black. On account of the large quantity of acid it contains, it is very destructive to steel pens, and for this evil we know of no cure.

*Dick's Encyclopedia of Practical Receipts and Processes*, [no date] circa 1870

(NOTE: In the 1940s, I used to purchase "Arnold's Black Japan" ink, which was made in England and sold in brown ceramic jars. I liked the way it flowed from the pen, but its bluish tinge was very disappointing before I found it to be black on some kinds of paper. I did not find it to be destructive to either steel or quill pens as stated above.)

### **Simple Carbon Ink.**

Dissolve 30 grains of sugar in 30 grains of water, to which add a few drops of concentrated sulphuric acid. Upon heating this mixture the sugar becomes carbonized by the acid, and when applied to the paper it leaves a coating of carbon which cannot be washed off. This stain is rendered more perfect by the decomposing action of the ink itself upon the paper, and thus resists the action of chemical agents.

*Dick's Encyclopedia of Practical Receipts and Processes*, [no date] circa 1870

(NOTE: This ink might be acceptable for acid-free, heavy-weight papers, but I believe that it might burn holes through most 20th century papers which have high acid content.)

### **Drawing Ink.**

A very black and indelible drawing ink may be made by dissolving shellac in a hot water solution of borax, and rubbing up in this solution a fine quality of Indian ink. After using, dip the drawing pen in alcohol, and wipe dry to keep it clean and bright.

*Dick's Encyclopedia of Practical Receipts and Processes*, [no date] circa 1870

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### Jewish Scribe's Ink

This recipe was sent by Rabbi Yair Hoffman of Far Rockaway, New York, who obtained it from Rabbi Kilschewsky, a scribe in the Meah Shaarim section of Jerusalem. The recipe likely dates back to a time before the settlement was initiated by the students of Rabbi Elijah of Vilna in the early 1800's. *[posted 2/27/2002]*

- 1] Soak two pounds of gallnuts in two quarts of water for 24 to 48 hours.
- 2] Cook the soaked gallnuts on a small flame for six hours. An electric hotplate or burner would be preferable as it provides a uniform pattern of heat.
- 3] After the gallnuts have cooked on a small flame for six hours heat the mixture on a larger flame until it boils and reaches a mudlike consistency
- 4] Strain the mixture and remove the sediment.
- 5] Place the mixture on the fire once again, but this time in a wide pan and on a low flame.
- 6] Dissolve two spoonful of Kankatum (ferrous sulfate) in a cup of hot water and mix it well.\*[See note below]
- 7] Slowly add the dissolved Kankatum into the gallnut mixture.
- 8] After adding the Kankatum and mixing it thoroughly, add the Gum Arabic (one gram for every two liters of ink of a teaspoon will suffice).\* The Gum Arabic gives it a rubber-like quality ensuring that the letters will not crack on the page. Care should be taken not to add too much Gum Arabic as this would allow the entire letter to slip off the parchment.

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\* [Note: A good ratio to stick to is one gram of Kankatum for every two liters of ink.]

**This is the third of five pages of information about old ink.**

**Next are some interesting [notes about old ink](#).**



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Evan Lindquist  
Artist / Printmaker /Emeritus Professor of Art  
Arkansas State University  
[Contact information](#)



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