

ANCIENT SUNRISE®

Compound Henna



Dark Auburn



Light Blond



Auburn



Light Auburn



Light Brown
Light Chestnut



Reddish Blond



Blond



or Faded Ha

**B. PAUL'S
HENA**

OUND

*ring
Hair*

Why have Gray or Faded Ha

**B. PAUL'S
HENNA**

COMPOUND

*For Coloring
Gray Hair*

Catherine Cartwright Jones PhD

Chapter 3, Compound Henna, part 4: Walnut, Silver Nitrate, and Para-phenylenediamine as Brunette Hair Dye



In the middle of the 19th century, home-made hair dye formulae contained fresh, green walnut husk for covering the grey in brunette hair. These generally followed the well-understood method of dyeing wool a range of brown and black colors with green walnut husks. The indigenous people of North America used walnut (*Juglans nigra* or *J. rupestris*) bark, leaves, hulls, and roots to dye fibers a range of colors from yellow to dark brown.¹ Early settlers found they could mask graying hair by rubbing with green or ripe walnut shells.² The dye molecule in the green walnut husks is juglone, a naphthaquinone similar to lawsone, the dye molecule in henna. People who harvested walnuts in the fall³ or who played under walnut trees as children⁴ knew that their fingers would be stained brown from green walnut husks and also knew that walnut stains could cause blistering rashes.

Walnut (juglone) dye from green walnut husks is a stable vegetal dye for wool which can be used with or without mordants,⁵ and with or without prolonged boiling. That would make green walnut husks a good candidate for hair dye except that other molecules in walnut husk, bark, and roots often cause contact dermatitis⁶ and allergic reactions.⁷

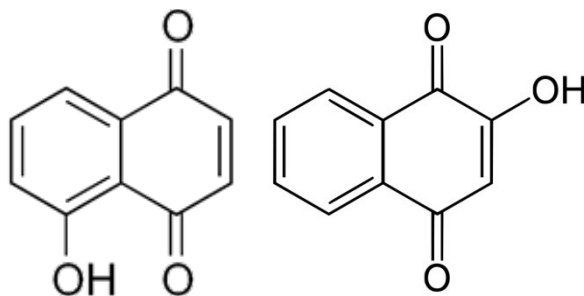
1 Richards, L. "Folk Dyeing with Natural Materials in Oklahoma's Indian Territory" *Material Culture*, Vol. 26, No. 2 (SUMMER 1994), pp. 29-47

2 Roia, F. (1966) "The Use of Plants in Hair and Scalp Preparations" *Economic Botany*, Vol. 20, No. 1 Jan. - Mar., 1966, pp. 17-30

3 Foti, C., Romita, P., Angelini, G., and Bonamonte, D. (2015). "Allergic Contact Dermatitis to Walnut (*Juglans Regia*) Husk." *Indian Journal of Dermatology* 60, no. 6: 622-623.

4 Neri, I., Bianchi, F., Giacomini, F., Patrizi, A., (2006) "Acute irritant contact dermatitis due to *Juglans regia*" *Contact Dermatitis* Volume 55, June 29, 2006 Issue 1, Pages 62-63

5 Nicholson, S. M. and Clovis, J. F. (1967) "Dye Plants and Dye Methods in West Virginia" *Castanea*, Vol. 32, No. 2 (Jun., 1967), pp. 111-116, Southern Appalachian Botanical Society Chrome mordants were used to dye wool khaki with walnut hulls, and alum mordant was used to dye wool brown.



Left: Juglone from walnut 5-hydroxy-1,4-naphthalenedione, an isomer of lawsone:
 Right: Lawsone from henna: 2-hydroxy-1,4-naphthoquinone

Products labeled as walnut juice were marketed as a hair dye in the late 1800s. The Year-Book of Pharmacy, in 1886, reported walnut hair oil formula that darkened hair,

“Walnut Hair Oil (*Chemist and Druggist*): Crush 2 ounces of fresh green walnut shells with 1 ounce of powdered alum to a smooth paste; digest with 10 ounces of benzoinated oil in a waterbath until all aqueous vapour has been driven off. Perfume with two drops of otto of roses and 10 drops of oil of neroli. The walnut shells are best obtained about the end of August or beginning of September. They contain, besides an oil and other constituents, a substance resembling pyrogallic acid, and impart a brown shade to the hair.⁸

The same “Year-Book of Pharmacy” reported another formula for hair dye containing ripe walnut husks.

“Walnut Hair dye (*The National Druggist*): The juice of the fresh walnut rind has been used from time immemorial as a hair dye. Bernschen and Semper have recently communicated to the Berlin Chemical Society a method of preserving it for use in the

6 Craton, D. W., Williams, R. D. (1980) Juglone dermatitis: allergy or irritant? [Chemical (C₁₀H₆O₃) found in black walnut (*Juglans nigra* L.) and other *Juglans* species]. *Proceedings of the Indiana Academy of Science*
 7 Thermo Scientific. Walnut, Allergens. <http://www.phadia.com/en/Products/Allergy-testing-products/ImmunoCAP-Allergen-Information/Food-of-Plant-Origin/Seeds--Nuts/Walnut/> Walnut husks can produce a rich yellow-brown to dark brown dye that is used for dyeing fabric and for other purposes. Husks should be handled wearing rubber gloves, to avoid dyeing one's fingers. Allergens: The following allergens have been characterized:

Jug r 1, a 14-16 kDa protein, a 2S albumin, a major allergen (1,3-9).

Jug r 2, a 44-48 kDa protein, a 7S vicilin globulin, a major allergen (1,3,5-7,10).

Jug r 3, a 9 kDa protein, a lipid transfer protein, a major allergen (5-7,11).

Jug r 4, a legumin-like protein. (5-6,12-13).

Jug r profilin (14).

Jug r 1, a 2S albumin, was shown to be a major allergen in a study of 20 American Walnut-allergic individuals; the allergen bound 75% of the patients' sera. Similarly, IgE binding to Jug r 1 was demonstrated in 12 of 16 (75%) sera from Walnut-allergic patients.

8 Braitwaite, J. O. “Year-book of Pharmacy comprising Abstracts of Papers relating to Pharmacy, materia Medica, and Chemistry contributed to British and Foreign Journals from July 1 1885 to June 30, 1886 with the Transactions of the British Pharmaceutical Conference at the Twenty-Third annual Meeting held at Birmingham September 1886.” Page 306

“Ancient Sunrise® Henna for Hair” Chapter 3, part 4, Walnut, Silver Nitrate, and Para-phenylenediamine as Brunette Hair Dye, Copyright © 2018, Catherine Cartwright-Jones PhD, TapDancing Lizard® LLC www.mehandi.com www.hennaforhair.com www.ancientsunrise.com

shape of a hydroglucoside, prepared as follows: — the rinds of the ripe nut are digested in sulphuric ether until their colouring matter is extracted. A solution of chromic acid in water is added to the ether solution, and the mixture thoroughly agitated. The ether is then distilled off, and the residue purified by solution, first in hot ether and afterward in a mixture of chloroform and petroleum ether, from which latter it is obtained in a crystalline form, as hydrogen glucoside. This substance colours the hair and skin exactly as does the juice of the fresh rind.”⁹

Formulating and Marketing Brunette and Black hair Dye in the late 19th Century: Silver Nitrate, Lead Acetate, Walnut

In the late 19th century, henna, henna-rastiks (pyrogallol, copper, and iron), and to a lesser extent, indigo renga,¹⁰ were available to dye hair brunette and black colors through colonial trade with the Ottoman Empire, Arabia, and North Africa. Piesse, the author of “Useful Information about Hair Dyes,”¹¹ seems to have regarded Northern European cultures, pale skin and hair as superior to that of their conquered territories, and that dyeing hair dark was deplorable, “As a rule, all hair-dyes should be avoided; in almost every case the process is prejudicial to the unities which tend to form that harmonious whole, which we call personal beauty. ... The Teutonic beauty of Anglo-Saxons and Anglo-Normans, has come down to the people of Great Britain along with the practical common sense of the one, and the lofty bearing of the other. The mass of female loveliness which graces the land is therefore essentially " fair" -white and clear- in contradistinction to brown and dark.”

He did concede that premature gray for “Such persons who do not exhibit these marked features of Teutonic extraction, in whose veins commingles the blood of a more southern race ...” might use hair dye “without infringing the principles of the harmony of color”.

Piesse seems to refer to the use of henna in the following statement, “hair is too bright an auburn its redness can be artificially lowered by the application by the application of what the French perfumers name *Eau Crayon*, pencil-water, but which is, called by its right name, simply walnut-water.”¹²

Piesse continues on to describe brunette hair dye techniques as a way to color naturally dark colored hair that is becoming gray with age. Please note: the techniques described here are

9 Braithwaite, J. O. “Year-book of Pharmacy comprising Abstracts of Papers relating to Pharmacy, materia Medica, and Chemistry contributed to British and Foreign Journals from July 1 1885 to June 30, 1886 with the Transactions of the British Pharmaceutical Conference at the Twenty-Third annual Meeting held at Birmingham September 1886.” Page 309

10 For more information on 19th century henna in Europe, see “Compound henna, rasticks, henna-reng, henna-rasticks, and metallic salts” Ancient Sunrise® Chapter 3, Compound Henna, *Ancient Sunrise® Henna for Hair*, Catherine Cartwright-Jones PhD

http://www.tapdancinglizard.com/AS_henna_for_hair/chapters/chap3/henna_reng_rastik_compound.pdf

11 Piesse, S., (1859). “Useful Information About Hair Dyes” *Scientific American*, Vol. 14, No. 41 (JUNE 18, 1859), p. 342, Scientific American, a division of Nature America, Inc.

12 Piesse, S. (1859) “Useful Information About Hair Dyes” *Scientific American*, Vol. 14, No. 41 (June 18, 1859) p. 342, Scientific American, a division of Nature America, Inc.

presented only for historical interest. They are dangerous and extremely damaging to the hair and should not be attempted by anyone. They do highlight the problems of walnut hair dye in that they rely on lead acetate and silver nitrate for color rather than the husks themselves.

“Nearly everybody is familiar with the property of the juice of the walnut husk to stain the skin of a dark brown. By some chemical magic this water can be prepared to darken the hair, and yet not to stain skin.¹³ This liquid, sold by the manufacturing perfumers, is the best for darkening the hair, without, strictly speaking, dyeing it. Walnut water does not darken the hair very rapidly; it therefore requires to be applied repeatedly during several weeks, and the change, however slow, is thus the more natural and unobserved. There are several good recipes to dye grey hair. The quickest dyes have the fault of staining the skin, should any portion touch the skin or scalp by accident,¹⁴ which it is almost impossible to avoid. The slower-acting dyes give more trouble, but are less likely to incur the unpleasant result of staining the skin.¹⁵

“A quick dye is made by dissolving a quarter of an ounce of nitrate of silver in little less than a quarter of a pint of distilled rose or elder water – even common water will do, provided it has been boiled for a few minutes, and then allowed to cool.¹⁶ If the hair be quite clean and freed from grease by first washing it with borax, dissolved in warm water, and then allowing it to get dry, the silver solution has only to be combed carefully through the hair in order to produce the effect desired.¹⁷ If the hair be allowed to remain disheveled and exposed to the action of sunshine, light, and air, the dye will act with increased rapidity; and if it be not dark enough, the dye can be again applied with increased effect. The application of a mordant, such as sulphate of ammonia, will also make the dye "strike" with greater rapidity; but it is a most disagreeable compound, and not to be recommended. Washing the hair with sulphur soap will help all dyes to produce a better color, whether they be walnut-water or silver solution. The best dye is thus prepared: Calcined magnesia, two ounces; quicklime slaked, two ounces; powdered litharge, eight ounces. Having slaked the lime with as little water as possible to cause it to disintegrate, mix the whole of the ingredients well together and they will be ready for use, in the following manner: -Mix the powder with enough water to form a thick creamy fluid; with the aid of a brush, completely cover the hair to be dyed with this mixture. To dye it light brown, allow it to remain upon the hair four hours; dark brown, eight hours; black, twelve hours. As the dye does not act unless it is moist, it is necessary to keep it so by wearing an oiled silk, india-rubber, or other waterproof cap. When the dye has taken effect, the hair has to be washed with an abundance of warm water.”¹⁸

13 Author's note: walnut husk water is a very weak hair stain.

14 This description is consistent with silver nitrate which will stain skin brown unless diluted.

15 Lead acetate or other metallic progressive dye require repeated applications to build up a dark color.

16 Author's note: Diluted silver nitrate will stain hair but not skin.

17 Author's note: Silver nitrate stains skin and can cause burns. The material does not at first stain, it is just absorbed into the skin or hair. Later, exposure to light causes it to darken and then turn jet black. Side effects of silver nitrate include: burning and skin irritation, staining of the skin, blood disorder (methemoglobinemia).

<https://www.bostick-sullivan.com/articles/silvernitrate.html>

18 Piesse, S. (1859). "Useful Information About Hair Dyes" *Scientific American*, Vol. 14, No. 41 (JUNE 18, 1859), p. 342, *Scientific American*, a division of Nature America, Inc.

A walnut hair dye formula without silver nitrate or lead acetate was offered in 1909 in the British Medical Journal. “The following formula for walnut hair dye is given in the Pharmaceutical Journal Formulary: Green walnut shells, 16 oz.; rose water, 4 fl. oz.; alum, 2 oz. Bruise the walnut pericarps and the alum together in a mortar, add the rose water, allow to macerate for four days, then strain and press. To every 3 oz. of expressed liquid add 1 oz. of eau de Cologne or other alcoholic perfume.”¹⁹ A medical paper in 1909 reported injuries from “walnut juice hair dye,”²⁰ though it reported that there had been many more injuries reported from para-phenylenediamine hair dye. These reactions evidence that walnut hair dyes being reformulated by manufacturers, the ‘walnut’ dye products depended more on silver nitrate or lead acetate than walnut to darken hair by simply combing the liquid through the hair and waiting for the stain to darken in the light.

By 1909, there were numerous cases of allergic reaction reported, which may have been caused by walnut juice or unlisted para-phenylenediamine. A note in the 1909 issue of *Drug Topics* reports injuries caused by products labeled as Walnut Juice Hair Dye which are more consistent with para-phenylenediamine injuries than with walnut allergic reactions.²¹

“DANGER IN WALNUT JUICE HAIR DYE

“Hardaway (Interstate Medical Journal) writes that he has seen many cases of dermatitis follow the use of walnut juice as a hair dye. The amount of inflammatory action varies in different persons. Sometimes the attack is acute, involves the face, neck and ears, and presents such an amount of accompanying edema that the eyes are closed and the features unrecognizable. The subjective symptoms are burning and prickling sensations and intolerable tension. In some persons the condition is merely one of subacute inflammation, renewed from time to time by the reapplication of the dye, and limited to the ears and the skin at the margin of the scalp. In persons of an “eczematous habit,” the dye has apparently evoked a veritable eczema, which has extended to the arms and trunk. The hairy scalp itself is not particularly involved, since, as is well known, this region is naturally very insensitive.”

There were two contemporaneous manufacturers of “Walnut Hair Dye” in the United States in the first decades of the twentieth century: Mme. Robinnaire’s Walnut Hair Dye and Mrs. Potter’s Hygienic Walnut Juice Hair Stain. Both initially branded their dye as harmless walnut hair dye; both seem to contain lead acetate or silver nitrate dye at the beginning, or very early in their formulation and manufacture, though their advertising claims denied such. Both later changed to cheaper para-phenylenediamine dye, causing many documented injuries. Both eventually dropped their claims of any association with actual walnut, though they continued to deny the dangerousness of their dye. Mme. Robinnaire’s seems to always have been a local product in Georgia, though distributed by mail to other areas. Mrs. Potter’s walnut hair dye was based in Cincinnati and had a wider distribution in the mid-western and northern states.

19 Letters, Notes, And Answers Source: *The British Medical Journal*, Vol. 2, No. 2480 (Jul. 11, 1908), p. 124

20 Beddoes, T. P., Siebold, L. editor. (1909) *The British Medical Journal*, Vol. 2, No. 2543 (Sep. 25, 1909), p. 918

21 Hardaway, (1909) “Danger in Walnut Juice Hair Dye” *Drug Topics*



Mme Robinnaire's Walnut Hair Dye Atlanta GA²²
Advertised between 1897 and 1917

Sequential advertising texts for Mme Robinnaire's Walnut Hair Dye Atlanta GA. in the Atlanta Constitution provide clues to the contents of the small purple bottle.

The 1903 ad for Mme. Robinnaire's Walnut Hair Dye, states that the dye "instantly restores faded or gray hair to natural color" and "one application" implies that this is not a lead acetate or progressive dye requiring multiple applications to achieve color. It may have been a silver nitrate dye, or possibly an early oxidative dye. Though the 1903 advertisements in Munsey's magazine, volume 29 and Wiltshire's Magazine, issue 65, claimed that Mme Robinnaire's contained only plant dyes, it is very unlikely that this dye is actually walnut-based.

Transcription of ad from Madame Robinnaire's Walnut Hair Dye, 1903 Atlanta Constitution is:

"Mme. Robinnaire's Walnut Hair dye

"Instantly restores faded or gray hair or whiskers to natural color. Easily applied. Only one application required. The most perfect hair restorer made. Cures dandruff and falling out of the hair. Small, 25¢. Large 75¢., post-paid. Write for booklet toilet preparations. Jacobs' Pharmacy,²³ Atlanta, Ga."

²² Collection of author, Catherine Cartwright-Jones PhD

²³ Jacobs' Pharmacy in Atlanta Georgia was run by Dr. Joseph Jacobs, a pharmacist and innovator of 'the American drug store.' He claimed to be the first seller of Coca-Cola in his drug store soda fountain, beginning May 8, 1886.

By 1905 and 1906, the advertising claims for Mme Robinnaire's Walnut Hair dye were more lavish and include more implied criticism of competitor's dyes while making what were probably false claims about its own composition, based on contemporaneous pharmaceutical papers on hair dye.²⁴ Transcription of advertisement for Madame Robinnaire's Walnut Hair Dye, 1905 Atlanta Constitution is:

"Mme Robinnaire's Walnut Hair Dye

"Of the many hair dyes and similar preparations now on the market, nearly all have serious faults. Few are of any real value and none can be compared with Madame Robinnaire's Walnut Hair Dye which is, unquestionably, the most valuable article of the kind ever offered to the public. Its merits are recognized by thousands of satisfied users in this and other countries and its sales have grown to enormous proportions.

"Madame Robinnaire's Walnut Hair Dye is made from the pure juice of the black walnut (*Juglans Nigra*) and contains no minerals or injurious drugs or chemicals. It renews faded or gray hair, producing with wonderful faithfulness the natural shade of brown or black and giving the hair a rich glossiness. No one should allow the hair or whiskers to remain gray or faded when three or four applications a year of this wonderful preparation will bring back the color and beauty of youth.

"But Madame Robinnaire's Walnut Hair Dye does more than merely color the hair. It stimulates the scalp, tones up the roots of the hair and causes a luxuriant growth. It keeps the scalp in healthful condition and prevents and cures dandruff and other scalp troubles. It strengthens the hair and makes it soft and silky instead of dry and brittle.

"Every man and woman whose hair is losing its natural color, turning gray or fading, should test the efficacy of Mme. Robinnaire's Walnut Hair Dye by a trial. No other similar preparation or imitation possesses its merits, while many are positively dangerous to use.

"It can now be had of leading druggists in many cities, but wherever there is no local dealer it will be sent, postpaid, upon receipt of price by Jacobs' Pharmacy, Co., Atlanta Ga."

In 1909 and 1910, the advertising copy specified that there were four different colors available. Transcription of advertisement for Madame Robinnaire's Walnut Hair Dye, 1909 Atlanta Constitution is:

"Madame Robinnaire's Walnut Hair Dye

In 1929, Dr. Jacobs wrote an article for *Drug Topics*, an industry magazine for the pharmacy trade, describing the soda fountain in his building. "On the right-hand side of the entrance was a soda fountain ... The fountain enjoyed a wonderful reputation and did a large business. It averaged fully \$150.00 a day from the various drinks." 24 Beddoes, T. P., Siebold, L. editor. (1909) *The British Medical Journal*, Vol. 2, No. 2543 (Sep. 25, 1909), p. 918

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“Preserve your charms by preserving that which above all else is the secret of your charms – your hair. Beautiful hair means a beautiful woman. Faded, scanty, or gray hair is an indication of old age, no matter what your years may be. Mme. Robinnaire’s Walnut Hair Dye restores the hair to its original color, gives it life, vigor and luster.

“Choice of four shades – black, brown, dark brown and light brown. Will not fade. Small (trial) size 25¢. Large size 75¢. Sent postpaid anywhere.”

In 1917, the product no longer claimed to contain any walnut, the advertisement was small, and did not state any indication of the chemical composition. It was available in four different colors. Transcription of ad for Madame Robinnaire’s Walnut Hair Dye, 1917 Atlanta

Constitution:

“Robinnaire Hair Dye Restores Natural Color

Keep the original, the natural color of your hair. Mme. Robinnaire’s hair dye can be used with perfect confidence that your original color and soft texture of your hair will be restored and maintained. It comes in black, brown, dark brown, and light brown. Any desired shade may be given (sic) the hair. Trial size 25¢. Regular size \$1.00. Manufactured only by Jacobs’ Pharmacy Co., Atlanta GA.

Mme. Robinnaire's also produced a face bleach, “A Perfect Beautifier,” to remove tan, moth patches, pimples, and was claimed to remove freckles in three to five days. Mme. Robinnaire's Powder claimed to be an absolutely pure and extremely fine rice powder, free from bismuth and arsenic.²⁵

Advertising Text for Mrs. Potter’s Hygienic Walnut Juice Hair Stain, in 1903, “Everybody’s Magazine,” was very similar to Mme. Robinnaire’s text.

“Gray Hair Restored Mrs. Potter’s Hygienic Walnut Juice Hair Stain

“Is the only strictly vegetable and perfectly harmless stain for restoring prematurely gray hair, white patches caused by fever, etc. It has no odor, and blends so perfectly with the natural color of the hair that experts cannot detect it. It does the work beautifully and inexpensively. Ordinarily one bottle will last a year. “The highest Medical Authorities on the Hair in America and Europe endorse and recommend WALNUT JUICE as the safest and best hair stain. Thousands of educated and refined society people everywhere use it regularly. Stains any shade – from light golden brown to almost black. Tresses that have been ruined by chemical dyes or worthless stains are quickly restored. It does not burn the hair nor rub off on clothing. Good results are guaranteed to every customer. Price \$1. Per bottle. MRS. POTTER’S HYGIENIC DEPOT, 179 Groton Building, Cincinnati, Ohio.”

25 Advertisement in “Silhouette A. S. C.,” 1907, Agnes Scott College, Decatur Georgia.

GRAY HAIR RESTORED



**Mrs. Potter's Hygienic
Walnut Juice
Hair Stain**

Is the only strictly vegetable and perfectly harmless stain for restoring prematurely gray hair, white patches caused by fever, etc. It has no odor, and blends so perfectly with the natural color of the Hair that experts cannot detect it. It does the work beautifully and inexpensively. Ordinarily one bottle will last a year.

The highest Medical Authorities on the Hair in America and Europe endorse and recommend WALNUT JUICE as the safest and best Hair Stain. Thousands of educated and refined society people everywhere use it regularly. Stains any shade—from light golden brown to almost black. Tresses that have been ruined by chemical dyes or worthless stains are quickly restored. It does not burn the hair nor rub off on the clothing. Good results are guaranteed to every customer.

Price \$1.00 per bottle, by mail, in plain wrapper. Write for booklet and "Mrs. Potter's Talk to Ladies on the New Hygiene," a pamphlet replete with valuable information and new ideas on Physical Form and Beauty which every lady should know. Address

**MRS. POTTER'S HYGIENIC DEPOT,
179 Groton Building, Cincinnati, Ohio.**



Left: Mrs. Potter's Hygienic Walnut Juice Hair Stain,²⁶ 1903 "Everybody's Magazine"²⁷
Right, Bottle of Walnut Juice hair dye from Mrs. Potter's Hygienic Supply Co. Cincinnati, Ohio²⁸

Based on the size of Mrs. Potter's bottle containing the liquid and the instructions given, this product contained little, if any walnut juice. Combing a small amount of walnut juice, even if concentrated, through the hair would not have effectively covered gray. Dilute silver nitrate or lead acetate would have been more probable.

Advertising text for 1905 Red Book magazine advertisement for Mrs. Potter's Walnut Juice:

"Why Have Gray Hair?

Look Young It Pays

Gray Hair is costly. Society and business demand "Young Blood."

Stains gray, bleached, faded, and patchy hair, or beard, a beautiful modest brown, so natural in appearance that even experts cannot detect it. The shade may be made lighter or darker, as desired, to suit each individuality. Stains nothing but hair. Does not show on scalp. Makes no muss. Does not rub or wash off. Does not make hair conspicuous. Best remedy for "Bleached" and "Chemical Blonde" Hair. Very easy to use.

Enough to Last One Year for \$1.00

²⁶ Collection of author, Catherine Cartwright-Jones PhD

²⁷ "Everybody's Magazine" was founded in 1899. The editor, John O'Hara Cosgrave, was fully committed to investigative journalism. In August, 1902 the magazine published an article by Frank Norris exposing corrupt business dealings in agriculture. This was followed by another article on the treatment of miners, Life in the Mining Region (September, 1902). These articles established it as a magazine concerned with social justice. However, its critics described it as muckraking journalism.

²⁸ Image owned by and used with permission of Don Fadely.

At drug stores, or by mail prepaid, in plain sealed wrapper.
Money refunded without argument if not fully satisfied.
Mrs. Potter's Hygienic Depot 15 Groton Bldg. Cincinnati, Ohio"



1905 Red Book magazine advertisement for Mrs. Potter's Walnut Juice²⁹

Marketing Para-phenylenediamine as Walnut Hair Dye in the Twentieth Century

By 1912, Mrs. Potter's had changed the product name to Walnut Tint Hair Stain, and the colorant was para-phenylenediamine. The product was sold with two liquids in bottles, and advertised as, "BROWN YOUR HAIR. Send for a trial package . . . Mrs Potter's Walnut Tint Hair Stain with your comb. Stains only the hair, doesn't rub off, contains no poisonous dyes,³⁰ sulfur, lead or copper. Has no odor, no sediment, no grease. One bottle of Mrs Potter's Walnut Tint Hair Stain should last a year. Sells for \$1.00 per bottle at first-class Druggists. We guarantee satisfaction."³¹

The formula seemed to have been changed after 1905 when the dye was released as a two-bottle product. After many injury reports, the new Mrs. Potter's Walnut Juice Hair Stain was analyzed by chemists and reported to the American Medical Association.³²

"This preparation is manufactured by the Mrs. Potter Hygienic Supply Company, Cincinnati, Ohio. It was analyzed by the chemists of the North Dakota Agriculture Experiment Station, who found it to consist of two liquids called No. 1 and No. 2, respectively, which according to directions were to be mixed before the dye was applied to the hair. Analyses showed bottle No. 1 to contain 1.86 per cent, absolute hydrogen peroxide; bottle No. 2 contained "a strong alcoholic liquid of a light brown color

²⁹ Collection of author, Catherine Cartwright-Jones PhD

³⁰ This product contained para-phenylenediamine.

³¹ "Woman Beautiful Magazine," 1910 advertisement original transcribed by Don Fadely, used with permission.

³² 1913 "Nostrums and Quackeries" Articles on the Nostrum Evil and Quackery Reprinted from the Journal of The American Medical Association. Journal of The American Medical Association. Press of American Medical Association, Chicago

containing 54.45 per cent.' absolute alcohol by volume." No lead, bismuth or mercury compounds were detected. The report goes on to state that "the active principle of the dye appears to be a phenolic compound, and conforms to the tests, etc., for paraphenylenediamine, an aniline derivative which by oxidation becomes black or brown."



Mrs. Potter's Walnut Tint Hair Stain, bottles No. 1 and No. 2
Containing no walnut; the dye is para-phenylenediamine with peroxide. ³³

"The poisonous qualities of paraphenylenediamine have long been known. Eighteen cases of poisoning have been reported by Cathelineau. Brocq described a severe form of dermatitis due to this chemical; Balso reports a case of poisoning due to wearing hose which had been dyed with the chlorate of paraphenylenediamine, and Mewborn reported a case of dermatitis from the use of a hair dye having this chemical for its base.

"A number of cases of poisoning due to the use of Mrs. Potter's Walnut Juice Hair Stain have been reported to" THE JOURNAL. They are as follows:

Feb. 13, 1909, Dr. A. Schalek, Omaha, Neb., 1 case.

March 6, 1909, Dr. W. W. Barker, Dorchester, Mass., 1 case.

March 15, 1909, Dr. W. W. Harrington, Spokane, Wash., 1 case.

³³ Image owned by, and used with permission of Don Fadely.

March, 17, 1909, Dr. J. D. Gold, Bridgeport, Conn., 1 case.
April 7, 1909, Dr. E. N. Ewer, Oakland, Cal., 1 case.
May 15, 1909, Dr. J. H. Mackay, Norfolk, Neb., 1 case.
Aug. 13, 1909, Dr. E. A. Hannum, Cleveland Ohio, 1 case.
Aug. 18, 1909, Dr. J. G. Burke, Pittsburg, Pa., 1 case.
Aug. 18, 1909, Dr. W. W. Wood, Jamestown, N. D., 1 case.
Sept. 6, 1909, Dr. P. S. Roy, Washington, D. C, 1 case.
Sept. 8, 1909, Dr. D. V. Traver, Steelton, Pa., 1 case.
Sept. 13, 1909, Dr. M. L. Emerson, Oakland, Cal., 1 case.
Sept. 14, 1909, Dr. A. S. Storey, Cleveland, Ohio, 4 cases.
Sept. 21, 1909, Dr. B. Stanton, Cincinnati, Ohio, 5 cases.
Oct. 22, 1909, Dr. A. P. Good, Philadelphia. Pa., 2 cases.
Sept. 21, 1910, Dr. P. R. Straight, Bradford, Pa., 1 case.
Oct. 4, 1910, Dr. H. B. Ormsby, Cleveland, 1 case.
Oct. 17, 1910, Dr. H. K. Gaskill, Philadelphia, 3 cases.
Nov. 29, 1910, Dr. F. Eft, Philadelphia, 1 case.
Jan. 26, 1911, Dr. G. M. MacGregor, Garfield, Wash., 1 case.
April 27, 1911, Dr. F. T. Woodbury, Ft. D. A. Russell, Wyo., 1 case.
June 7, 1911, Dr. E. W. Rowe, Lincoln. Neb., 1 case.

“As this dye does not depend for its action on walnut juice, the name would seem to constitute misbranding within the meaning of the national Food and Drugs Act. This may account for the change that has been made in the name of the preparation. We now find it labeled not "Walnut Juice" hair stain, but "Walnut Tint."

“In the newspaper advertisements, however, we still (October, 1909) find it advertised as "Walnut Juice" Hair Stain, and the deception is carried still further in some cases by an accompanying picture of a woman with a basket on her arm with the legend under it "Gathering Walnuts." (From The Journal A. M. A., of various dates, with additions.)”³⁴

Walnut Powder as Hair Dye

J. L. Hopkins & Co. Inc sold bulk powders and herbs such as damiana, sarsaparilla, cannabis, and henna in the early to mid twentieth century. Hopkins sold reliably unadulterated Egyptian henna powder, as well as a ‘bronzing’ henna powder, and a ‘white henna’ powder that was hydromagnesite, hydrated magnesium carbonate. Hopkins produced a walnut blending powder, with instructions to use it as a pack, mixed with henna.

Text on front of J. L. Hopkins & Co. Inc Walnut Blending Powder package:

“1 lb Net Hopkins’ Black Walnut Blending Powder

34 1913 “Nostrums and Quackeries” Articles on the Nostrum Evil and Quackery Reprinted from the Journal of The American Medical Association. *Journal of The American Medical Association*. Press of American Medical Association, Chicago

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Guaranteed not to contain coal-tar dyes or derivatives. Effective as a coloring agent for gray hair, when used with Hopkins' Rajah Brand Egyptian Vegetable Henna.
A Wholly vegetable Product.

J. L Hopkins and Co., Inc. Importers, Millers and Manufacturers

The Earth Contributes and J. L. Hopkins and Co. Distribute Cosmetic Basic Materials”



J. L. Hopkins & Co. Inc Walnut Powder, 1930's³⁵

Directions on side of J. L. Hopkins & Co. Inc Walnut Blending Powder package:

“Directions:

“The average pack contains from 2 to 4 parts of Henna and 1 to 2 parts of Black Walnut Blending Powder, depending on individual taste and the amount of gray mixture in the hair.

“The first step is to shampoo the hair and rinse it thoroughly so that every particle of soap is removed. Clear warm water for rinsing is sufficient.

“Henna, Black Walnut Blending Powder and water are boiled slowly until all lumps have dissolved. The mixture should not be too thin. The pack is applied directly to the hair with the hands, which is advisable to protect with rubber gloves of good quality.

“Starting at the back of the head, the preparation is worked into the hair with a rotary movement from the base of the neck to the crown of the head.

35 Collection of author, Catherine Cartwright-Jones PhD

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“When the entire head has been covered, place a warm damp cloth or towel over it to keep the paste on the head securely.

“After the pack has been on the required time, the hair is immediately shampooed. The shampoo must be very thorough so that all the paste is removed. This prevents streaking.

Users of this product will be interested in Hopkins’ Rajah Brand Egyptian Vegetable Henna.”

The remnants of powder left in the Hopkins’ box are consistent with powdered walnut husk.

Testing Walnut Powder on Hair

To test Hopkins’ claims for walnut hair dye, and claims of current online blogs, I tested walnut powder as a hair dye without alum or other mordants, and without a boiling application as is done with wool. The walnut husk powder produced a blackish and paste when mixed with a mildly acidic liquid for an eight hour soak. Boiling walnut powder also produced a blackish paste and liquid, but when hair was immersed in the liquid, it was not stained. If there was little or no stain, it could not have covered gray as claimed by the early twentieth century manufacturers of walnut hair dye. The most reliable way of staining keratin with walnut is to use the green husks.

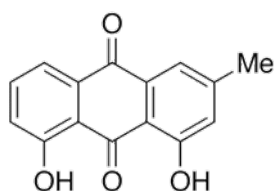
This walnut powder was sourced is certified organic black walnut hulls powder organic *juglans nigra*, origin USA,³⁶ the same black walnut hulls that produced brown dye for indigenous North American people and colonists. Green walnut husks were used for traditional dye; the green husks also have the greatest likelihood of causing an allergic reaction, so personal experimentation should be done with caution.



36 The walnut powder was sourced from Starwest Botanicals, April 2018. The package declares it is certified organic black walnut hulls powder organic *juglans nigra*, origin USA. There is a warning on the package, ‘prolonged use is not advised due to the presence of significant quantities of juglone, a known mutagen in animals.

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This is plain unprocessed white mohair; identical hair was used in each of these dye tests. Natural untreated, undyed, and unprocessed mohair serves as a reasonably consistent facsimile of human hair for dye testing. White farm-raised mohair has the advantage of not having variables caused by shampoos, conditioners, perms, straighteners, or previous dyeing, as well as being inexpensive and more easily available than human hair. The farmed mohair keratin is harder-surfaced than human hair, so I usually apply the dye paste for a longer time to more closely approximate the results on human graying hair.



Chrysophanol, the anthraquinone dye molecule in cassia obovata

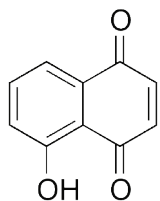


This is identical white hair dyed with Ancient Sunrise® cassia paste, mixed 8 hours ahead of time, applied to the hair, covered for 12 hours, and then rinsed with warm water. The pale golden color is typical of cassia obovata; the dye molecule is chrysophanol, an anthraquinone, a less robust keratin dye than the henna lawsone quinone.



Above is identical white hair with ½ Ancient Sunrise® cassia paste and ½ powdered walnut husk paste, mixed 8 hours ahead of time, stirred together, applied to the hair, covered for 12 hours, and then rinsed with warm water. The addition of walnut powder made the cassia dye slightly more

golden, certainly not brown, and it was very difficult to rinse all the walnut particles from the hair.



Juglone, the quinone dye molecule in walnut hull

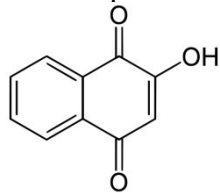


Above is identical white hair with powdered walnut husk paste, mixed 8 hours ahead of time, applied to the hair, covered for 12 hours, and then rinsed with warm water. The walnut husk residue was very difficult to rinse from the hair. The walnut powder paste stained the hair, but it did not stain the hair a brown color. Juglone is an isomer of lawsone and the color resembles a weak lawsone stain. In an additional test, walnut hull powder and water were simmered for half an hour, then the same white hair was immersed in walnut hull water for several hours without a caustic mordant or additional boiling, as would be necessary for skin application. Though the hair was initially coated with thick, blackish liquid, all of the color rinsed away in the first washing. ‘Walnut water’ from boiling walnut powder left no stain on the hair whatsoever; some dye was released with the acidic mix.



Above is identical white hair with ½ Ancient Sunrise® henna and ½ powdered walnut husk paste, both mixed 8 hours ahead of time, stirred together, applied to the hair, covered for 12 hours, and then rinsed with warm water. The addition of walnut powder made the henna dye

slightly more golden, but was very difficult to rinse all of the walnut particles from the hair. The addition of the walnut paste seems to have had negligible effect on the henna stain.



lawsone, the naphthaquinone dye molecule in henna



This is identical white hair with Ancient Sunrise® henna paste mixed 8 hours ahead of time, applied to the hair, covered for 12 hours, and then rinsed with warm water.

All of these samples were photographed 24 hours after rinsing the pastes from the hair.

Conclusion: the dye molecule in walnut hulls, when dried, and powdered, and mixed into a paste in a manner similar to henna, does not seem to be effective in dyeing hair brunette. Water from boiling walnut hull powder does not appear to leave any stain on hair at all. Walnut powder is difficult to rinse from hair and causes blistering allergic reactions, so walnut powder should be considered a poor candidate for hair dye. Claims for the efficacy of walnut as hair dye are improbable. It appears that juglone binds poorly with hair unless in a glucoside or aglycone precursor state, which seems to occur only in the green husk.

Ancient Sunrise® Henna for Hair Chapter 3, Compound Henna, Part 4, Walnut, Silver Nitrate, and Para-phenylenediamine as Brunette Hair Dye

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