

Chapter I:

Introduction: The Emergence of Henna into the West and the Need for a Systematic Study of Henna



Figure 1: Henna body art: stain on skin (Cartwright-Jones, 2005)

“ I didn’t know white people did henna!” (Indian-American girl observing Catherine
Cartwright-Jones apply bridal henna to her older sister: Mansfield, Ohio, 2005)

During the last twenty years, henna body art has emerged from South Asia, the Levant, the Arabian Peninsula and North Africa into the popular culture of the USA, Canada, Europe and the UK (Maira, 2000). The western world has little understanding of henna, its techniques, traditions or history, and no legal or commercial framework for definition or regulation of henna. There have been scattered mentions of henna in anthropological, botanical, medical, historical, economic and legal literatures, but there has never been an integrated multidisciplinary study of what henna is. There is no resource on henna that includes where it was used, when it was used, how it was used, why it was used, who used it, nor have these elements been linked. The lack of a coordinated source of information about henna hampers not only academic for discussion about henna's history and traditions, but stands in the way of ordinary people's understanding and enjoyment of henna.

In this first chapter, I will demonstrate the need for a scholarly investigation of henna, particularly the historic regions of henna body art. Chapter two will define the criteria for investigating henna. Chapter three will test the usefulness of the proposed criteria. Chapter four will show how historical regions of henna can be mapped based on these investigations. Chapter five will propose the potential use of mapping the geographies of henna.

Problems Created by Henna's Rapidly Changing Geographies

Henna body art surged into the west following the 1998 release of Madonna's music video "Frozen", when the "Om" patterns on her hands were viewed by millions of people who had never seen henna before. Henna kits and henna tattoos were suddenly the hottest impulse purchase everywhere (Maira, 2000). However, indigenous understanding of techniques, traditions and context did not accompany the shipments of henna powder and paste. The only written references on henna application and traditions were a few popular press publications, quickly published to ride the pop culture profit wave. These either promoted fashionable henna artists (Roome 1998, Batra & Wilde, 1999), or were meant to sell henna products (Marron 1998, Fabius 1998). Though these gave westerners a "beginners guide" to henna, they did not provide substantive information about the science, art, history and traditions of henna.

An artist must have high quality henna, skill and experience to make get good results from their work. Patrons must understand that they have to keep the henna paste on the skin for several hours, and allow the resulting stain to darken for the following two days. When artists and patrons became impatient with traditional henna techniques, and were unable to find training, they often abandoned henna, substitute a fast-acting, cheap, widely available chemical hair dye: black para-phenylenediamine. This was sold as "black henna." Para-phenylenediamine paste makes a fashionably black stain on

skin within an hour, similar in appearance to a needle tattoo. Para-phenylenediamine “black henna” causes severe injuries as seen in Figure 3, and has become a major health concern around the world (Sosted, Johansen, Andersen, & Menné, 2006).



Figure 2: Street side artists attract clients with signs of “henna tattoos”
(Cartwright-Jones collection, Greece, 2003)

Figure 2 shows a typical western “henna” sidewalk artisan, working a summer beachfront location on a Greek island, not very different from sidewalk henna artists around the world. This artisan advertises “black henna”. There is no such plant as “black henna.” These “black henna” tattoos are popular in vacation resorts around the world, and tourists are unaware that this is not henna, and are often injured by the para-phenylenediamine pastes (Van den Keybus, Morren, & Goossens, 2005). The USA

placed a ban on imports of henna for body art following the rise in popularity of “black henna”, and confusion over the cause of the injuries.

In Los Angeles, one of the first areas of henna emergence in the USA, sidewalk henna artists set up on the Third Street Promenade in Santa Monica in the late 1990’s, similar to those in figure 2. Because neither artists nor patrons were familiar with henna, sidewalk artists substituted para-phenylenediamine for henna, marketing it as “black henna”. Inevitably, a purchaser developed injuries similar to Figure 3, and sued the city of Santa Monica. The city subsequently banned henna body art. The city may have been unaware that para-phenylenediamine, not henna, was the causative factor in injury, or it may have been unwilling to police artists’ mixes for the chemical (White & White, 2001). This sequence has been repeated in many countries.



Figure 3: Blistering and scarring from para-phenylenediamine applied to skin, sold as a “black henna tattoo” in Rome, Italy (Willett, 2005)

An example of the problems created by this lack of information about henna in the west is a discussion at alt.religion.Christian.biblestudy, June 30, 2005, thread 18, an online

use group (Willitt, 2005b). Willitt writes, “I have challenged gods, all of them, to show themselves. Many times. No result. Two weeks before the latest effort my daughter on a school trip to Rome has a "henna tattoo" done which she reacts to a week later, as many people have done before. This you take to be a Holy Sign from God. So your god gives my daughter a sign that she may bear for the rest of her life as a lesson to me? Mysterious ways? Tell me about it!” Willitt shows his daughter’s injury, Figure 2, in his weblog (2005a), and writes further about it, “The reason for the heart-to-heart ... was to tell her that a Christian has put down her problems with the henna tattoo to the wrath of his ever loving and merciful God.”

The misconceptions about henna in this statement are not unusual, and evidence the problems of henna’s emergence into a geographic area where there is no traditional knowledge of henna. The problems in this are:

1. The skin reaction referred to by Willitt is not from henna, which is virtually harmless, but to para-phenylenediamine black hair dye (Stante, Giorgini, & Lotti, 2006.)
2. The street artist in Rome incorrectly termed para-phenylenediamine as “black henna.” This is often done to create a fast black skin stain by people who do not know how to safely mix and apply henna.
3. The British purchaser did not know that there is no such plant as “black henna”, and did not know that henna never leaves a black stain on the upper arm.

4. Local regulations did not distinguish between safe application of henna and dangerous application of para-phenylenediamine paste.
5. The Western writer construes that the blistering and scarring may be an example of the Christian God's judgment against henna, a practice indigenous to "Oriental" cultures.

If the street side artist, the purchaser, and the local regulators understood what henna is, what it is not, how it is applied, and what the history and traditions of henna are, Willit's daughter would not have been injured. The understanding of henna is implicit in the cultures where it has been used safely as body art for thousands of years. The understanding of henna in the cultures where it has recently emerged is poor, and practices are unsafe!

In the USA, there is a fundamental contradiction in the legal status of henna based on lack of information about the history, traditions and use of henna. The USA presently allows henna to be unconditionally imported as hair dye: FDA Code of Regulations, Title 21, Volume 1, Chapter 1, Part 73, Sec. 73.2190: Henna, but forbids the use of henna for body art (FDA, 1997). Customs is charged to confiscate all henna entering the USA that has any evidence that it will be used for body art, "In April, 1997, LOS-DO examined two shipments of a hair color product, brand names Zarqa and Almas, or color additives. Neither product has directions for use. However, the labels for both products declare henna as the sole ingredient and depict designs on the hands and feet.

The color additive regulation 21 CFR 73.2190 specifically allows for the safe use of henna in coloring the hair only. The regulation does not allow for the safe use of henna to make colored designs directly on the skin, including the hands and feet.” Most of the female population of South Asia, the Levant, North Africa and the Arabian Peninsula adorn their hands and feet with henna at least once in their lives, usually at a wedding, and may use it regularly for celebrating social and religious holidays. Adverse reactions in adults are extremely rare. Dermatologists regard henna as virtually harmless for use in staining skin, (Jung et al, 2006), and henna has been used as body art for thousands of years. The FDA ruling was put in place before there was any awareness that henna was used as a body art in other countries, and before there was a significant immigrant population in the USA that would want to retain henna as part of their traditional culture.

A thorough investigation of henna, enabled by defining of what henna is and is not, is crucial to legal, marketing, health, safety, ethnic and religious issues surrounding henna’s present introduction into western culture. Up to this point, there has been no organized study of henna, not even a set of criterion for undertaking that study. This paper proposes to identify the components that would make it possible to construct the history of henna, its traditions, its art and science: a geographic approach to henna.

Perspective:

I have been in a unique position to view the emergence of henna into the west, and the problems and potential created by this emergence. I have been a henna artist and researcher since 1990. Most of the body art photographs in “Developing Guidelines on Henna: a Geographical Approach” are my own henna work. I have had the opportunity research henna history in the archives of the Bodleian and British Libraries, funded by a grant from the Iranian Heritage Foundation. From these experiences as an artist and researcher, I am very familiar with henna and its interaction with skin. I currently own and operate hennapage.com, the henna website consistently ranked top on search engines since its inception in 1996. During June 2006, The Henna Page had over seven thousand visitors per day, according web stat report from the Visox.net. I also own and operate a business importing and exporting henna, and am familiar with the logistical problems of moving henna across through the legal, cultural, and financial networks. I organize and lecture at the International Henna Conferences, where I am able to meet and work with henna artists from around the English-speaking world. Through these contacts, business records and my academic research, I have been able to observe the movement of henna, and gather information on the emerging and ancient geographies of henna.

The Lack of a Systematic Study of Henna

The western academic community has paid scant attention to henna. As a women's tradition, it was not easily available to male anthropologists and explorers, nor was body art studied seriously as a cultural expression until recently. Henna and HipHop (Maira, 2000) has a thorough and insightful analysis of henna's explosion into the western pop fashion industry in the late 1990's, but does not attempt to set this into an understanding of the plant, the traditions, nor the history of henna. Field (1958) compiled a literature review of mentions of henna from a wide range of sources, including the Ebers Papyrus, Josephus, Pliny III, and Clement of Alexandria through colonial travelers such as Sonnini, Lady Burton, and Tavernier. Rather than illuminating the history of henna, this revealed that there had never been more than sporadic and disconnected mentions of henna by western observers.

Westermarck (1914 and 1924) documents details of henna traditions in Morocco in the early 20th century, but do not elaborate on the specific materials, techniques, or the artists. Sijelmassi (1974) draws some of the patterns used for henna in his larger work on Moroccan art. Messina (1988) writes about women's henna parties in Morocco, with more detail than her predecessors about the patterns, events, and social purposes. Tauzin writes in great detail about contemporary henna art in Mauritania, and makes a small attempt to assemble some historical references, but falls back on the same phrase

spoken in different ways throughout the literature, “L’utilisation du henné est très ancienne, en même temps que le sens à lui donner demeure souvent obscur” (Tauzin, 1988:11). All authors make it clear that henna is longstanding and an integral part of the culture, but they offer neither specifics of its origins nor its connections with henna use in other cultures.

A few indigenous authors have written about henna, though it is unusual for mostly male writers to take much notice of what is essentially a women’s art. Saksena (1979) details Rajasthani henna patterns and traditions, but fails to interview or quote any Rajasthani women when discussing henna. He offers his own opinions on henna, such as “Mehndi acts like a charm and would keep your begums confined to their harems if their hands were decorated with mehndi once a week. Then they would need no guards and no chains to hold them (p. 96).” He offers some unfortunate advice on mixing henna, such adding of kerosene to the henna paste (p. 59). He makes some unusual claims for henna, “if the paste were tied round the joints of a horse’s legs, he would go four to five hundred miles without feeling any fatigue” and “a bandage of wet mehndi cures the severest of headaches (p. 96).” Saksena also states that there is no Muslim tradition of patterned henna, and that henna looks dirty and messy on dark skinned people, contradicting abundant evidence of complex henna art in Moorish Spain, Iraq, and Iran in the 12th through 17th centuries, and African henna traditions. Saksena is under the impression that henna originated in India and traveled west from there, a premise widely contradicted by archaeological evidence. “The Victim and Its Masks”

(Hammoudi, 1993) mentions the use of henna for Id sacrifice by the Ait Mizane of southern Morocco but does not connect sacrificial henna to range of other henna practices, nor does he attempt to illuminate the history of the practice.

Old medical texts have useful references for placing henna in historical geographies: The Ebers Papyrus, written around 1550 BCE in Egypt details the medicinal attributes of henna grown in soils of differing moisture content, and characteristics of different parts of the plant (Bryan, 1974). Medicine of the Prophet (Al_Jawziyya, tr. Johnstone 1998) lists specific uses for henna, including treatment of migraines. However, medical texts do not concern themselves with henna as body art.

Descriptions of cosmetics and cosmetic formularies are a useful source of historical placement for henna. Ovid's verses about women's cosmetic habits imply Roman women dyed their hair with henna (Schmidt, 1924: 26). Early editions of Chemist and Druggist provide articles on henna as hair dye, as well as historical mentions, such as that the Dialogues of Lucian mention that Greek women tinted their hair and nails with henna (Chemist and Druggist, 1932). Chemist and Druggist (1926) also sheds light on the confusion surrounding the introduction of henna into the west: the wide varieties of henna hair dye with undeclared ingredients. "Neutral henna", "red henna" and "black henna" were widely sold for blonde, red, and black hair. Only red henna was actually *lawsonia inermis*. Neutral henna was *cassia obovata*, and black henna was *indigofera tinctoria*. The dried powdered leaves of all of these plants appear very similar.

Exporters of these hair dyes were reluctant to give away their trade secrets, and declarations of ingredients were not required during the early twentieth century. Additional confusion about henna comes from the addition of lead, copper, and iron sulphates and acetates, used to create other tones of hair dye. These are also usually undeclared ingredients in a package simply labeled “Henna” (Chemist and Druggist, 1925). This confusion about what henna is and is not opened the way for the current problems with para-phenylenediamine black dyes substituted for henna, and the subsequent problems with confiscation and banning of henna as body art.

Henna is mentioned in the King James Version of the Bible (Holy Bible, KJV), the Old Testament, by its Latin name, camphire: “I am my beloved's, and his desire is for me. Come, my beloved, Let us go into the open, Let us lodge among the camphire” (Song of Songs 7:11-13), "Your shoots are a royal garden full of pomegranates, with choice fruits: camphire and spikenard" (Song of Solomon, IV, 13), and "My Beloved is unto me as a cluster of camphire in the vineyards of En-Gedi" (Song of Solomon, I, 14). There are well-documented henna traditions among Armenian Christians, Coptic Christians, and among all of the Jewish groups that lived North Africa, the Arabian Peninsula and the Levant. Yet, some priests such as Father Peter Joseph (2002) condemn henna as unsuitable for Christians. Rabbi Jack (2005), of New York City, posting on the National Conference of Synagogue Youth, advises, “Henna tattoos are Rabbinically prohibited even when two youths asked him pointedly about the Yemenite and Sephardic Jewish henna traditions.

A potential source of information on henna, people who have emigrated from countries where henna is an indigenous tradition, is not as accessible as one would hope. When I began researching henna in 1990, I went to Arab markets in the Akron and Cleveland, Ohio areas, and asked to purchase henna, and how to use it. The answer was usually, “Why do you want that old-fashioned filthy stuff?” This attitude is demonstrated in an article about Egyptian night of the henna in the countryside, “the henna stain remains for weeks; it is thus city couples that find its appearance inappropriate to office or school settings, who tend to abandon this tradition” (Morgan, 1995). In an Iraqi Arabic dictionary, this bias against henna is shown in an example following the definition of henna, “Educated girls don’t put henna on before their marriage.” (Clarity, Stowasser, Wolfe, Woodhead, & Beene, 2003: 122)

The scarcity of reliable information on henna in western publications adversely impacts legal, economic, health, cultural, and religious issues tangent to henna. A fundamental academic investigation of henna, enabled by defining what henna is and is not, is sorely needed to integrate it into the body of knowledge, and to facilitate henna’s introduction into western culture. Up to this point, there has been no organized study of henna, not even a set of criteria for undertaking that study. This paper proposes to identify the criteria that would make the historical, anthropological, economic and legal study of henna possible.

Identifying Henna and Proposing Criteria for a Systematic Study of Henna

To construct a systematic study of henna, it must be identified and understood as a plant, as a material culture including its cosmetic, medicinal, and ritual traditions, and all aspects must be situated in geographies and history. To this end, henna and its uses must be precisely identified.



Figure 4: Henna body art, paste on skin (Cartwright-Jones, 2005)

Henna body art is the practice of staining the skin with a paste made of henna, *lawsonia inermis*, leaves that have been pulverized and mixed with a slightly acidic liquid. These stains last longer than pigmented cosmetics, but are not permanent as are tattooing, scarification and piercing. Henna is also used to dye hair and fingernails, and has been

used medicinally in India, the Middle East and North Africa. Henna body art is presently popular as adornment for weddings and other celebrations in South Asia, the Middle East and Africa, and there is text and pictorial evidence that henna has been used for adornment for over 5,000 years.

When dried henna leaves are pulverized, wetted and applied to the skin for half an hour or more, lawsone, the dye molecule in henna leaves, breaches cells, penetrates and stains keratin in skin, hair, and nails just as the liquid from a teabag penetrates and stains cellulose in a white cotton tablecloth. Figure 1 shows the stain left from the paste application in Figure 4.

Henna body art is a transitory skin stain and can only be directly observed during the few weeks that it is on a living body. Text and artifact evidence indicate that people may have used henna as an adornment since the late Neolithic, though use can only be indirectly observed, and thus far has been only sporadically studied. The lack of a reliable history of henna underlies the misconceptions held by Willit and Rabbi Jack, and the problematic FDA legislation.

Constructing a history of henna is challenging. We can verify the presence of henna patterns on living skin by observing this characteristic paste application, color after removal, fragrance, and subsequent disappearance of the pattern. We cannot directly observe henna that was applied a month ago, because the henna stains exfoliate within a

month. We cannot directly observe henna that was applied several thousand years ago, because the living people are gone. In the absence of direct observation, how can one study henna in the past, particularly in the distant past? Field (1958) provides an archive of henna mentions in text. Barring difficulties with translations of the names of plants, one could assemble historic geographies of henna from text mentions, but this would only reach as far into the past as text exists. Also, text rarely evidences the patterns of henna in body art. How, then, can one establish the existence of henna use and the characteristics of application in the absence of text?

Eastern Mediterranean statuettes and wall paintings from as early as 3500 BCE depict women with red stained hands (Getz-Preziosi, 1994: 49). Can we claim these artifacts as evidence of early henna traditions? How can one prove that a transitory body art existed when there can be no directly observable evidence? One can identify criteria based on direct observations of henna and its interaction with skin that facilitate evaluation of indirect evidence of henna body art within a specific time and location. For instance, in Figures 5 through 14, what evidence would be needed to interpret the body markings?

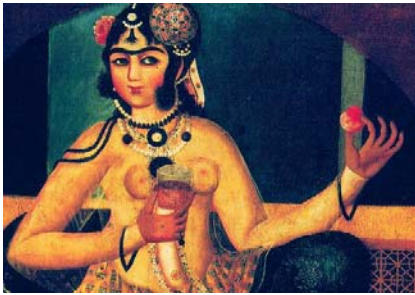


Figure 5: Two Harem girls, attributed to Mirza Baba, Iran 1811-14, Collection of the Royal Asiatic Society London, 01.002



Figure 6: A Lady Playing the Tanpura, Rajasthan, Kishangarh, ca. 1735, Metropolitan Museum of Art, New York, Fletcher Fund, 1996 (1996,100.1) Indian Court Painting, 16th – 19th C



Figure 7: King Mahajanaka, Ajanta Caves, Maharashtra India, 5th – 6th century CE



Figure 8: Postcard 185: Scenes Et Type, Fez, Beuté Marocaine, H. D. Séréro, Fez,
Mailed 1909



Figure 9: Post card, purchased from an Ebay auction, labeled “Arab woman”



Figure 10: Ceremonial object, carved stone circle, Figure III from Waring and Holder,
1945 (Fundaberk, 1957: 53)



Figure 11: Detail from Life in The Country: The Nomad Encampment of Layla's Tribe, Tabriz, 1539 – 43, Cambridge, Harvard University Art Museum 1958.75



Figure 12: Figure from the Little Palace, Knossos Post-Palace Period, 1400 – 1100 BCE Gallery X, Case 140, Figure 46, Herakleion Museum, Greece

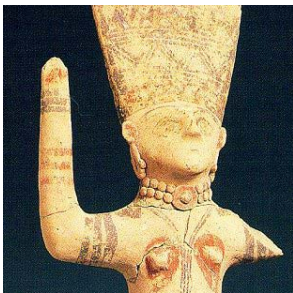


Figure 13: Figure from Paphos, Cyprus, 700 BCE; The British Museum



Figure 14: Xeste 3, "Lustral Basin" North Wall: Adorants, (Coumas, 1992)

Proxy evidence has been used in other archaeological disciplines to study transitory aspects of culture. Such techniques are used to study ancient dance. Dance is an important part of culture. Dance cannot be directly observed except during moment of dance. How then can one study dance as it was done in the seventh century BCE? One can examine pottery fragments with depictions of people who are presumed to be in dance poses and compare them to folk dances still existing in a region (Tubb, 2003). One can examine ancient texts that describe dance and compare those descriptions to eyewitness observations in the modern era (Gabbay, 2003). Scholars reconstruct ancient dance by coupling indirect evidence from thousands of years ago with contemporary ethnic dance studies and the fundamentals of human movement. Similarly, if one has criteria based on what is known about fundamentals of henna body art, the interaction between henna and skin based on direct evidence, then criteria should also apply to proxy evidence of ancient henna.

The strength of these criteria and proxy evidence is that they can assist the study of henna that cannot be directly observed. The weakness of the criteria and proxy evidence is that they cannot definitively prove that henna existed; they can merely support the probability of that existence. They can help support or negate interpretation of artifacts as having evidence of henna. Mapping the artifacts judged “positive for henna” could be used to help reconstruct the historical geographies of henna.

In Chapter One of this paper, I explain the need for a scholarly investigation of henna, particularly henna body art. Chapter Two observes the characteristics of henna to establish the criteria for evaluating evidence of henna. Chapter Three will test the usefulness of the proposed criteria. Chapter Four will show how artifacts that have been judged as having “positive” evidence of henna can be mapped to show the historical geographies of henna. Chapter Five will propose the potential usefulness of these maps for further study of different aspects of henna. The usefulness of a systematic investigation and mapping of henna is that it will clarify what henna and is not, and provide a sound basis for decisions regarding appropriateness, legalization and trade.

Chapter II:

Criteria for a Systematic Investigation of Henna

Evidence of henna body art must be based on directly observing henna's characteristics, and extending these observations into the past, to that which we cannot directly observe. We observe that henna leaves a rusty-red stain on skin. Henna's dye is lawsone, the red-orange dye molecule. Lawsone stains skin and other keratin. The initial stain is orange, and that may oxidize to dark red, to brown, and nearly black. Human skin is presumably the same now as it was 8,000 years ago. The henna plant and its lawsone molecule are presumably the same now as it was 8,000 years ago. If henna leaves a brick colored stain on hands and feet now, henna should have left a brick colored stain on hands and feet consistently since the late Neolithic.

The first set of criteria would be to determine whether there are any eliminating factors that would preclude the possibility of the markings being made by henna. The second set of criteria for evaluating the evidence of henna body adornment would be to

demonstrate that the henna plant could have been available to make the stain. This is determined by comparing the location of the artifact to a climate zone suitable for henna. The third set of criteria would be that the appearance of the markings would have to be consistent in color and placement with henna body art. Henna stains differently across the geography of the body, and henna markings are usually placed in the optimal stain areas, the hands and feet. Henna stains have a specific color range, and representations would be expected to fall within that range. The fourth set of criteria would be contextual evidence from written accounts of henna use, cultural associations of henna use and other forms of body art that can be used to support or negate henna as the probable source of the body markings.

If there are no “negatives”, and there are criteria about the artifact consistent with henna, that sets an artifact in the range of being “possibly henna”. Since there are other sources of red-brown body markings, all “possibles” from this list must be further examined to support the probability that the markings were made with henna rather than a cosmetic with similar appearance. Taken together, these sets of criteria should provide a “sieve” for artifacts with body markings that would support or eliminate the interpretation of body markings as either representing henna, or representing another form of body art. The “positives” then can be positioned to construct historical geographies of henna.

The Henna Plant: *Lawsonia Inermis*



Figure 15: Three-year-old henna plant, 1 m tall; branches (Cartwright-Jones, 2004 and 2005)

Division: Magnoliophyta

Class: Magnoliopsida

SubClass: Rosidae

Order: Myrtales

Family: Lythraceae

To establish criteria for henna, the plant must be defined. Henna, *Lawsonia inermis*, is a tall shrub or small tree, 2 – 6 m high. It is glabrous, multibranched with spine tipped branchlets. Leaves are opposite, entire, glabrous, sub sessile, elliptical, and broadly lanceolate (1.5 – 5.0 CM x 0.5 – 2 cm, acuminate, having depressed veins on the dorsal surface (Kumar, Singh, & Singh, 2005).



Figure 16: *Lawsonia inermis* leaves and seeds (Cartwright-Jones, 2005)

Lawsone resides in the leaves and is in the highest quantities in the petiole.



Figure 17: A high-resolution scan of a newly budded henna leaf showing red lawsone concentrated in the petiole (Cartwright-Jones, 2005)

The highest lawsone content is in the new growth of leaves following an extended period of heat and drought, then a brief flush of rain (Roy, Singh, & Tewari, 2005). During the onset of precipitation intervals, the plant grows rapidly; putting out new shoots, then growth slows. The leaves gradually yellow and fall during prolonged dry or cool intervals.



Figure 18: Stages of henna leaf development: new growth, one month old, and three months old (Cartwright-Jones, 2005)



Figure 19: Henna seeds (Cartwright-Jones, 2005)

The seeds are three mm across, angular with a thick seed coat (Kumar, Singh & Singh, 2005). Henna seeds are not difficult to germinate, but require soaking and moisture

maintenance during initial growth. In the wild, birds feasting on henna berries at one wadi or oasis propagate henna when they migrate to another oasis and excrete seed. Henna farmers propagate by rooting cuttings in a riverbank or nursery, a more reliable method than planting seed (Singh, Jindal & Singh, 2005).



Figure 20: Henna seeds sprouting (Foster, 2004)

Henna flowers have four sepals and a 2 mm calyx tube with three mm spread lobes. Petals are obvate, white or red stamens inserted in pairs on the rim of the calyx tube. Ovary is four celled, style up to five mm long and erect. Fruits are small, brownish capsules, four to eight mm in diameter, with 32 to 49 seeds per fruit, and open irregularly into four splits (Kumar, Singh & Singh, 2005). Lawsone content in leaves is negatively associated with the number of seeds in the fruits (Singh, Jindal & Singh, 2005).



Figure 21: Henna fruits (Abid and Co, 2004)



Figure 22: Henna Flowers (Musselman, 2005)

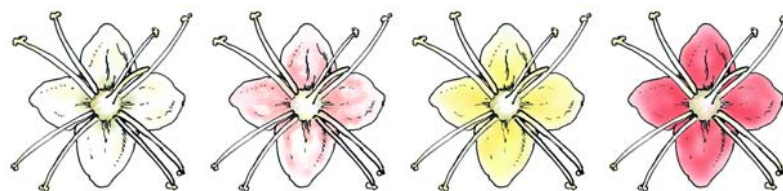


Figure 23: Henna flowers in four colors, white, pink, yellow and dark rose (Cartwright-Jones, 2005)

In Rajasthan, the henna plant flowers during August and September as the monsoons subside. The flowers are intensely fragrant, and are used in perfumery. The Biblical reference to henna, Solomon 1, 14, “My love is unto me as a cluster of Camphire in the Vinyard” (King James Authorized Version) refers to the flowers. Henna flowers come in four colors, bloom asynchronously, and about half of them set into berries (Singh, Jindal & Singh, 2005: 18). In India, the white to yellow flowered plants are called Madayantika, and the deep rose and pink flowered plants are called Kuranaka. The scent manufacturing centers in India for henna flowers are Kannaj and Ujjain. The flowers are crushed in oil to retrieve hina attars, which have scents reminiscent of a combination of chocolate, roses and good cigars. The pungency of scent is from the beta-innone content, which is antifungal and antibacterial (Kumar, Singh, & Singh, 2005)

Henna's Growing Range: Global Regions

Another fundamental criterion for evaluating whether a body marking was made with henna would be to determine whether or not henna was available to make that mark.

Henna is indigenous to North Africa, Arabia, the Middle East and South Asia. There is no henna body art native to the Americas, though American indigenous people had red body paints. Figure 24 is of Amazonian indigenous people ornamenting each other with red pigment. This paint is crushed annatto seed, not henna.

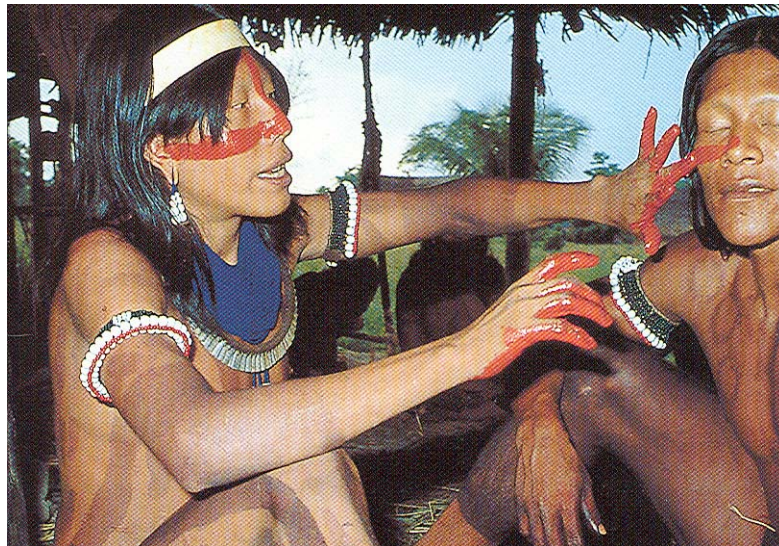


Figure 24: Ngrano applies red pigment from annatto seed (Verswijver, 1996: 64)

Henna was imported into the USA for hair dye as early as the late 1800's, and was popular as a hair dye before para-phenylnediamine dyes were introduced in the 1920's (Ninety-Sixth Congress, first session, Subcommittee Hearing, 1979) and popularized in the 1930's with the formal registration of cosmetologists (Walrath, 1977). Lucille Ball's famous red hair was maintained with henna; she was naturally blonde (Tannen, 2002). Lower quality henna will suffice for hair dye, but high quality henna for body art was not widely imported into the USA until the early 1990's.

A mature henna tree produces five to seven kilos of henna leaves per year (al-Ashaf, 2002). A single henna tree could be assumed to provide one woman with henna sufficient for a year's worth of hair dye and skin care: based on my experience dying my own hair and skin and selling henna to several thousand regular clients through my business, a woman uses about five hundred grams of lower to medium quality henna to treat waist-length hair once a month, for a total of six kilos per year. She would use an additional 100g of better quality henna to stain her feet, hands, and fingernails each month. She would reserve one additional kilo of the best quality henna for a wedding, circumcision, Id or Diwali party. So, for henna to be available in sufficient quantities for a community of one hundred women to develop and sustain a henna tradition, there would have to be at least one hundred henna plants locally growing wild or under cultivation to sustain regular harvesting and use.

The first henna plants were introduced into the Caribbean through Indian laborers working in the British sugar industry in Trinidad between 1845 and 1917 where the plants were locally known as “Jamaican Mignonette” (Mahabir, 2001). These were cultivated as a hedge plant and appreciated for the flowers, but body art use did not extend beyond the Indian immigrant community. Other henna-using immigrant communities in the Americas had to import henna where it could not be grown locally, or go without.



Figure 25: Henna package, West Virginia, 1930 (Cartwright-Jones, 2004)

Henna powder becomes stale and loses dye content in about three months unless it is packaged in airtight, climate-controlled packaging. When dried henna leaves are

powdered, the lawsone degrades in contact with air or light. Henna kept in loose, porous packaging for more than three months makes pale orange stains, or at one year, little or no stain at all. If henna is packed as dried whole leaves in dark, moisture proof containers, it has a shelf life of six months to a year. Prior to the 1990's henna was packaged in cloth bags, cardboard and cellophane packaging.

This degradation has always limited the geographic extent of henna material culture. When pack animals were the normal transport, traveling henna at 25 km per day, and cloth sacks were the normal packaging, one would expect henna customs to be confined to 1500 km from the henna-growing zone. Henna traveling for more than three months, then brought to market for resale, would be in demise before it could be purchased and applied to hands or hair. Henna couldn't move easily beyond this zone until railroads, trucks and aircraft were available to transport henna more quickly. The henna canister in Figure 25 contains dried henna leaves, and was sold in West Virginia in 1930 as hair dye. If these leaves were harvested and packed in Egypt, they could have been shipped across the Atlantic and arrived in West Virginia in about 60 days in 1930, traveling by cargo ship, then railroad.

Dried henna will retain dye content for over a year if it is kept frozen, in airtight packaging. During the last few years of the 20th century, air freighted henna from India to the Americas became increasingly available, and henna body art became popular in metropolitan areas in the USA. Information available through the internet, particularly

through <http://www.hennapage.com>, the most frequently accessed resource for henna in the English speaking world, has disseminated information about techniques and traditions to areas where henna was previously unknown (icertified.net, 2001 – 2006).



Figure 26: Hennaed hands (Regency Weddings, 1998)

From the 1990's on, airfares dropped low enough that Indian immigrants and their families regularly flew back and forth between India, Canada, and the USA for weddings. Since henna was an important feature of Indian weddings, and the South Asian families were keen to maintain cultural practices in the Americas, Indian specialty shops began stocking henna, and families brought henna with bindis and saris from India to the west. Small Indian bridal businesses, such as Regency Weddings in New Jersey, Figure 26, began in urban areas with South Asian immigrant populations

by the late 1990s. This was the first widespread use of henna as body art in the Americas.



Figure 27: Henna body art products available in US Indian specialty markets in 2002

(Cartwright-Jones, 2002)

Sumita Batra was a henna artist working out of Zubeda salon on Pico Blvd in Los Angeles in the late 1990's. Madonna wore Sumitra's henna for her appearance in the music video "Frozen", and to the subsequent MTV music awards, instantly familiarizing people across the western world with henna. In 1998, People Magazine and other celebrity-oriented magazines featured Demi Moore, Gwyn Stefani, Sting, and other pop stars were photographed with their trendy, exotic henna done by Loretta Roome and Sumita Batra, and henna suddenly became the most desirable "late

Orientalism” cultural consumption product, the exotic trend of the moment (Maira, 2000).

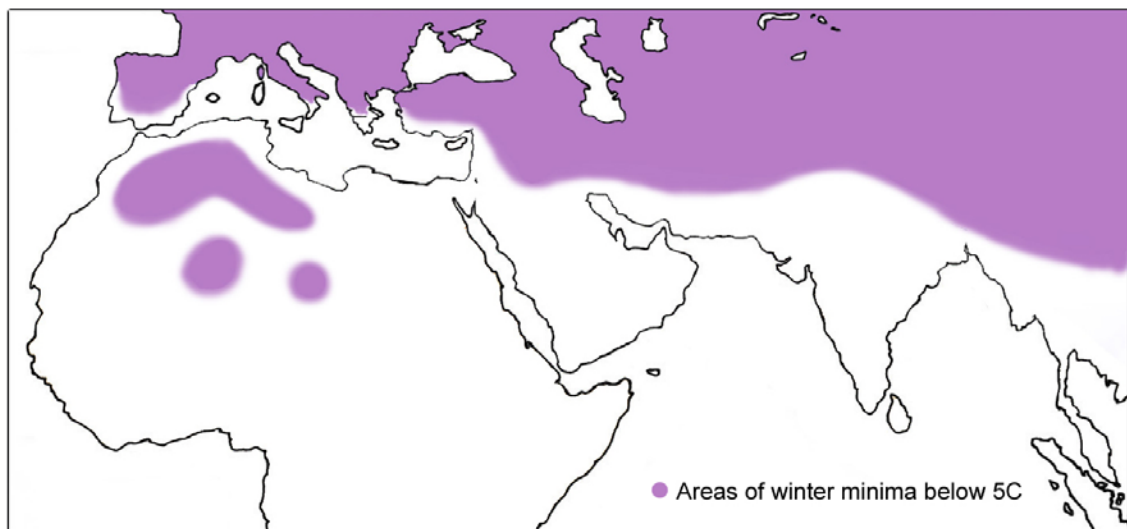


Figure 28: Coshocton Library Teens, Coshocton, Ohio, after a henna class (Harold, 2004).

The demand for henna grew rapidly in the USA after 1998, with its introduction in to major amusement parks and beachside attractions as a “temporary tattoo”. Reddish brown body markings in the west after this time may be considered “possibles” for henna. Reddish brown body markings from the Americas before 1990 (other than hair dye) should be assumed to not be henna, unless the specific instance has other evidence supporting henna, because henna was not available.

Henna's Growing Range: Temperature Minima and Henna

Henna grows best in tropical savannah and tropical arid zones, in latitudes between 15° and 25° N and S, and produces highest dye content in temperatures between 35 C and 45C. It can also occupy frost-free Mediterranean scrub zones, though it doesn't develop maximum dye content without high summer heat. Optimal soil temperatures for germination are 25 – 30C (Rao, Regar & Singh, 2005). It does not thrive where minimum temperatures are below 11C. Temperatures below 5C will kill the henna plant.



Map of current temperature minima lower than 5C

Figure 29: Map of areas too cold for henna to survive (Kartographisches Institut

Bertelsmann, 1989: 181-2)

Henna will not grow in the blue areas in Figure 29 because winter minimums will kill the plant. The map in Figure 29 is based on present climate data, and should be adjusted for different climate periods. For instance, medieval Arab authors believed the island Cyprus was named after the henna (κύπρος) growing there (Parrington, 1935: 457). There are many Cypriot artifacts dating from warm climate periods that depict women with stained hands. When botanists investigated the island during the 1800's, during a cool climate period, they could find no evidence of henna, and believed the island was named after the metal copper, discarding the possibly more accurate Arab history.



Figure 30: Henna shrubs growing wild alongside palms in Ain Guicier, Morocco

(Le Maroq pittoresque: Ain-Guicer Imp. Phototypique A, Gelly Charleville P. Grebert
photo, Casablanca, 1906)

Henna grows easily and self-reproduces in alluvial soils along seasonal creeks or near water holes in tropical zone semi-arid and desert regions (Bakshi, 1984) such as seen in the Figure 30. In Egyptian villages it is sometimes cultivated as a hedge plant, growing alongside rose bushes. (Hepper & Friis, 1994: 195)

Body art from areas too cold to support henna are unlikely to have been created with henna, unless the henna was imported through known trade routes and had cultural connections so strong that people were willing to import henna to serve tradition. Afghanistan is an example of this: though henna can only grow in the southeastern provinces, it is used in weddings throughout the country for the night of the henna, and to dye graying beards and hair (Field, 1958: 105).

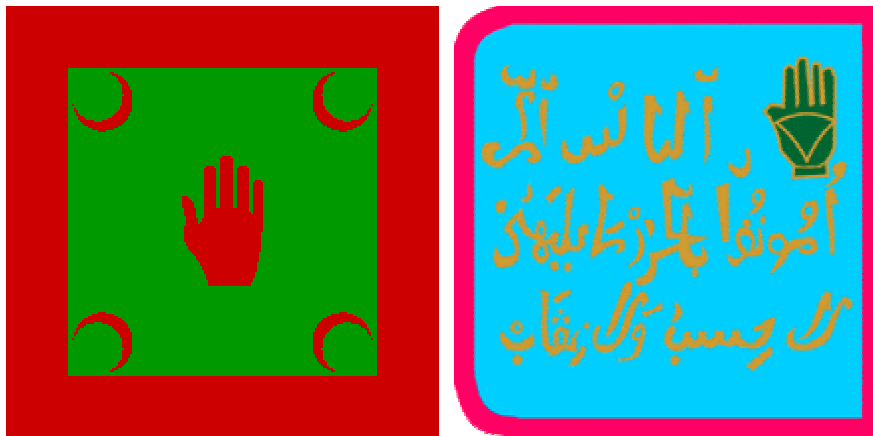


Figure 31: Algerian 19th century Colonial Flags

Left: 4th Battalion, 14th Company, Algeria

Right: 10th Regiment of Tirailleurs, 1st Battalion, Algeria (Crampton, 1990)

Based on the preceding climate map, flags in Figures 31 and 32 with images of a colored hand may be evaluated as potentially representing hennaed hands. The two flags from Algeria, Figure 31, have hands consistent with the colors of henna, green as “paste on” and red as “paste off”. The Algerian flags are from a climate zone suitable for growing henna. Corroborating evidence shows that the hand of Fatima, the symbol of a hennaed hand, a symbol of luck and protection, was a common device for Algerian units of the French Army (Crampton, 1990).

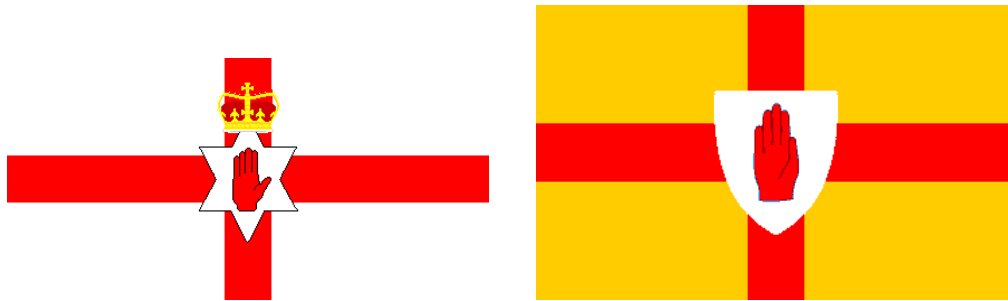


Figure 32: Irish Regional Flags

Left: Civil Flag for Northern Ireland prior to Belmont Assembly 1973

Right: Flag for Province of Ulster established 1922

The Irish flags in Figure 32 are from northern latitudes, unsuitable from growing henna. The previous map shows that red hands from Irish flags such as the “Red Hand of Ulster” could not have represented a hennaed hand, because winter minimums in Ireland would kill henna. Corroborating evidence shows that the Red Hand of Ulster is a severed hand traditional symbol of the O'Neill clan, not a hennaed hand.

Henna's Growing Range: Precipitation and Henna

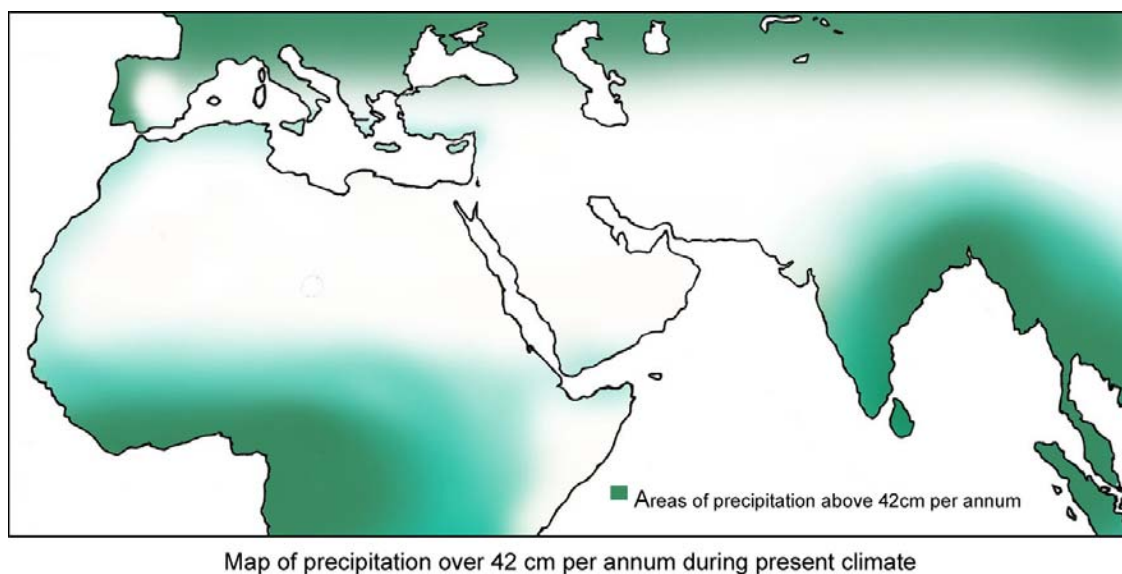


Figure 33: Areas of heavy precipitation that would impair lawsone content and favor plant diseases that attack henna (Kartographisches Institut Bertelsmann, 1989: 181-5)

Henna thrives in low-latitude semi-arid to arid zones, (Singh, Regar, Rao & Jangid, 2005). Pali district, the most intensive cultivation area of henna in the world, is on the fringes of the Thar Desert, and the rainfall was between 400 and 420 mm per annum at between 1968 and 2004. Marwar province, also a henna-growing region ranged from 460 to 500 m per annum in 1980 to 2004 (Singh, Regar, Rao & Jangid, 2005). Eighty five percent of the annual rain falls between August and September, with little rain between monsoons. These areas have sandy loam soil, and little ground water. The plants thrive in a region of chronic drought.

In areas of high precipitation, or in heavy, damp soil, henna is vulnerable to scale insects, aphids, and root rot, and the dye content is lower than in areas with prolonged droughts.



Figure 34: Aphids on henna

(Singh, Lodha, 2005)

In tropical rainforest areas, other red substances are more likely to be used than henna. In central Africa, indigenous people use camwood, *Baphia nitida*, also known as African sandalwood, to create red body art; a red dye soluble in alkali can be extracted from the heartwood and bark (Speedy, A. 2004). Luluwa brides are ornamented with camwood, as are sculpture images representing fertile young women.



Figure 35: Lulua Bride ornamented with camwood (author's collection)

Much of India has precipitation above 50 cm per annum. Though henna grows throughout the subcontinent, it only achieves high dye content in the dryer western region with rainfall around 40 cm per annum. There are several other materials used for red body markings in India, particularly in the high precipitation zones, which are preferred over henna because they give a more vivid red, which is considered auspicious.

Alkalized turmeric, kumkum, lac, vermillion, alta and sandalwood powders have a vivid red color associated with luck and fertility. Married Indian women mark their foreheads and the center part of their hair with vivid red cosmetics, and tint their feet red with pigments other than henna. In older paintings, it is easy to confuse these red cosmetics with henna, so interpretations must be cautious. Evidence of red body art in moderate to heavy rainfall tropical climate zones, must be evaluated with additional

information from cultural context before one can conclude that they were created with henna or other cosmetics with a similar appearance.

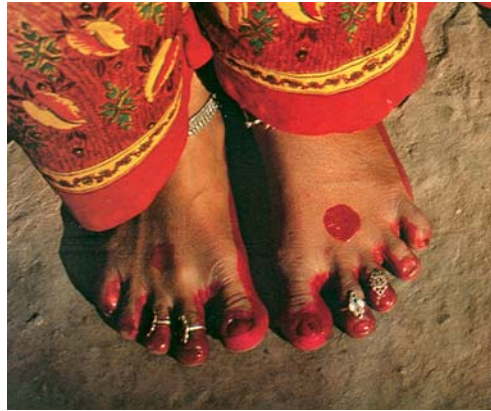


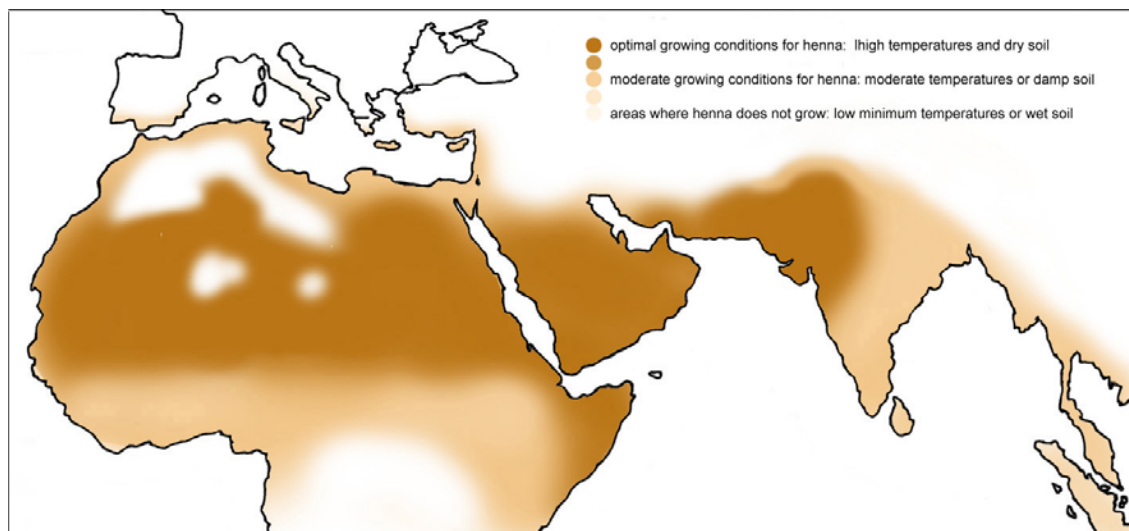
Figure 36: Feet painted with vermillion, Ahraura, Uttar Pradesh, India (Leen, 2006)



Figure 37: Slaked lime turns yellow turmeric red (Cartwright-Jones, 2003)

Turmeric is a plant root that is often used for ritual cosmetics in India, particularly for the Pithi ceremony (Desai, 2006: 25). Turmeric powder is mixed with slaked lime, the color changes to vivid red.

Henna's Present Growth Range



Map of henna growth range during present climate

Figure 38: Map of henna growth range during present climate (Kartographisches Institut Bertelsmann, 1989, 181-85)

This map is based on present climate data, and should be adjusted for different climate periods. At present, henna grows naturally in Algeria, Bahrain, Burkina Faso, Chad, Cyprus, Egypt, Eritrea, Ethiopia, Indonesia, Iran, Iraq, Israel, Jordan, Kenya, Kuwait, Lebanon, Libya, Liberia, Malaysia, Mali, Mauritania, Morocco, Niger, Nigeria, Pakistan, Philippines, Oman, Qatar, Sahara, Saudi Arabia, Singapore, Somalia, Sudan, Syria, Tanzania, Tunisia, Turkey, Western Sahara, Yemen and Zanzibar (Kuram, Singh and Singh, 2005: 11). During warm climate periods, henna also grows in Sicily,

Greece, Spain, and Crete. Henna has been recently introduced in North America and Europe as a houseplant and semi-tropical zone shrub through Companion Plants in Athens, Ohio (companionplants.com), Richters (richters.com), Sand Mountain Herbs (sandmountainherbs.com), and other specialist garden suppliers.

Henna is cultivated as a commercial crop in Egypt, Somalia, Sudan, Morocco, Iran, Yemen, Niger, and Pakistan. Nigeria exports most of its henna to Algeria, and Yemen exports most of its henna to Saudi Arabia. India is the biggest producer of henna, growing an estimated 10,500 tons of henna in 2003-4. Seventy percent of that crop was sold within India, and thirty percent was exported to Middle Eastern clients, with most of the rest going into the European and American hair dye market (Narain, Singh, Roy, Chand, Jangid and Singh, 2005: 1).

Body markings that appear consistent with henna, and are on people living within henna's cultivation and trade range should be considered as possible evidence for henna. Body markings that are not within henna's growth range or on export routes from that growth range cannot have been made with henna, and must be excluded as possible evidence of henna. Once a body marking is considered to be possibly henna, additional criteria can be applied which could support or negate the probability that a marking was made with henna.

The Color of Henna



Figure 39: Henna releases lawsone as the leaves are wetted and pulverized. Skin is stained orange within moments of contact (Cartwright-Jones, 2004)

One criterion for henna would be that the markings would have to be in a color range consistent henna stains on skin, nails and hair, unless some aspect in the representation precludes such. Very old sculptures may have once had surface paint that has since worn away. Old paintings may once have had body markings consistent with henna, but the color of paint may have changed over time. Black and white illustrations may show body markings without color reference. Such artifacts would have to be examined with corroborating evidence to determine original color intent.

The Basis of Henna Color: Lawsone

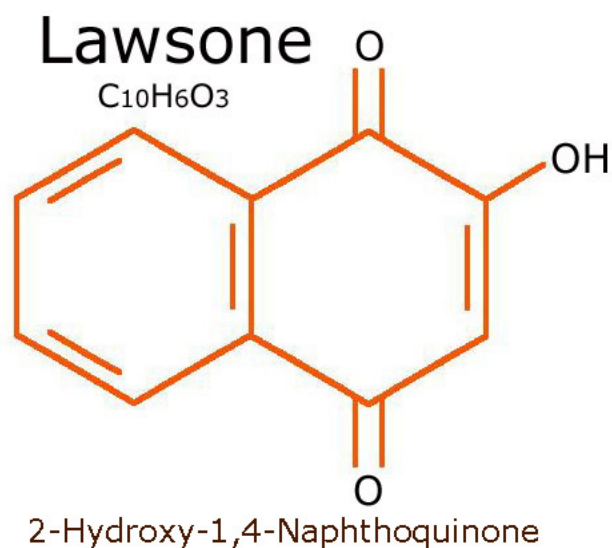


Figure 40: Lawsone, the dye molecule in henna (Bonev, Cartwright-Jones, 2004)

Henna stain color is created by the presence of Lawsone, the dye molecule in henna. Lawsone is a red-orange molecule, 2.54 Angstroms, about the size of an amino acid (Aldrich Chemical Database; Bonev, 2004). It is small enough to breach, penetrate and stain skin cells. Lawsone is released from the henna leaf cells if they are crushed to a pulp with lemon juice, rainwater, or other acidic liquid. Henna leaves contain lawsone, 2-hydroxy-1, 4-naphthoquinone in amounts between .5% and 4%, the range of commercially grown henna being usually between 2 and 3%. The lawsone molecule is about the size of an amino acid and is small enough to easily breach a skin cell. Once it has penetrated the skin, lawsone binds easily with keratin molecules, and needs no

mordant, fixative, or additional heat to make a permanent brick-colored stain that will not fade with washing or in light. Lawsone will dye hair, hands, feet, fingernails, beards, and animal hair (Khandelwal, Gupta, Sahu, 2002: 67).



Figure 41: Henna application, paste removal, initial stain, matured stain (Cartwright-Jones, 2003)

In the sequence in Figure 41, dark green henna paste is applied to the skin and allowed to stay in place for several hours. When the paste flakes off, an orange stain is left in its place. This stain darkens to red, then brown over the next forty-eight hours. The stain will gradually disappear as the outer layer of skin is shed over a period of three weeks. Henna stains the outermost layer of the skin and new skin regenerates daily in inner layers. The henna gradually disappears as the stained skin cells rise to the surface and exfoliate as seen in Figures 42 and 43.



Figure 42: Henna two days after application (Cartwright-Jones, 2002)



Figure 43: Henna twenty-one days after application (ibid)



Figure 44: The color range of henna stains on keratin (Cartwright-Jones, 2006)

Henna stains skin and fingernails range from pale orange to vivid red-orange to shades of brown and black, depending on the level of lawsone saturation and oxidation in the keratin. Low saturations and little oxidation produce the colors in the pale end of the lawsone spectrum. Intense saturations and strong oxidation produce colors in the dark end of the lawsone spectrum, such as seen in Figure 45.

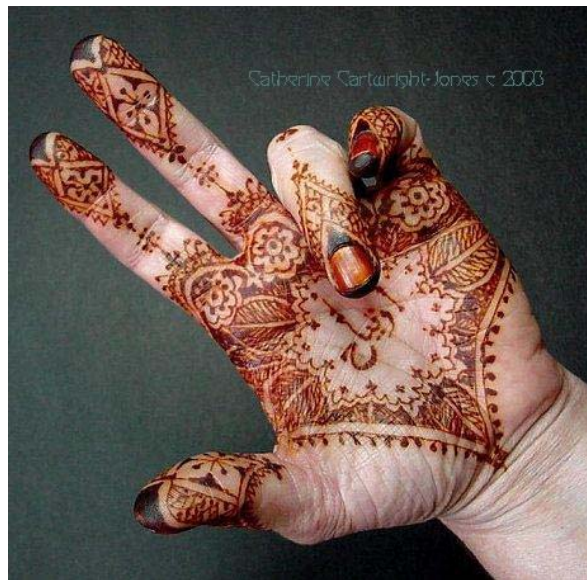


Figure 45: Stains from high lawsone content Yemen henna summer crop (Cartwright-Jones 2004)



Figure 46: Stains from lower lawsone content Yemen winter crop (ibid)

Henna with lower dye content, such as from the Yemen winter crop henna in Figure 46, does not give as dark a stain.

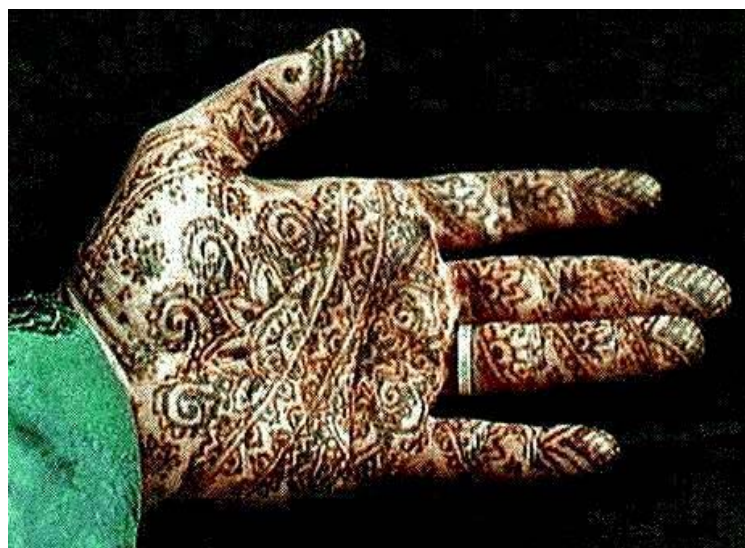


Figure 47: Henna darkened with ammonia (Cartwright-Jones, 1999)

If a saturated henna stain is treated with heat or alkali such as perspiration or urine, the stain oxidizes to dark brown to black as seen in Figures 47, 48, and 49.



Figure 48: Henna stain darkened with heat (Cartwright-Jones 2003)

Alkali and heat will blacken henna within 20 minutes to 24 hours after contact, though this technique only effective on highly saturated stains and on heavily keratinized skin.



Figure 49: Blackened henna stains on Rendile woman, Kenya (author's collection)

When henna paste is applied to the skin, lawsone molecules gradually migrate into the skin, just as brown pigments migrate from a wet teabag left on a white tablecloth. Lawsone molecules can migrate into the skin so quickly that henna paste can leave a visible stain when left on skin for as little as one minute. Longer contact permits more pigment migration. Brief contact permits minimal pigment migration. Henna is frequently applied in the evening and left on the skin overnight to facilitate intense saturations and darker stains. Henna applied and removed in less than 15 minutes gives less saturation and lighter stain. The result of short and long duration application is illustrated in Figure 50.



Figure 50: In areas of dark stain, the henna paste was applied for 12 hours and then removed. In the areas of light stain, henna paste was applied for 10 minutes and then removed. (Cartwright-Jones, 2003)

Henna stains fingernails, because they are composed of keratin, and lawsone easily binds with the keratin. The stain remains on fingernails as they grow outward from the root. Figures 51 and 52 show the typical stain color and outward growth of henna on fingernails, as opposed to exfoliation of fingertip skin.



Figure 51: Henna stains on fingernails and fingertips, one day after application
(Cartwright-Jones, 2004)



Figure 52: Henna stains on fingernails and fingertips, two weeks after application (ibid)

More henna is presently used to dye hair than for any other purpose, and this may have been the case since henna was first discovered. Caucasians begin graying in their twenties, and are often more than 50% gray by the time they're in their forties (Tobin, D.J.; Paus, 2001: 30). When graying people wished to keep a youthful appearance, they turned to henna to mask the gray. Henna gives a translucent red strain on hair, staining gray hair red-orange, blonde hair rich red, and brunette hair auburn. Henna gives black hair a red or slightly purple shimmer in the sunshine.



Figure 53: Henna on graying dark brown hair before and after henna (Cartwright-Jones, 2004)

Henna is a permanent dye, so does not fade, but new growth from the roots is the original color.



Figure 52: Henna on gray hair before and after henna (Cartwright-Jones, 2005)

Egyptian mummies, such as Ramses II, often have white hair colored with henna. (Ceccaldi, P. F, from Balout, et al, 1985: 254-257) When a mummy has dyed hair, the length of growth unstained with henna can be used to determine when henna was applied: prior to, or at the time of death.

Figures of mature people with red or auburn hair streaked with red should be considered as “possible” for use of henna. To examine a proposition that these people naturally have dyed their brunette, dark blonde or graying hair red, one can compare the number of children depicted with brunette, dark blonde or red hair to the number of

mature individuals with Brunette, dark blonde or red hair, and see if the proportion of red haired individuals increases with maturity.



Figure 55: The sarcophagus of Seianti Hanunia Tlesnasa. Etruscan, 150-140 BCE, found at Poggio Cantarello, near Chiusi, Tuscany, Italy

Figure 53, an Etruscan sarcophagus in the British Museum, is a portrait of a mature woman with dark red hair. True red and dark red hair is genetically uncommon, occurring in only four percent of people (MC1R, found on the 16th chromosome) (Rees, 2004), and occurring most frequently in Scotland and Ireland, not in the Mediterranean. Scientific testing of the woman's teeth indicates that she was probably about 50 to 55 years old at the time of her death. Assuming that the present color of

paint is close to the original color, it appears very similar to henna dyed graying brunette hair on a woman of the same age, in Figure 56. Since it is genetically improbable that the Etruscan woman had naturally red hair at a mature age, it is more likely that the sarcophagus portrays an older woman who covers her graying brown hair with henna.



Figure 56: Henna over graying brunette hair (Cartwright-Jones, 2005)

To support or negate evidence of henna use as a hair dye, one can also compare hair color between genders and across age groups. For instance, wall paintings in Pompeii show the majority of female sex workers as having red hair. In comparison, no children and no males have red hair. This evidence supports the probability that these women dyed their hair with henna.

The Geography of Skin and Henna: Henna Stains on Skin

Skin has geography: a variable terrain with differing characteristics across the epidermal surface. Henna stains differently across that surface, and changes as that surface is replenished.

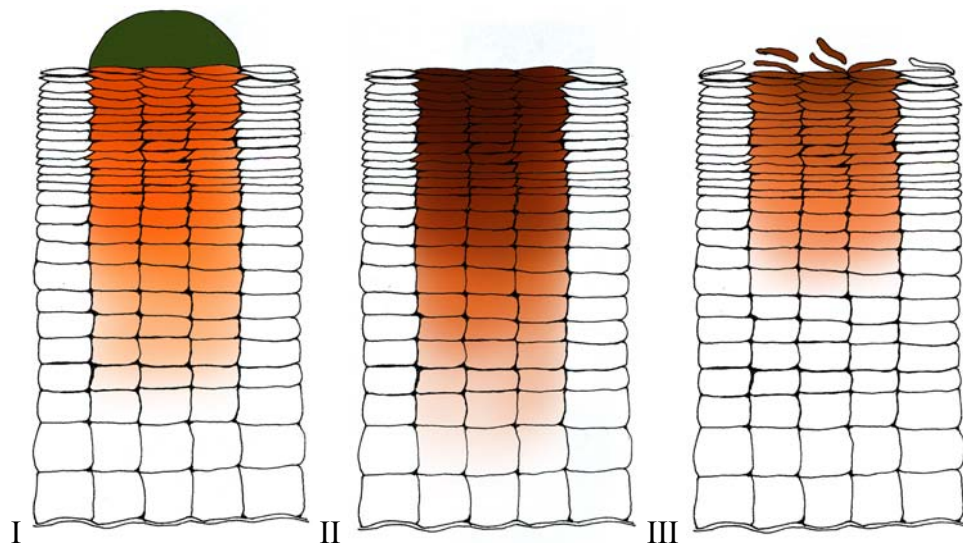


Figure 57: Diagram of epidermal henna staining and exfoliation process (Cartwright-Jones, 2006)

- Image 1: Lawsone migrates from henna into the stratum corneum
- Image II: Lawsone oxidizes and the stains become dark brown
- Image III: Lawsone stained skin exfoliates and less saturated areas rise to the surface through exfoliation, appearing as “fading”

Henna body art is created when henna paste is placed on the skin and lawsone dye migrates from the henna paste into the upper epidermal layer of the skin, breaching cells and saturating them. After paste removal, the henna stain darkens in the 48 hours, though oxidation by contact with air or alkaline. The stained skin is exfoliated during the following days, and the stain appears to be “fading” as skin cells less saturated with lawsone rise to the surface.

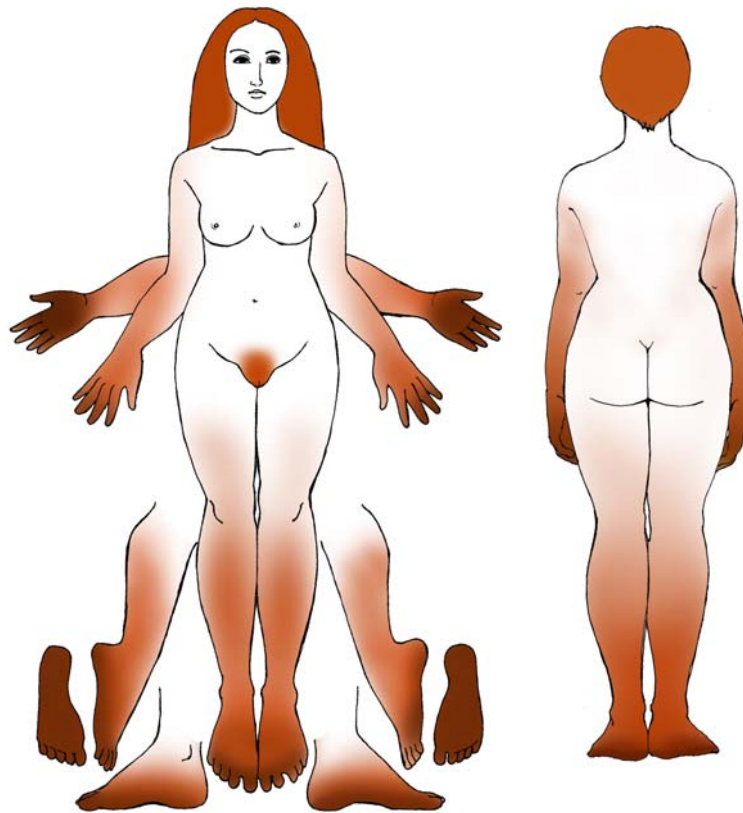


Figure 58: Diagram showing areas most frequently hennaed, and comparative stain color (data derived from Ya-Xian, Suetake, & Tagami, (1999); illustration by Cartwright-Jones, 2006)

The outer epidermal layer is of different depths and characteristics across the geography of the body, and henna stains differently across this geography. Palms have, on average, 50 cell layers of stratum corneum. Soles also have an average of 80 cell layers. People who go barefoot build up deeper layers on their soles, and people who do manual labor develop deeper corneal layers on their palms to protect the living tissue underneath. These areas absorb the greatest amount of lawsone, and attain the darkest color. Henna also stains fingernails and knuckles easily. Though henna also stains knees and elbows, it is rarely used there because the paste falls off when the joint is flexed, and the pattern is distorted. Henna was often used in the pubic region following depilation, to soothe irritated skin, and deter bacterial growth (Bassano da Zara, 1545).



Figure 59: This photograph shows darker henna stains on thick palm skin, lighter stains on the thinner skin on arms, and the lightest stain on thinnest skin protected by a watch band (Cartwright-Jones, 2004)

Skin not abraded by physical activity tends to develop a shallower corneal layer. The thinnest skin is on the penis, where the stratum corneum is only 6 layers of cells deep. (Ya-Xian, Suetake, & Tagami; 1999)



Figure 60: Henna stains on the cranial skin of a chemotherapy patient (author's collection)

Very thin stratum corneum will never take henna stain as well as very thick stratum corneum. In thin areas of stratum corneum, cells go quickly from being living, flexible skin cells to shedding from the surface as dead cells. Eyelids have very thin stratum corneum, and that skin is soft and flexible. Cranial skin is also thin, and is often oily as well. Henna does not get dark in these areas, as seen in Figure 60, and the pattern exfoliates in three to five days.

Heels have a very thick layer of stratum corneum, averaging 86 cell layers with some people having over 120 cell layers. That area often becomes hard, dry and rigid. Henna can penetrate farther into these dead layers, and can saturate more completely. Henna stains on soles can be nearly black, and last for nearly two months.



Figure 61: Henna stains on young athlete's back (Cartwright-Jones, 2003)

Shoulder, chest, back, buttock, back, belly, and upper arm have stratum corneum of medium depth. These areas have, on average, 12 to 14 cell layers of stratum corneum. Henna stains in these areas will last 7 to 10 days, and are a medium rusty color.



Figure 62: Henna application showing darker stains on thicker foot skin and lighter stains on thinner thigh skin (Cartwright-Jones, 2003)

Thighs, lower legs and lower arms have moderately thick stratum corneum layers on average 14 to 18 cell layers deep. Henna stains on backs will last 10 days to two weeks and are a range of rust and chocolate colors as seen in Figure 61. The backs of hands and tops of feet have thicker layers of stratum corneum, averaging 25 to 30 cell layers deep. Henna stains on the dorsum of hands and feet may get to a dark chocolate color, and last nearly three weeks.



Figure 63: Henna stains on the nails and backs of the hands (Cartwright-Jones, 2002)

Though there are historical records of full body henna applications, henna is most commonly applied only to arms, legs, feet, and hands, because those can be kept still while the person is comfortably seated, and applications rarely take longer than a person can remain sitting as is the bride in Figure 64.



Figure 64: Tunisian Bride at her night of the henna (Stannard, 1997: 82)

Differentiating Henna From Other Forms of Body Art: Tattoos

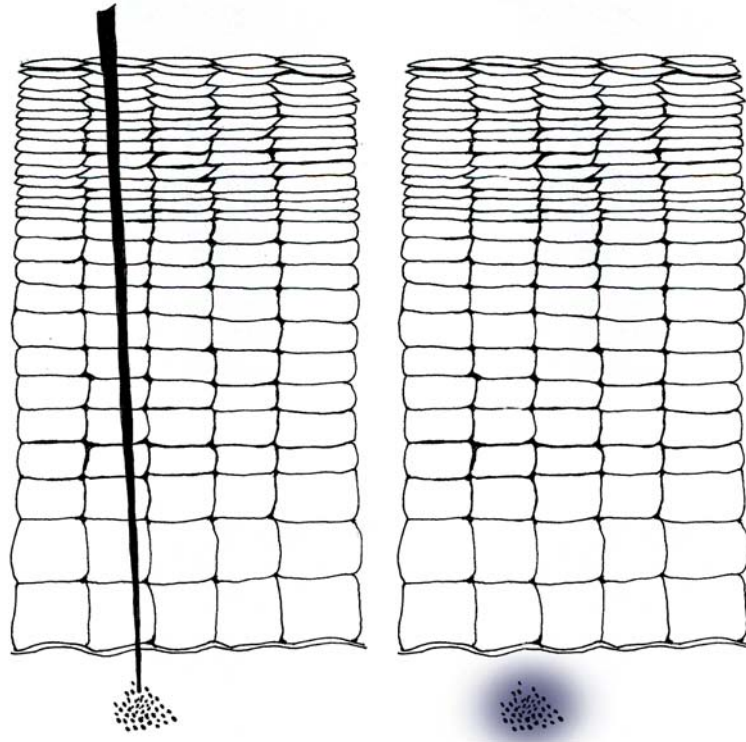


Figure 65: Diagrams of tattoo creation and aging in the dermal layer underneath the epidermis: the tattoo does not exfoliate (Cartwright-Jones, 2006)

A tattoo is created when pigment is inserted with a needle, razor cut, or other sharp instrument into the dermal layer of skin below the epidermis. Though the pigment stays in the basal layer and is not exfoliated, over a period of years, the pigment “drifts” in the basal layer and the tattoo becomes blurred. Tattooing is done most easily on thin epidermal areas so the skin is easily pierced, and the pattern visible. Tattooing is rare in

very thick epidermal areas such as palms and soles. Carbon, easily available as soot, is most widespread material for tattooing. In indigenous cultures, carbon was mixed with breast milk to deter infection. Plant dyes were less used, because they are not sterile and are apt to fester, spoiling the pattern.

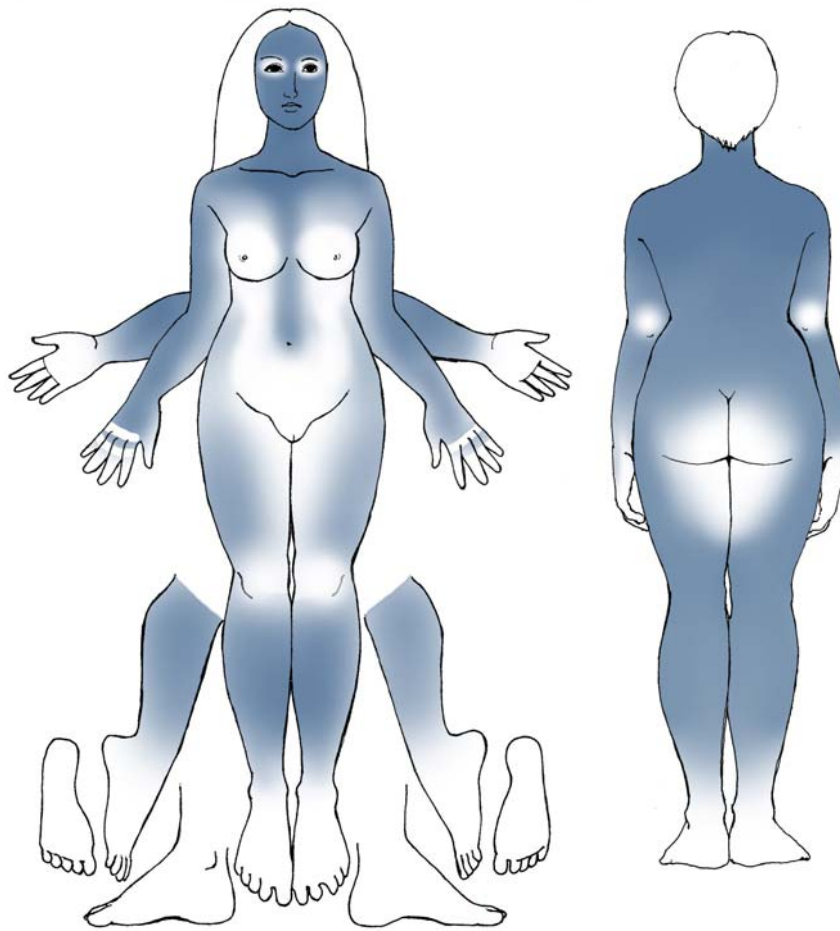


Figure 66: Diagram of skin areas most commonly tattooed (data derived from Ya-Xian, Suetake, & Tagami, (1999); illustration by Cartwright-Jones, 2006)

Tattooing is more frequently done on skin areas that are stable over time, such as arms, backs, thighs, and shoulders, so the design will remain as intended. Tattoos are less common on areas where the skin will deform during aging and pregnancies, such as breasts and bellies. They are also uncommon on areas where the fresh tattoo may become infected through contact with urine or feces. Though the skin near the eyes and genitals is thin, tattoos are rarely done there, probably in consideration of the discomfort, and the potential damage from infection or swelling. Knuckles are rarely tattooed, and soles of hands and feet are very difficult to tattoo.



Figure 67: Tattoo on upper shoulder, 5 cm x 5 cm (Cartwright-Jones, 2005)

Full back or chest tattoos, upper arms and thighs are an optimal for tattooing technique, because the person can lie down for long periods to allow the tattoo artist to work large, intricate patterns into relatively thin skin, with relatively few nerve endings. Endorphin release (trauma response to tissue injury) comes quickly after the onset of tattooing (Van der Kolk, 1988: 1: 273-290), so many people do not find tattooing unbearably painful, even during prolonged sessions, and even may find the experience enjoyable.



Figure 68: Postcard: Lady Viola, tattooed woman, 1920 – 1930

Present professional tattoos deposit pigment between 1.5 mm to 3.5 mm into the skin (O'Donnell, Mulvaney, James & McMarlin; 1995: 601-603.) The pigment-bearing dermal cells are not shed, so a tattoo is permanent. The most easily tattooed areas are those with a shallow epidermal layer that the needle doesn't have to pierce deeply to reach the dermal layer. Palms and soles are rarely tattooed because of the difficulty of piercing the thick skin. In North Africa, the Middle East and western India, women often have tattoos and henna on complimentary parts of the body (Field., 1958)

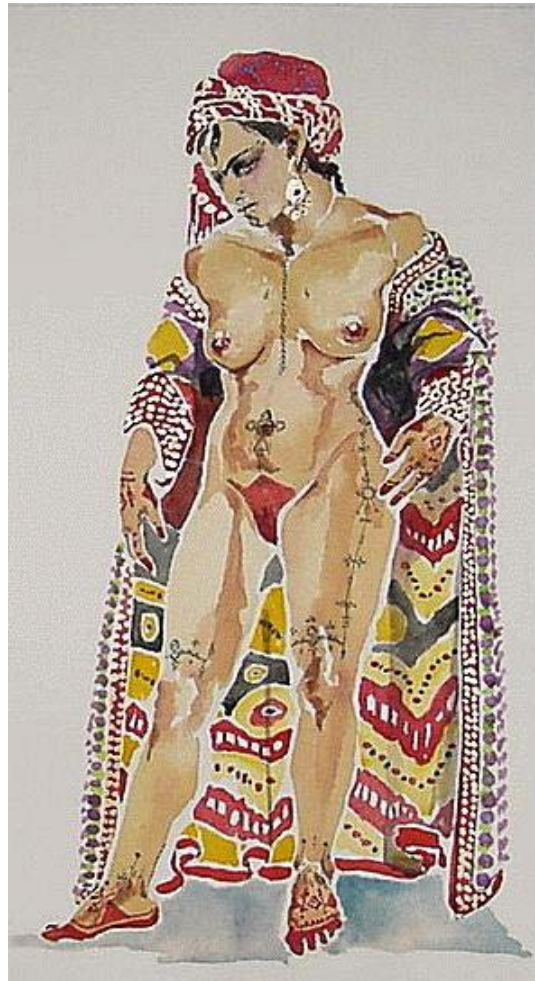


Figure 69: Turkoman woman with henna and tattoos (Data from Field, 1958;
illustration by Cartwright-Jones, 2002)

Since the tattoo is permanent, the application can be done over many brief sessions over a period of years to create an accumulated larger pattern, unlike a henna pattern that must be completed in a day or two. The subject may have additional work done ceremonially at ritually significant events, or whenever an hour or two of leisure is available.

Differentiating Henna From Other Forms of Body Art: Paints

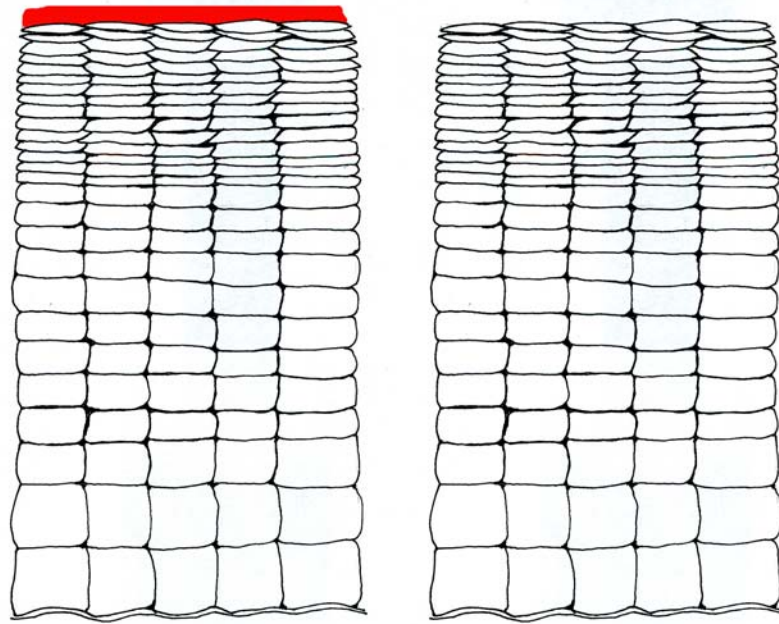


Figure 70: Diagram of paint on skin: Paint does not penetrate the epidermal layer, and can be washed away (Cartwright-Jones, 2006)

Skin painting may be the oldest body adornment, and it is certainly the most widespread. Late Paleolithic figures of women such as “Woman Holding a Bison Horn” from Laussel cave in the Dordogne, and Middle Magdalenian *Vénus Impudique* presently in the Musée de l’Homme, Paris, are marked with red ochre. Most indigenous cultures use some colored pigments to ornament their skin for ceremonial occasions, or to mark hierarchy. Naturally occurring mineral pigments are the most common body

paints, carbon black, calcium white, iron red, ash gray, copper green and blue. These are supplemented with paints made from plant-based colors: pollen yellow, grain pastes, flower, fruit or vegetable pulp, and insect pigments such as lac or cochineal.

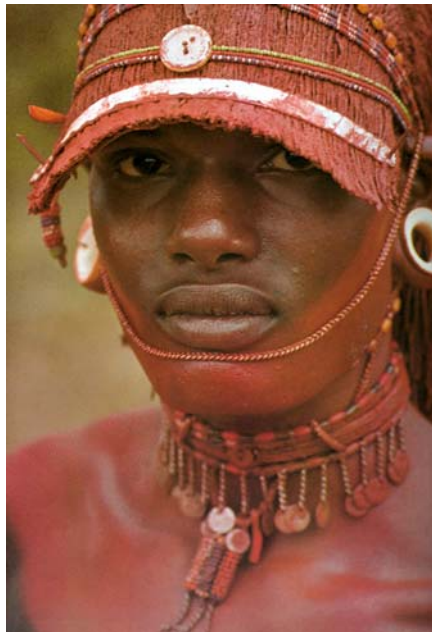


Figure 71: Turkana young male, painted with ochre (Fisher, 1984:34)

Most paints smear, a limiting factor for clothing and movement. A nude body may be almost completely covered with paint for a ceremonial occasion. If the body is clothed, only the exposed skin will be painted, to avoid smearing and staining clothing. Areas such as insides of thighs or upper arms may be less frequently painted, as a person's motion smudges patterns. Though ochre occurs naturally in the same color range of henna, it can be differentiated from henna by the position on the body. Ochre smears and rubs off the body easily, which limits use: palms and soles are not ochred

because touching, washing, eating, walking and dancing spoil ochre patterns, and ochred hands would soil food and drink.



Figure 72: Muslim bride from Salé, (Besancenot, 1988: 10)

Henna, paint and tattooing optimize in different areas of the skin's geography: Figure 70 shows how henna, paint, and tattooing may be combined in a coordinated ceremonial body adornment. Most Moroccan women of the late 19th or early 20th century had tattoos on their faces, arms and chest. The woman in Figure 70, a Muslim bride from Salé, has had her face painted, her hands and feet hennaed, and presumably there would be tattoos on her face, arms, legs and chest (Seawright, 1984).

Differentiating Henna From Other Forms of Body Art: Scarification

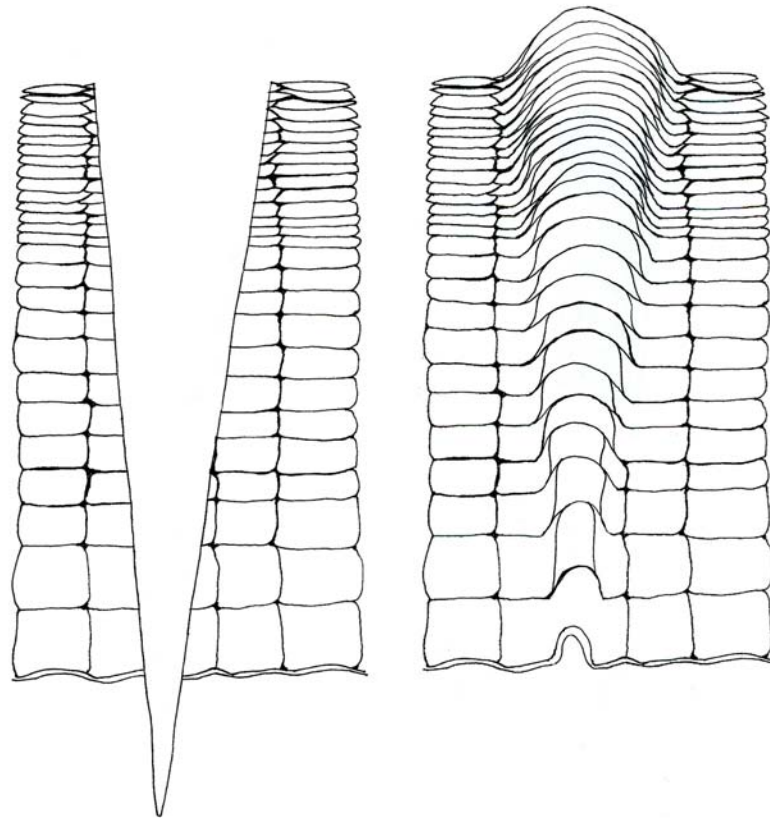


Figure 73: Diagram of Scarification: skin is cut into dermal layer and irritated to form hypertrophic or keloid scar tissue (Cobbold, Sherratt, 2000; illustration by Cartwright-Jones, 2006)

Scarification is the process of cutting the skin through to the dermis and rubbing irritants into the wound to create a decorative hypertrophic or keloid scar. This body art form is presently most frequently practiced in sub-Saharan Africa, in populations

that have a genetic predisposition to keloid scar formation. Scarred areas are often oiled to enhance the beauty of the patterns for ceremonial occasions. Scarification is done on relatively thin skin, which is easily cut through, not on palms or soles. Scarification is also less common on body areas where contact urine or feces could cause serious infection.

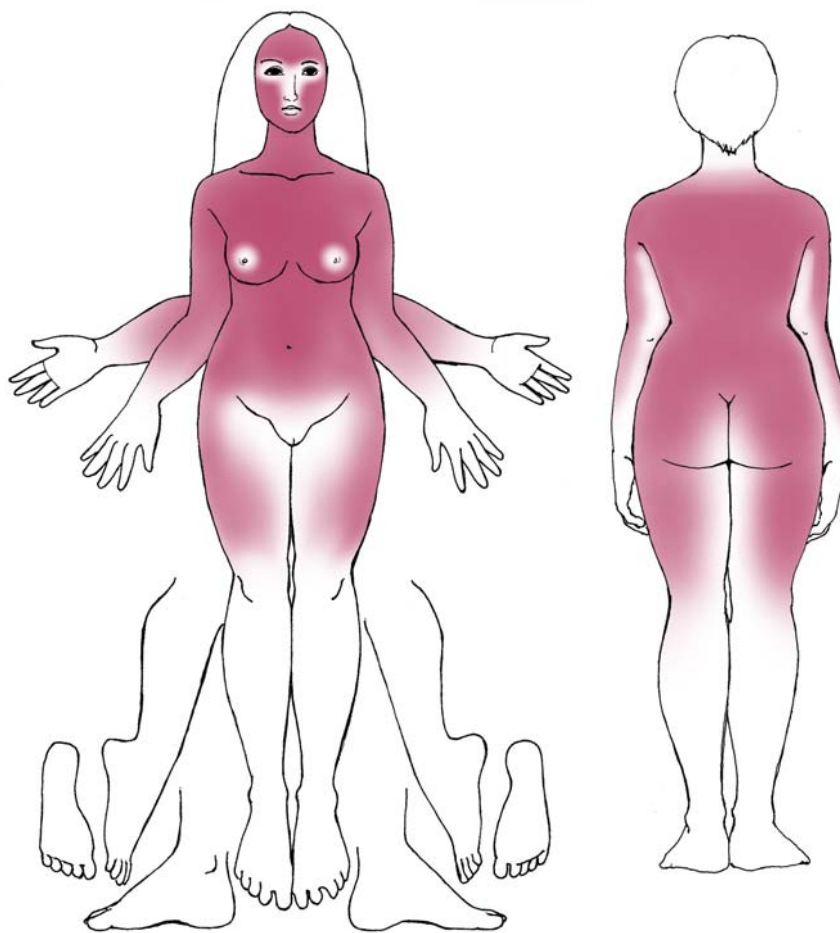


Figure 74: Areas most frequently ornamented with scarification (Cartwright-Jones, 2006)

Scarification is a painful and bloody process, but the areas of the body most frequently cut are not the most sensitive areas, and the body responds to the trauma of injury by releasing endorphins: naturally occurring opiates. The participants in a scarification ceremony more often feel euphoria, or an altered state, rather than excruciating pain. (Ferentz, 2001)



Figure 75: Nuba scarification technique, Sudan (Thevoz, 1984: 38)

Figure 75 shows the scarification process. In this picture, you can see scarification on the face finished and scarred over, the back area in the process of healing, and the upper arm area being newly cut. The recipient calmly observes the process and may be enjoying the endorphin response.

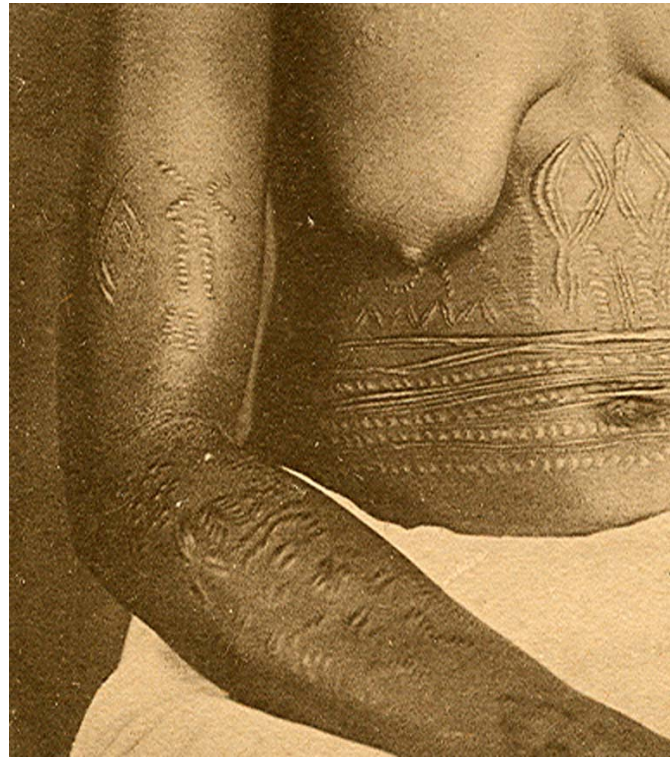


Figure 76: Une Femme tatouée de race Bangala (Nels, 1910, postcard in author's collection)

Figure 76 shows an early 20th century Bangala woman's arm and belly scarification patterns. African scarification may have pattern elements similar to henna patterns, and the patterned area has some overlap with henna and tattooing. If a line drawing or incised sculpture were made of this woman, and viewed out of context, it would be difficult to be certain whether the arm patterns represented henna, tattooing or scarification. However, viewed in the context of the Sub-Saharan region, the interpretation would be clear: the woman's belly patterns are unique to sub-Saharan Africa. Several dark skinned keloid-forming groups scar women's bellies before

puberty in anticipation of stretching during pregnancy. When the belly distends in late pregnancy, the stretch marks align with the cuts, so stretch marks form attractive, culturally significant patterns rather than random gashes.

Understanding the technique and processes of henna, tattooing, paint and scarification can assist in interpreting images of adorned bodies so ancient that only minimal context is available. In Figure 77, a Neolithic rock painting in Algeria, the body is marked.



Figure 77: Sahara Rock Painting, 5th millennium BCE, Tassili N'Agger, Algeria (Thevoz, 1984: 8)

The person depicted is probably a dark-skinned person, as the low latitude sunshine would injure an unclothed pale-skinned person. The markings on the breasts are

unlikely to be paint, because women needed to keep their breasts available for on-demand nursing. Henna stains would be a low contrast marking on a dark woman's back and breasts, and this painting implies that the markings were a high color contrast against the skin. Tattooing is possible, but carbon-based tattooing is more common on light skin than dark skin, again because of the low color contrast. Scarification is the most plausible source for these body markings, done to enhance stretching in breast development, and weight gain in the hips and buttock area, with complimentary patterns on her back and upper arms. These patterns are intriguingly similar to the Sudanese patterns in Figure 75.

Differentiating Henna From Other Indian Body Adornments That Resemble

Henna: *Impatiens Balsamica*



Figure 78: Nails stained red-orange with the lawsone from *impatiens balsamica*

(Bookish Gardener, 2004)

The Bhils of Rajasthan have a tradition of hennaing fingernails and palms with crushed *timadia* (*Impatiens balsamina*) flowers, which contain lawsone as henna does. The flower grows wild in the Udaipur district. The stain is not as intense as that from henna, and stays red-orange, which is culturally a more auspicious color than henna stains which can oxidize to near black. (Kumar, 1997)

Differentiating Henna From Other Indian Body Adornments that Resemble

Henna: Lac



Figure 79: Lovers with Lac-painted hands and feet, Orissa, 19th century (Comfort, 1997: 53)

Historical records of Indian cosmetics indicate that lac was used to stain palms and soles vivid red, and to paint a red line around the edge of the foot (Auboyer, 1965: 181). Lac is a red cosmetic derived from the scarlet resinous secretion of the *Laccifer lacca*, a scale insect. Thousands of these tiny insects colonize branches of red dye containing Acacia catechu trees, and their excretions are a vivid red resinous pigment. People harvest the *Laccifer* infested branches, and refine the vivid red resin and dye. Lac production has long been established in Northern India, Bangladesh, Myanmar, Thailand, Laos, Vietnam and parts of China. One of the centers of lac production in India is Orissa.

Older artifacts in northern and eastern India showing vivid red palms and soles might be depictions of henna, but may be more likely to be depictions of lac. One possible clue as to a determination of whether a particular subject's red soles are lac or henna would be the appearance of footprints: when a woman with lac-stained feet walks across a floor, she leaves red footprints (Auboyer, 1965: 270).



Figure 80: Krishna and Radha, Jaipur School, 1810: red toes and feet may be either henna or lac

Henna, sandalwood and lac were used simultaneously as cosmetics in India from the Gupta period (Auboyer, 1965) and probably as early as the Vedic period. Henna was used to clean and dye hair, and was used for skin, particularly as a coolant in hot weather. Henna possibly grew throughout India, except in areas of high precipitation or low temperature minimums. Lac was the preferred vivid red skin paint in northern and eastern India, where it was naturally available or through trade connections. Sandalwood was used on the body and face where it was naturally available in Southern India, or through trade connections. One can propose which cosmetic was being used in a particular instance, based on the geography of skin and the geographic location in India, though absolute judgment between lac and henna on feet and palms

may not be possible without corroborating evidence from other sources. In Figures 79 and 80, the semi-arid climate of Jaipur would favor henna as a source for red body markings whereas the high precipitation area of Madhuban would favor lac as a source of body markings.



Figure 81: “Lakshmi” Madhubani Folk Art (Devi and Jha, 2006)

Indian paintings from about 1750 forward show red patterns on women’s hands and feet. These are not the patterns we presently associate with “traditional Indian henna”. They are mostly simple line and dot patterns, and may have been created with lac rather than henna. The complex henna patterning currently popular in India is a very recent

innovation did not begin before the 1960's when stone burr mills were installed in Sojat region henna processing industry. Improved hammer mills were introduced in 1980, and were improvised and improved during the 1980's including air-cooling towers to preserve henna quality during the milling process. Pulverizers introduced in the 1990's brought the quality of henna powder to its present state where it can be easily mixed and manipulated into fine, delicate patterns (Chand, Jangid, Roy and Singh, 2005, 51).

Cultural Carriers of Henna

The earliest text evidence of henna body art is from the 15th century BCE Ras Shamra texts, the Ugaritic Myth of Baal and Anath, according to the Version of Ilimilku (De Moor 1971: 85). The fragment of CTA 3:B.2-3, “kpr . šb . bnt . rh . gdm w’anhbm .” is translated as “henna of the seven girls, scent of saffron and purple snails”. In context this refers to a springtime event of young women adorning themselves with henna to seek mates, coinciding with harvesting the murex dye-bearing snails, the gathering of fragrant wild crocus, and the appearance of the Pleiades in western sky at sunset. This event was a fertility, feasting and sacrifice event that was the predecessor of Passover, Id al-Adha and Easter. Images of young women with red marked hands, presumably related to and illustrating this myth, can be found around the Mediterranean region throughout the bronze age, and into the early Roman period, in areas of Minoan, Syrian, Mycenaean, Punic and Phoenician colonization. The fertility religion of Baal and Anath, interlocking with a grain-dairy based agro-ecological system was a strong early carrier of the bridal henna tradition.

When Jews migrated into Palestine between 1700 and 1200 BCE, they entered a region where the Baal and Anath myth was the dominant belief system, and where henna was strongly associated with young women, sexuality, fertility, celebration, and sacrifice. Early texts show that the Jews were unfamiliar and uncomfortable with the henna markings on young women (Adam and Eve XX: 31), but by the time the Song of

Solomon was written; they had become fond of henna (Song of Solomon, I: 14). As Jews immigrated out of the region after the fall of Jerusalem, they carried the bridal henna traditions with them into North Africa (Rubens, 1967), the Arabian Peninsula, Yemen, India, and the Levant (Brauer (1993), where they continued until the present era. When Jews immigrated outside of the climate zone for henna, the traditions were not maintained.

The earliest Christians probably continued the same bridal and seasonal henna traditions as were common Jerusalem at the beginning of Christianity. "Hanging with Christian Images", from 6th century Byzantine Egypt, presently in the Cleveland Museum (accession number 1982.73) shows three people with red markings on their raised hands. This may be evidence of early Christian used of henna. Coptic Christians and Armenian Christians hennaed for weddings until the present era. Christian women in medieval Spain and Sicily used henna during periods of Arabic cultural influence. Christians further north could not keep up the practice outside of the climate zone.

The cultures of the Arabian Penninsula were strong carriers of henna. There are Arabic records of hennaed hands being strongly associated with marriage (Sunan Abu Dawud, 33: 4153 and 4154: Aisha, Ummul Mu'minin). In Yemen, there are records of henna being associated with celebration according to the description by Ibn Habib al-Baghdadi's Kitab al Muhabbar (Mernissi, 1987: 71). Henna was associated with cleanliness and health in the medical texts of 13th century Ibn Qayyim Al-Jawziyya.

Henna was carried with the Arab culture as it expanded westward across North Africa, into Spain, and eastward through the Middle East, India and into Malaysia. The Night of the Henna reinforced henna traditions where they previously existed and spread the tradition into areas where it had not been. Hajj brought Muslims together in Mecca each year, and henna from Mecca was a favorite gift as pilgrims returned to their homes. The spread of Islam matched the climate zone for henna closely enough that henna was available to maintain the traditions. Henna is part of the celebration of Ids, marriage, circumcision, and many other joyous holidays, as well as daily grooming.

In India, devotional paintings of Hindu goddesses Kali, Lakshmi and Durga typically have red hand and foot markings, and had at least since the Gupta period. Some male deities, particularly Ganesha, also have these marking. However, it is uncertain where and when these red markings may have been henna and where and when they may have been henna, if there is a clear division between these, or whether they were interchangeable.

At present, henna is used for Diwali and other auspicious occasions in western India (Sharma, 2006). Henna has been used for weddings in the Punjab since at least 1700 CE, in the Muslim communities. Eyewitness reports, as recently as 1940, indicate that henna was a part of Indian Muslim weddings, but not Indian Hindu weddings. In the last thirty years, the Punjabi style wedding traditions, with a “night of the henna” and sangeet, have spread into a “pan-Indian” wedding tradition, carried by motion pictures

and women's magazines. The motion picture "Devdas" (2002) is credited by henna artists (Bahar, 2006) as setting the style for bridal henna across the subcontinent and into immigrant communities by videotape and DVD. Popular magazines such as Viya, Asian Bride, and Asiana advertise henna artists and their work, making bridal henna currently a lucrative and competitive business in India, as well as US and UK immigrant communities.

Sikhs in India and immigrant communities celebrate weddings and Diwali with henna (Sahib, 2006). Zoroastrians celebrate weddings with henna (Dalal, 2006). Figures of the Buddha and other Buddhist deities in India, Nepal and Tibet frequently have red palms and soles, but this could be lac rather than henna.

Chapter III:

Using Criteria to Evaluate Body Markings on Artifacts

In Chapter One, I demonstrated that there has been no coherent study of henna in the west, particularly its historical geographies, and that is complicating laws, commerce, and use of henna. To solve this problem, one could map the historical geographies of henna if one could collect sufficient artifacts that demonstrate the presence of henna, and place them in time, space, and culture. To do this, one would have to establish criterion for identifying what is, and is not henna. In Chapter Two, I proposed for identifying henna based on the characteristics of human skin and henna. These should be the same at present as they were ten thousand years ago. In this chapter, I will demonstrate how these criteria can be used to examine body markings on artifacts and determine whether these may be interpreted as presence of henna body art. In Chapter Four, I will show how the artifacts that have positive evidence of henna can be mapped to construct the historical geographies of henna.

Some artifacts will have strong evidence of henna. Some will have weak or inconclusive evidence of henna. Others may be evidence of body markings from other sources such as tattoo, scarification, or body paint. Recent artifacts will have the most easily identifiable evidence of henna, because there will be more corroborating evidence available, and the evidence will not have deteriorated. If a one-year-old artifact has body markings that are completely consistent with henna, and inconsistent with any other sort of marking, we may proceed to discuss the artifact as representing evidence of henna body art. If a ten thousand year old artifact has body markings that are completely consistent with henna, and inconsistent with any other sort of marking, we may proceed to discuss the artifact as representing evidence of henna body art. Unfortunately, ten thousand year old artifacts are unlikely to have an intact representation of body markings, nor are the representations as clear as in a photograph, so conclusions drawn cannot be as firm as those from a photograph. Even with incomplete information to populate the groups of criteria presented in this chapter, the available evidence of body art can be “sieved”, to support or negate evidence of ancient evidence of henna.

Criteria Groups for Evaluating Artifacts with Body Markings

There are four groups of criteria proposed: Criteria groups I through IV are groups of positive, supporting, ambivalent and negating evidence of henna based on what has been established in Chapter Two.

Criteria Group One: Negative Evidence of Henna

First is a “negative” group of criteria to eliminate objects from consideration that cannot possibly be representations of henna. These criteria have a list of characteristics that would eliminate henna as a source of markings, based on the information in Chapter Two. If any object has the following characteristics, it cannot be henna, and should be eliminated from consideration as henna body art

- Location: Western Hemisphere
- Climate: Temperature minimum below 11C
- Climate: moderate to heavy precipitation
- Black body markings on upper arms, legs, torso, or head

- Bright red body markings on upper arms, legs, torso, or head
- Color other than henna range (such as blue or yellow)
- Cultural celebrations do not include henna
- Material culture does not use henna
- Trade routes unavailable for importing henna from cultivation areas
- No words in language for henna plant and/or henna art

If an artifact has body markings which might be henna, or a word in text that might be “henna”, but has these negative criteria, is unlikely to be evidence of henna. For instance, a woman with the name “Henna” in Iran may be named after the henna plant. A woman with the name “Henna” in Finland is probably not named after the plant.

Criteria Group Two: Positive Evidence of Henna

Criteria Group Two identifies strong characteristics of henna body art. Any artifact that has “positive evidence” of henna from Criteria Group Two, and no “negative evidence” from Criteria Group One, it should be considered as “possibly henna.” If an object is determined to be “possibly henna”, additional evaluation through Criteria Groups Three and Four can determine if there is supporting evidence for henna. Criteria Groups

Three and Four identify supporting, and ambivalent evidence of henna. Based on the information in Chapter Two, the following should be considered strong evidence of henna.

- Location: Eastern Hemisphere
- Climate: Temperature minimum over 11 C
- Climate: Temperature maximums over 30C
- Climate: Low to moderate precipitation
- Marking Position on Body: Palms, soles, fingers, toes
- Fingernails or toenails stained red, brown, or near black
- Color within range of henna

According to Criteria Group Two, if a tenth century Spanish illuminated manuscript has a painting of a people with black and red markings on their fingernails, hands and feet, the painting meets all of these criteria, and the markings may “possibly represent henna”. If there are cultural, trade, and linguistic evidence from Criteria Group Three that apply to this artifact, such as the markings being on women of childbearing age, the language including a word for henna, and known commercial trade in henna, then we can say that the markings “probably represent henna”.

Criteria Group Three: Supporting evidence of Henna

The elements of Criteria Group Three are not in and of themselves positive evidence of henna body art, but they corroborate evidence of henna use and availability based on known characteristics of culture, language and trade. If an object has markings that appear consistent with Criteria Group Two and has supporting evidence from Criteria Group Three, this strengthens the case for henna, and moves the artifact from “possible evidence of henna” to “probable evidence of henna”.

- Markings appear on female of childbearing age
- Cultural celebrations include henna
- Indigenous words in language for henna plant and/or henna art
- Trade routes available for importing henna from cultivation areas
- Material culture includes other uses of henna: such as dye, preservative, or perfume
- Ethnomedical practice includes henna

For instance, if a New Kingdom Egyptian blue faïence bowl has a figure of a woman with a pattern on her thigh, this would meet some of Criteria Groups Two and Three. However, the placement of the pattern falls in Criteria Group One, and should be further analyzed for potentially ambivalent evidence of henna.

Criteria Group Four: Ambivalent Evidence of Henna

Criteria Group Four is a set of body art characteristics that may apply to henna, but which also may be characteristics of tattoo, paint, or scarification. One cannot draw a conclusion that objects with these markings are henna without supporting evidence from Criteria Groups Two and Three.

- Marking Position: lower arms and hands, lower legs and feet
- Bright red body markings on hands and feet
- Black body markings on hands and feet
- Brown marks on torso or head
- Brown marks on upper arms and legs
- Markings appear on man
- Markings appear on child
- Foreign words in language for henna plant and/or henna art

In many cultures, tattooing, painting, and other forms of body marking are done in combination with henna, or in the place of henna. These ambiguous markings, such as the one previously proposed of a blue faïence bowl, should be examined in context of as much additional information as possible to make the determination of whether it is henna or another form of marking.

Using the Criteria Groups to Evaluate Evidence of Henna Body Art:

Evaluation of evidence using these criteria groups is not sufficient to prove any particular artifact shows evidence of henna use, but is nonetheless useful in proposing whether a body marking represents henna or not, and supporting that proposal. These criteria groups can be used to support or eliminate henna as a source of body markings in ancient artifacts. The most recent artifacts will have the most corroborating information available to make the strongest cases for the presence or absence of henna, and older, broken artifacts will have less, with information lost over time. As more artifacts can be brought in to populate the group, the more robust the evidence for henna will be.

Following are ten examples of artifacts that have body markings, which will be analyzed through the criteria groups to determine whether or not these may be interpreted as representations of henna.

Example One:

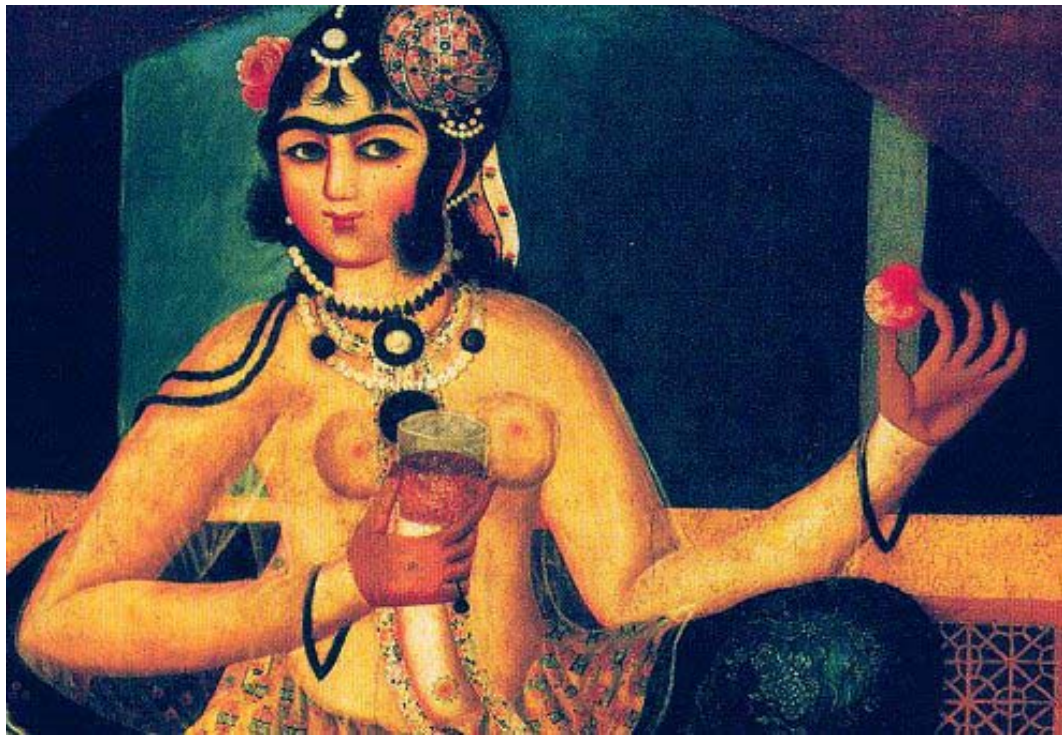


Figure 82: Example One; detail, Two Harem girls, attributed to Mirza Baba, Iran 1811-14, Collection of the Royal Asiatic Society London, 01.002

Figure 82 from Qajar Iran shows a young woman with red-stained hands, and black markings on the back of her hand and around her navel. When we apply the criteria groups to this image we find no negatives from Criteria Group One, the criteria for negative evidence of henna. From Criteria Groups Two and Three we find strong confirming evidence that the red color of the woman's hands represents henna.

Criteria Group Two: Positive Evidence of Henna

- Location: Iran
- Climate: Temperature minimum over 11 C: Yes, in Persian Gulf region
- Climate: Temperature maximums over 30C: Yes, in Persian Gulf region
- Climate: Low to moderate precipitation: Yes, in Persian Gulf region
- Marking Position on Body: Yes, the red orange color is on the palms and fingers
- Fingernails or toenails stained red: Yes, the fingernails are stained red
- Color within range of henna: Yes, the color is in the red-orange range

Criteria Group Three: Supporting evidence of Henna

- Markings appear on female of childbearing age: Yes, the woman is a young post-pubescent female.
- Cultural celebrations include henna: Yes, Iranian culture has a long and well documented tradition of celebrating holidays and weddings with henna.
- Indigenous words in language for henna plant and/or henna art: Yes, the word for henna in Farsi is pronounced *Hina*
- Trade routes available for importing henna from cultivation areas: Yes, henna can be grown near the southern coast of Iran.

A close examination of this painting in Figure 83, an enlargement of her hand and navel, shows that the young woman had more than one kind of body adornment. Her hands are stained a color consistent with henna, but she also has a small black pattern

on the back of her hands. She also has black markings consistent with tattooing around her navel. These are consistent with records of women's tattooing traditions in Iran during the Qajar period. (Field, 1958)



Figure 83: detail, Two Harem girls, attributed to Mirza Baba, Iran 1811-14, Collection of the Royal Asiatic Society London, 01.002

In this enlargement, you can see that the solid orange color on her hand is covering another pattern going along the base of the hand and thumb and up the index finger. I have examined similar Qajar paintings in the Victoria and Albert Museum that show patterns underneath an orange over painting. A previous darker henna pattern was painted over with a simple “dip” pattern, possibly to bring the image “up to date” with changing court styles. The above information supports an interpretation that this image represents henna body art worn by fashionable women at the Qajar court, but may also show a change in henna fashion!

Example Two:



Figure 84: Example Two.

A Lady Playing the Tanpura, Rajasthan, Kishangarh, ca. 1735

Metropolitan Museum of Art, New York, Fletcher Fund, 1996 (1996,100.1) Indian

Court Painting, 16th – 19th C

In Figure 84, a female musician has red fingertips, indication of a red palm, and a red mark on her forehead. When we apply the criteria group to this image we find no negatives from Criteria Group One for the red stains on her hands, so we may proceed to investigate those body markings as possibly representing henna.

Criteria Group Two: Positive Evidence of Henna

- Location: Eastern Hemisphere: Yes, this image is from India
- Climate: Temperature minimum over 11 C: Yes, this is from Rajasthan, where the temperature minimum was over 11c during the 18th century
- Climate: Temperature maximums over 30C: Yes, this is from Rajasthan, where the temperature maxima were above 30C C during the 18th century, based on flora in local landscapes paintings during that time and period. The flora included mangos, bananas, and other tropical plants (Kossak, 1997, Figs. 70, 41, 34).
- Climate: Low to moderate precipitation: Yes, this is from Rajasthan, a semi-arid zone where there were prolonged droughts during the 18th century, based on landscape paintings from 18th century Rajasthan showing semi-arid conditions similar to those at present, as well as depictions of violent monsoon storms (Kossak, 1997, Figs. 52, 56, 58, 71).
- Marking Position on Body: Palms, soles, fingers, toes: Yes, there are markings are on palms and fingertips.
- Fingernails or toenails stained red, brown, or near black: Yes, her fingernails are stained red.

- Color within range of henna: Yes, the stain color on fingertips, palms, and nails is red-orange, consistent with henna.

The above constitute strong evidence of henna body art on the palms, fingertips and fingernails in Figure 84.

Criteria Group Three: Supporting Evidence of Henna

- Markings appear on female of childbearing age: Yes, these markings appear on a sexually mature female.
- Cultural celebrations include henna: Yes, Rajasthan's cultural celebrations frequently included henna during the 18th century according to eyewitness accounts in British diaries.
- Indigenous words in language for henna plant and/or henna art: Yes, Rajasthani and Gujarati languages use "*mehandi*" and similar words to refer to the plant and art of henna.
- Trade routes available for importing henna from cultivation areas: Yes, henna may have been indigenous to Rajasthan, and was cultivated there from the 18th century on.
- Material culture includes other uses of henna: such as dye, preservative, or perfume: Yes, henna was a village hedge plant, and flowers were used in perfume in Rajasthan.
- Ethnomedical practice includes henna: Yes, folk medicine in Rajasthan uses henna to cool the body in extremely hot weather.

The above are corroborating evidence that support the conclusion that the red markings on palms, fingertips and fingernails represent henna, except for the consideration that fingertips and nails also are consistent with an *Impatiens Balsamica* stain, which was available in the area, and has been used for such.

The forehead bindi mark would be negative for henna: though henna can stain the face, it does not leave dark reddish brown marks on the forehead. It is more probable that her bindi was done with kumkum or sandalwood, the cosmetics traditionally used for that purpose.

Therefore, in Figure 84, we can tentatively identify the fingertips and nails as being stained with henna, though they could also have been stained with *Impatiens Balsamica*.

Example Three



Figure 85: Example Three; King Mahajanaka, Ajanta Caves, Cave I, Sankhapala
Jataka, Maharastra India, 5th – 6th century CE (Behl, 1998, fig. 97)

There is no negative evidence of henna from Criteria Group One for Figure 85. There is much positive and supporting evidence from Criteria Groups Two and Three.

Criteria Group Two: Positive Evidence of Henna

- Location: This image is from Maharashtra, India is in the southwestern Indian subcontinent, where henna grows easily.
- Climate: January mean temperature in Maharashtra is presently 19 C, suitable for henna, and was probably approximately the same in the year 400 CE as at present. The Ajanta paintings include depictions of tropical flora, consistent with a very warm climate with moderate precipitation.
- Climate: Temperature maxima in Maharashtra, India are over 38C in May at present, so can produce good dye content in henna. The near-nude state of many figures implies that the maxima were warm enough for people to wear little clothing.
- Climate: Low to moderate precipitation: Maharashtra has 2000 mm annual precipitation, not ideal for henna, but suitable for henna to grow easily.
- Marking Position on Body: Palms and soles marked
- Color within range of henna: brownish

Criteria Group Three: Supporting evidence of Henna

- Markings appear on female of childbearing age: This figure is a male, but female figures in the painting have the same hand markings.
- Indigenous words in language for henna plant and/or henna art: Court records for the period mention henna (Auboyer, J.; 1965: 88).

- Material culture includes other uses of henna: such as dye, preservative, or perfume: court records from the Gupta period describe henna use as a hair dye (Auboyer, J.; 1965: 88).

The palm markings are consistent with henna, and not out of place on a male in India during that period. Many female figures on the Ajanta caves have the same palm and sole markings. However, these markings are also consistent with lac, which is recorded as being used to tint palms and soles in India during that period. (Auboyer, J.; 1965: 88)

If the original color painted were vivid red that would support the interpretation of the hand markings as being made with lac. If the original color painted were brownish red or brown that would support the interpretation of the hand markings as being made with henna. Without knowing whether the color painted on the palms of these figures has remained stable or has changed in 1500 years, it's impossible to determine whether these markings represent henna or lac.

Example Four

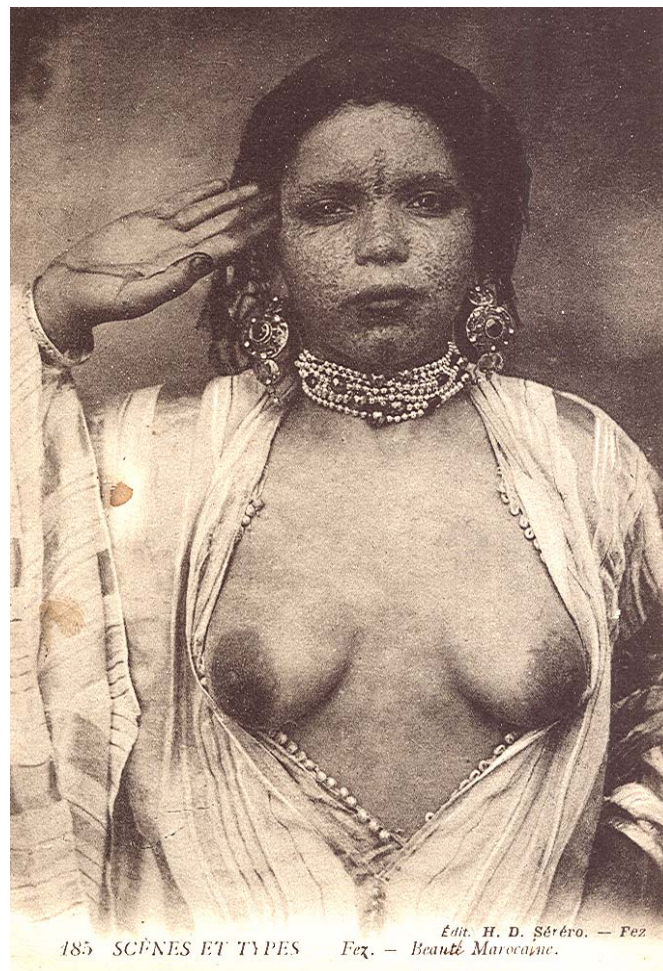


Figure 86: Example Four; Postcard 185: Scenes Et Type, Fez, Beauté Marocaine

H. D. Séréro, Fez, Mailed 1909 (author's collection)

There is no negative evidence from Criteria Group One for the hands in Figure 86, though there are markings on the woman's face that cannot be henna.

Criteria Group Two: Positive Evidence of Henna

- Location: This is from Morocco, where henna grows easily, and is presently commercially cultivated
- Climate: Temperature minima in Morocco are over 11 C except in the mountainous regions, and so is suitable for henna.
- Climate: Temperature maxima on Morocco are over 30C except in the mountainous regions, and so is suitable for henna.
- Climate: Precipitation is low to moderate in Morocco, and so is suitable for henna.
- Marking Position on Body: The fingers appear to have dark patterned stains.
- Color within range of henna: This is unknown, due to photographic and reproductions limitations, but indicates a dark stain.

Criteria Groups One and Two support the dark finger markings in Figure 86 as being “possibly” henna. Corroborating evidence from Criteria Groups Three and Four may be used to further identify this woman’s markings.

Criteria Group Three: Supporting evidence of Henna

- Markings appear on female of childbearing age: This woman is a post-pubescent female.
- Cultural celebrations include henna: Yes, henna was used for adornment in many Moroccan celebrations at the time of this photograph (Westermarck: 1914).

- Indigenous words in language for henna plant and/or henna art: Morocco used the Arabic word, “henna” for the plant and the body art.
- Local cultivation of henna: henna grows easily in Morocco.

Figure 87 is an enlargement of this image shows staining consistent with henna on the woman’s thumbnail, a streak across her palm, and staining on her index and middle fingers. Her forehead, tip of nose and chin have marks not consistent with henna, but which are consistent with tattooing as described in Seawright (1984), and other texts on Moroccan women’s traditional body markings.

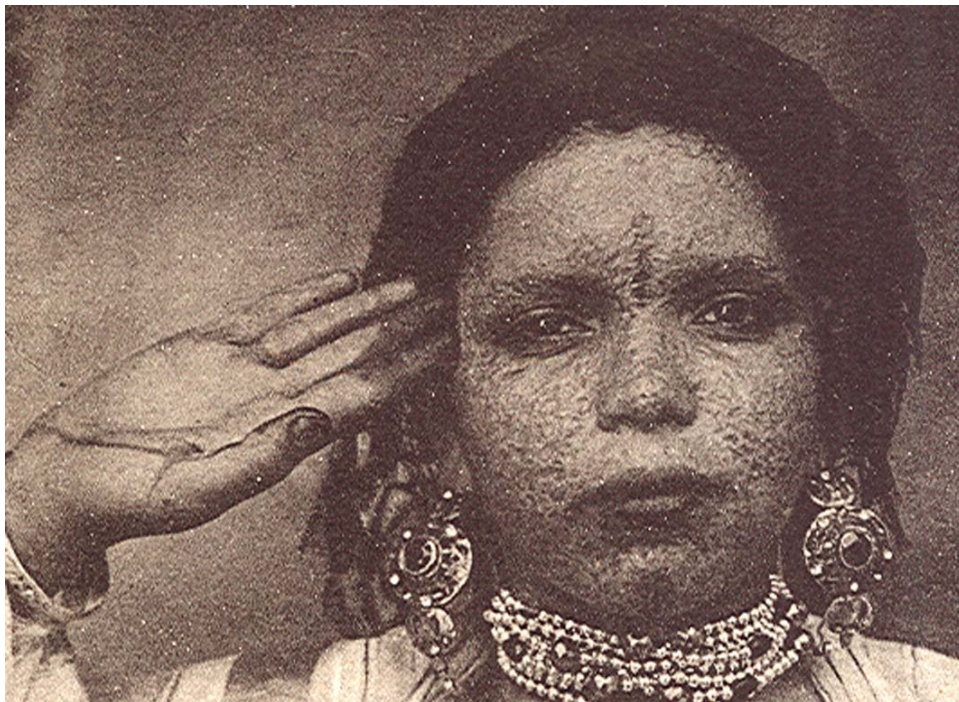


Figure 87: Detail: Postcard 185: Scenes Et Type, Fez, Beuté Morocaine

H. D. Séréro, Fez, Mailed 1909

The scarring on her face does not appear to be consistent with deliberate scarification markings; the markings are random and are more consistent with an accidental scalding or burning, both common household accidents. Skin mapping, geographic mapping, and corroborating cultural information strongly support this image as evidence of henna body art, combined with tattooing in Morocco, in the first decade of the twentieth century.

Example Five



Figure 88: Example Five: Post card, purchased from an Ebay auction, labeled “Arab woman” (purchased February, 2006, author’s collection)

Red markings on the hands may be considered evidence of henna. However, “Самоедка за выделкой оленьей шкуры. Самоедка за выделкой оленьей шкуры. Ненцы (самоеды). Из фотоархива РЭМ” is on the reverse of the post card, identifying the figure as a “Samoyed Woman”. This can be corroborated with an image of a Samoyed woman from the Russian Museum of Ethnology, Самоедка за выделкой

оленьей шкуры, seen in the Figure 88. The Samoyed are a sub arctic group of nomadic reindeer herdsman living in Siberia.



Figure 89: Самоедка за выделкой оленьей шкуры, Russian Museum of Ethnology,
http://www.ethnomuseum.ru/gallery24/256/606_370.htm retrieved March 19, 2006

Based on identification of this image as of a Samoyed woman, corroborated with Figure 89, many characteristics fall into negative evidence of henna:

Criteria Group I: Negative Evidence of Henna

- Climate: Siberian temperature minimum below 11C:
- Climate: Temperature maximum below 30C: Siberia
- Climate: moderate to heavy precipitation: Heavy snows

Based on the negative evidence that the climate in Siberia is inhospitable to henna, and and there are no known cultural or trade connections linking the Samoyeds to henna-using groups, the red on the woman's hands cannot be considered henna, and is more likely to represent red gloves, or blood from processing reindeer hides.

Case Study VI

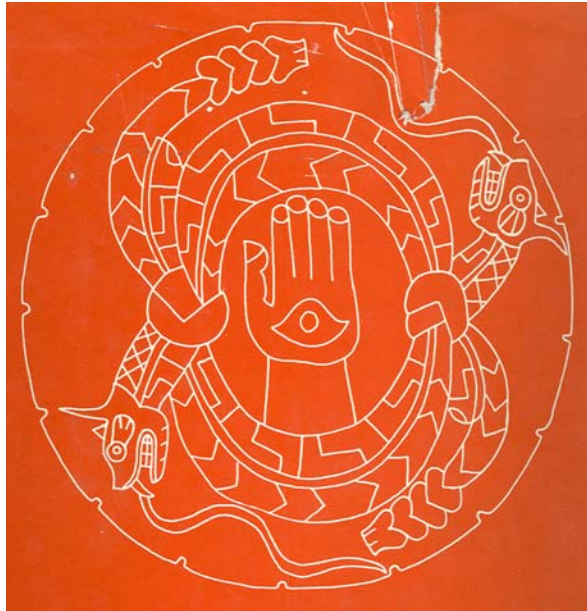


Figure 90: Example Six: Ceremonial object, carved stone circle

Figure III from Waring and Holder, 1945, (Fundaberk, 1957: p 53)

Figure 90 has an “eye in hand” pattern frequently seen in Middle Eastern and North African henna patterns meant to deter the Evil eye. However, this is a line drawing is of “The Rattlesnake Disk”, an engraved circular sandstone palette from Alabama, Tuscaloosa and Hale Counties, Moundville, A.D. 1300–1450. It is a pre-Columbian artifact, presently in the Alabama Museum of Natural History. This places this object into Criteria Group One, an object from the Americas prior to 1850, and therefore cannot represent henna body art.

Example Seven

Figure 91: Example Seven: Detail from *Life in The Country: The Nomad Encampment of Layla's Tribe*, Tabriz, 1539 – 43, Cambridge, Harvard University Art Museum, 1958.75

The illuminated manuscript from which Figure 91 is taken was painted in Tabriz, Iran, which is about 600 km north of the climate zone for henna. Tabriz has snowy winters and mild summers, which are Criteria Group I negative evidence for henna. However, Tabriz is on trade routes that could transport henna easily from the southern gulf shore region of Iran, where henna is cultivated, and has strong cultural traditions for henna use. Therefore, the cold climate of Tabriz does not eliminate the possibility that the girls and woman's hands and feet show henna patterning. Both have markings on their foreheads that should not be judged to be henna, and probably represent tattoos.

Criteria Group Two: Positive Evidence of Henna

- Marking Position on Body: Palms, soles, fingers, toes: Both the woman and the girl have markings on their hands and feet.
- Fingernails or toenails stained red, brown, or near black: The girl's fingernails and toenails are represented as being stained reddish orange and the woman's fingernails and toenails are represented as being stained black.
- Color within range of henna: The girl's hands and feet are within color range for a brief application of medium quality henna. The woman's hands and feet have patterns that are in a color range for henna of very high quality, which has been mixed with perfume, and has been darkened with heat or alkalini after paste removal. This would be consistent with the girl being of servant class, and the woman of higher rank.

Criteria Group Three: Supporting evidence of Henna

- Markings appear on females of childbearing age: The woman is certainly of childbearing age, and the girl may also be pubescent.
- Cultural celebrations include henna: Iran has a strong henna tradition, henna was praised in poetry of the period, and noted by travelers.
- Indigenous words in language for henna plant and/or henna art: In Iran, henna is referred to as “hina”.
- Trade routes available for importing henna from cultivation areas: Henna grows well along the Persian Gulf coast of southern Iran. There were well-established trade routes between the Persian Gulf and Tabriz.

Criteria Group Three: Ambivalent Evidence of Henna

- Black markings on hands and feet: The woman has black patterning on her hands and feet. High quality henna, mixed with alcohol-bearing perfume, then heated after application can leave a nearly black stain on skin. Since the soles and palms are patterned as well as the tops of feet and backs of hands, it is unlikely that these marks represent tattoos. It is also unlikely that this represents a black cosmetic paint. On the sole of the foot, black paint would soil shoes and smear with walking. On the fingertips and palm, black paint would soil her food and the child she is nursing. The black markings also only occur on the areas of the hands and feet that can easily be oxidized to a black or near-black color. Many images from Safavid art show similar black markings on hands and feet, and since they always include black markings on fingertips

and fingernails, and rarely extend beyond the wrist or ankle, this would favor the interpretation of darkened henna rather than black body paint.

- Brown marks on torso or head: Both females also have markings on their foreheads, which would not be henna markings. Iranian women have facial tattooing traditions, so it is probably that these marks represent forehead tattoos.

This evidence from the criteria groups indicates the hand and foot markings on the females in Figure 91 are probably representations of henna, and the forehead markings are not.

Example Eight



Figure 92: Example Eight: Figure from the Little Palace

Knossos Post-Palace Period, 1400 – 1100 BCE Gallery X, Case 140, Figure 46,

Herakleion Museum, Greece

Figure 92, a ceramic female figure has markings on palms, knuckles and fingertips. There are additional markings on wrists, throat and chest. The throat markings are very unlikely to represent henna, and are more probably representations of a necklace, and Figure 93, a similar piece, clearly has a necklace in the same place. The wrist markings

may represent bracelets, and the lines on the torso seem likely to be clothing. The hand markings may be examined in Criteria Groups Two and Three for evidence of henna.

Criteria Group Two: Positive Evidence of Henna

- Location: Eastern Hemisphere: The figure is from the Aegean Islands.
- Climate: Temperature minimum over 11 C: In warm climate periods, the Aegean islands temperatures do not fall below 11C
- Climate: Temperature maximums over 30C: The Aegean islands can be warm in the summer, but they don't get much above 30F.
- Climate: The Greek Islands have low to moderate precipitation with long, dry summers.
- Marking Position on Body: Palms and fingers: The markings on this figure are palms, fingertips and knuckles.
- Fingernails, fingertips, palm markings are brown: Though this figure is ceramic and the colors are limited to iron pigments, the color is consistent with that of henna.

Criteria Group Three: Supporting evidence of Henna

- Markings appear on female of childbearing age: The woman is post-pubescent.
- Indigenous words in language for henna plant: the words for henna in the Aegean islands at that period are *Cyperus* or *Phoinikion* (Chadwick, 1976, p 120-21)

- Records of henna grown on Crete (Chadwick, 1976, p 120-21): there was henna locally available, and there was not a need for import from another area.

The above evidence supports an interpretation of the hand markings on Figure 92 as representing henna, and indicates a probability of henna use in the Aegean Islands in 1400 – 1100 BCE.

Given the proximity in time and place of this figure and the mention of henna in the 15th century BCE Ras Shamra texts, the Ugaritic Myth of Baal and Anath, according to the Version of Ilimilku (De Moor 1971: 85), one could propose a connection. This is a figure of a young woman with hennaed hands, and she may be an illustration of the myth, a woman hennaed to go seek her husband. The Aegean Islands were commercial and cultural partners with Ugarit, where the Ras Shamra texts were written. They were also connected with Mycenaean, Crete, and Cyprus, where other similar statues have been found.

Example Nine



Figure 93: Example Nine: Figure from Paphos, Cyprus, 700 BCE;

The British Museum

Figure 93 is similar to Figure 92. A single arm remains on the figure, and there are red markings in the place of the palm. The wristbands and upper armbands probably represent clothing and bracelets. The location is Cyprus, a suitable zone for henna during warm climate periods as are the Aegean Islands.

Criteria Group Two: Positive Evidence of Henna

- Location: Cyprus, which is in the eastern Mediterranean
- Climate: In Cyprus, the temperature minima are over 11 C during warm climate periods.
- Climate: In Cyprus, the temperature maxima are over 30C during warm climate periods.
- Climate: There is low to moderate precipitation, and very dry summers in Crete.
- Marking Position on Body: The palms are marked.
- Color within range of henna: the marking color is consistent with henna, and differs from black markings denoting eyes, jewelry and clothing elements.

The Criteria Group Two above indicate there is a good support for the palm markings on Figure 93 as representing henna markings.

Criteria Group Three: Supporting Evidence of Henna

- Markings appear on female of childbearing age: this is an image of a post-pubescent woman.
- Cultural celebrations include henna: if this image is connected to the myth of Baal and Anath, or the fertility event described in the Book of Adam and Eve, women adorned themselves with henna for celebrations. In another section of the myth of Baal and Anath, she applied henna for a springtime fertility festival sacrifice and

hennaed again before she avenged Baal's murder by killing his enemy, Mot, the god of summer sun, heat and drought, (Hooke, 1963, 83).

- Indigenous words in language for henna plant and/or henna art: in nearby Ugarit, the word for henna was KPR.

Given the supporting evidence from the Myth of Baal and Anath, it is very likely that Figure 93 is representation of a young woman hennaed for celebration, and I believe these two figures support evidence of an early bridal tradition of henna in the eastern Mediterranean.

Case Study Ten



Figure 94: Example Ten: Xeste 3, “Lustral Basin” North Wall: Adorants, (photograph by J Liepe, Coumas, 1992)

Figure 94 is a wall painting from Akrotiri, excavated after being covered in the eruption of Thera in 1680 BCE. ON the north wall painting of Xeste III, there are young women with body markings that potentially represent henna. There is nothing in Criteria Group One that would preclude the interpretation of these markings as henna.

Criteria Group Two: Positive Evidence of Henna

- Location: Akrotiri is in the eastern Mediterranean
- Climate: The Akrotiri temperature minimum was over 11 C in the warm climate of the Bronze Age. Tropical plants are represented in other wall paintings.
- Climate: The temperature maximums in Akrotiri may have been over 30C, but were probably mild.
- Climate: Low to moderate precipitation is typical in the eastern Mediterranean.
- Marking Position on Body: There are reddish orange markings on the palms, and soles of some women in Xeste III, though these are not easily visible, and are indicated by a red line at the edge of the hand, foot and finger.
- Fingernails or toenails stained: on several of the women, the fingernails are colored red-orange.
- Color within range of henna: the reddish orange color is appropriate for henna grown in a climate without extreme heat.

Criteria Group Three: Supporting evidence of Henna

- Markings appear on females of childbearing age in Xeste III

- Cultural celebrations include henna: the women appear to be engaged in a cultural celebration
- Trade routes available for importing henna from cultivation areas: the Minoan world was a trading partner with Egypt, but they may have grown henna locally.

In Figure 94, from the north wall of the Lustral Basin room of Xeste 3, a woman's fingernails again are stained a color consistent with henna, and the red line at the palmar edge of the thumb may indicate that the woman's palms were also stained.



Figure 95: “The House of the Ladies”, Room 1, East Section, North Wall, Bare Breasted Female Figure: Detail of Feet (J Liepe photograph, Coumas 1992)

The woman's companion, shown in Figures 96 and 96 has red stains on the soles of her feet, red fingernails and red lines on the palm pressed to her forehead. A third companion in this group, wearing a spotted veil, has red stained fingernails and toenails. Taken together, these indicate that women stained their fingernails, toenails, soles and palms. These marking are consistent with henna stains in the body's geography.



Figure 96: Xeste 3, “Lustral Basin” North Wall: Adorants (photograph by J Liepe, Coumas, 1992)

“The House of the Ladies”, one of the northernmost buildings uncovered in Akrotiri, also has paintings of young women with body stains consistent with henna. In Room 1, East Section, North Wall, in the paintings of women with *Pancratium* Lilies, both women have rusty-copper colored markings on the soles of their bare feet and hennaed fingernails. These colors are consistent with henna stains from plants grown in cooler limits of the henna-growing zone.

If Figures 92 through 96 are taken together with the legend of Baal and Anath, this would support the possibility that henna bridal traditions originated in the early Bronze age, in the Minoan, Mycenaean and Phoenician civilizations, and may have spread across North Africa with their trade networks, also southward and eastward into the Arabian Peninsula and the Levant, where it was later embraced, reinforced and expanded with the expansion of Arabian culture in the eighth through fifteenth centuries.

The Results of the Evaluations

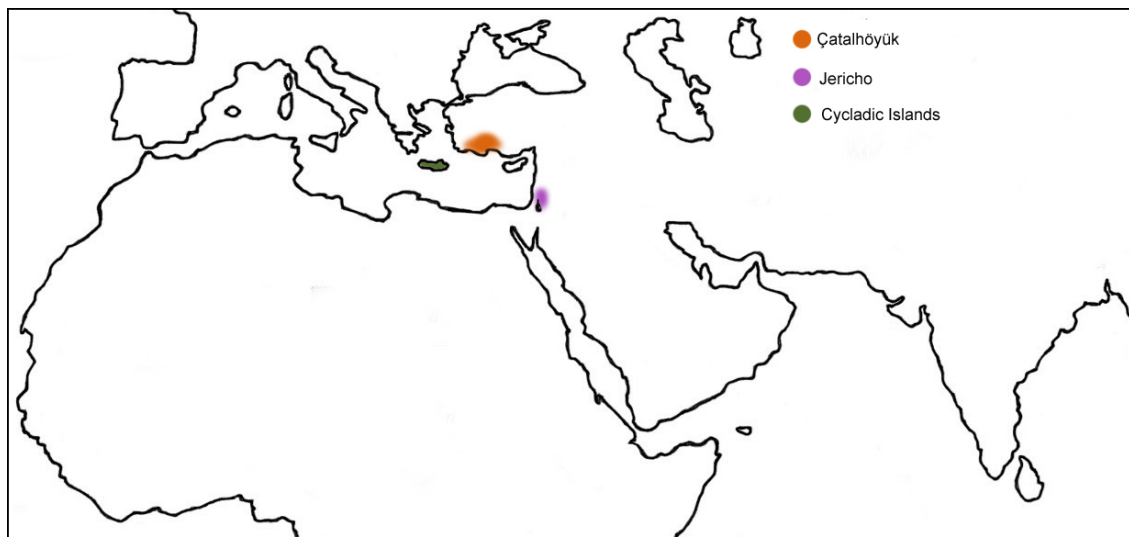
The examples in Chapter Three demonstrate that the presence or absence of henna body art on an ancient artifact can be systematically determined by evaluating them with the proposed criteria groups. Since these criteria are derived from what is known about henna, as discussed in Chapter Two, we should be fairly confident of these determinations. When many artifacts are examined and found to show evidence of henna, they can be mapped through time and space. These maps should reveal the geographies of henna. Chapter Four will propose maps of henna through periods of history based on available artifacts.

Chapter IV:

Mapping the Historical Regions of Henna

In Field's "Body Marking in Southwestern Asia" (1958), there are sixteen pages of mentions of henna through history, from Herodotus to Westermarck, each less than a paragraph. Field's collection of quotes is the most comprehensive academic collection of historic material on henna to date in English translation. Many scholarly investigations of women's culture in henna using countries briefly discuss henna traditions, such as Boddy's work on the Zar cult in Northern Sudan, "Wombs and Alien Spirits" (1989: 313 – 316) and Brauer's "The Jews of Kurdistan," (1993: – 349 and 122 – 124). If all available items determined to be evidence of henna could be systematically examined and mapped by place, culture and time, this should reveal the historic and present geographies of henna. This should assist further investigation of henna, and add rigor to that study. This should also provide a basis for the review of legal and commercial aspects of henna.

Location of Artifacts Between 6000 BCE and 3000 BCE That Show Positive Evidence of Henna Use



Locations of artifacts with body markings consistent with henna between 6000 and 3000 BCE

Figure 97: Areas of possible henna use between 6000 and 3000 BCE, based on artifacts that have body markings consistent with henna (map adapted from Kartographisches Institut Bertelsmann, 1989: 179) For larger map, see page 166.

Artifacts from Çatalhöyük, 6000 BCE, have images of red hands in ceremonial context in Shrine Level VII, 8, and there is some evidence of red markings on bulls in shrine E IV, 8 (Mellaart, 1963).

In Jericho at 6000 BCE, there is a death mask of an elderly person with hair and beard painted red (Mazar, 1992: 47).

Statuettes from the Cycladic Islands at 2800 BCE depict post-pubescent females with red markings on hands and fingers (Getz-Preziosi, 1994:49)

Other artifacts may exist which have not been excavated and studied, and other areas may have grown or used henna without leaving artifacts. This map only includes artifacts I have found to this date in English translations or publications.

Location of Artifacts Between 3000 BCE and 1400 BCE That Have Positive Evidence of Henna Use

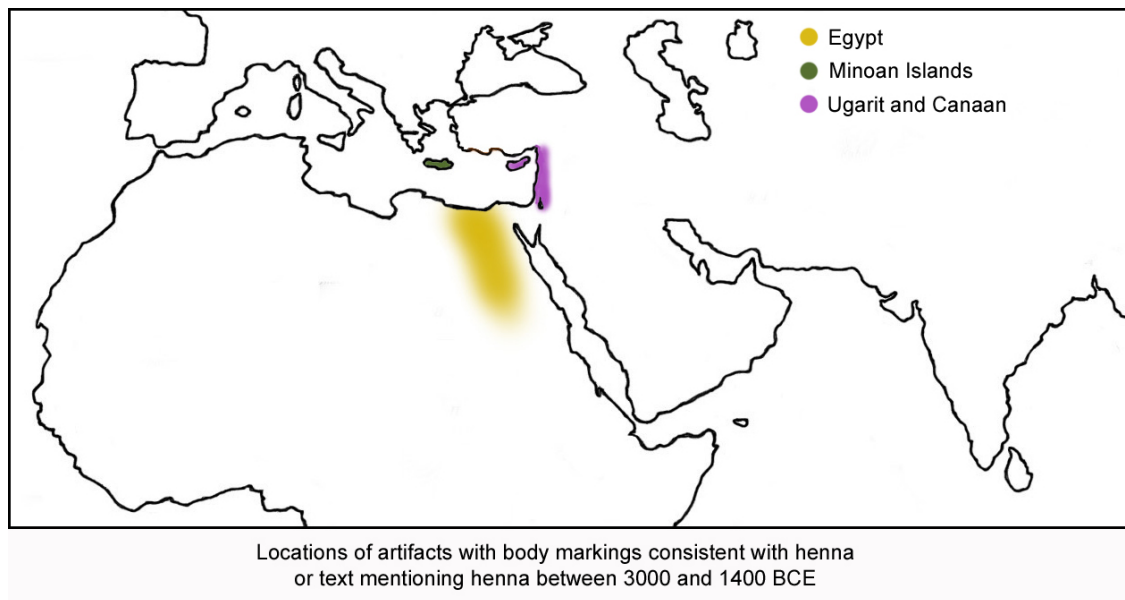


Figure 98: Areas of possible henna use between 3000 and 1400 BCE, based on artifacts that mention henna or body markings consistent with henna (map adapted from Kartographisches Institut Bertelsmann, 1989: 179) For larger map, see page 167.

In Egypt, between 3000 and 1400 BCE, henna was used for medicinal purposes. Older people dyed their hair with henna, and male and female mummies have been found with hennaed fingernails. The Egyptian word for henna was KPR or PKR.

Records from Ras Shamra and Canaan from between 3000 and 1400 BCE indicate that women used henna to dye their hair, fingernails, palms, soles, everyday and ceremonial body art (Hooke, S. H., 1965; de Moor, 1971: 85; Platt ed. 1970: 60-81). In the Ras Shamra texts, there is evidence of bridal use (de Moor, 1971: 85) and henna was primarily associated with post-pubescent females, though images of sacrificial bulls and goats also have red markings consistent with henna. The word for henna in the Ugaritic written language was KPR (de Moor, 1971: 85).

At Heraklion, prior to the eruption of Thera prior of 1680 BCE, women are depicted with red-stained fingernails, palms, and soles, in celebration or ritual context (Doulas, C, 1992).

Other artifacts may exist which have not been excavated and studied, and other areas may have grown or used henna without leaving artifacts. This map only includes artifacts I have found to this date in English translations or publications.

Location of Artifacts Between 1400 BCE and 500 BCE That Have Positive Evidence of Henna Use

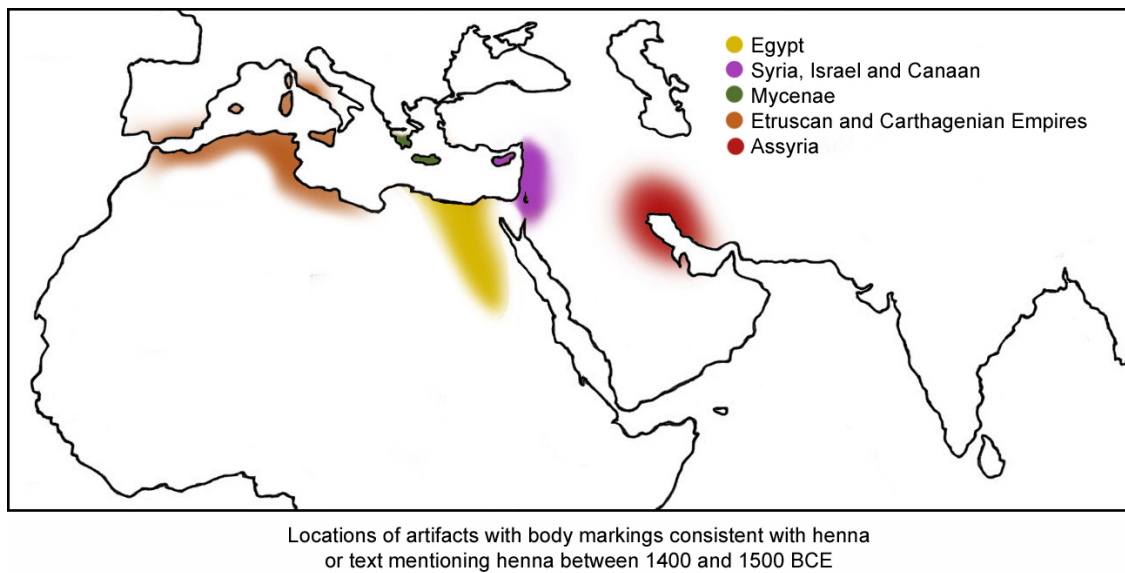


Figure 99: Areas of henna use in 1400 – 500 BCE, as supported in ancient texts and artifacts that have body markings consistent with henna (map adapted from Kartographisches Institut Bertelsmann, 1989: 179) For larger map, see page 168.

In Egypt between 1400 and 500 BCE, henna was used for hair dye, medicinal purposes and mummy preservation (Bryan, 1974, Ebers Papyrus, artifacts). It was used on hair and nails of both male and female mummies. The Egyptian words for henna were PKR and KPR.

In Syria, (Phoenicia), Canaan, and Israel, the words for henna were KPR in the Ugaritic (de Moor, 1971: 85), and camphire in Latin translations of texts (Shanks, 1993: 16). Henna was used to dye hair, fingernails, palms, soles, perfume, and for both everyday and ceremonial body art (Hooke, S. H.; 1965; de Moor, 1971: 85; Platt ed. 1970: 60-81). There is evidence of bridal use of henna (de Moor, 1971: 85; Platt ed. 1970: 60-81) and red markings only on post-pubescent females, though markings on horses and bulls may also be representations of henna

In Assyria at 800 BCE, there is a record of a women being hennaed for her marriage (Aubaile-Sallenave, 1982). Also, in 9th century BCE Assyria, there is evidence of hair dye and skin markings on both male and female images on the palms, soles and hair (British Museum WA124563 King and his Courtiers, North West Palace, Room 5 Panel 3, 865 BCE and Field, 1958: 103).

In Myceneae and Crete, in the 14th century BCE, the words for henna were poinikion or cyperus (Chadwick, 1976: 120-21) (Sonini, 1798, Vol 1: 300). Henna was used there as hair dye, fingernail colorant, a stain for palms and soles, a component in perfume, and as everyday and ritual body art (Shelmerdine, 1985: 33). There is evidence of hand and foot markings on post-pubescent females, which may have fertility or bridal connections.

In the Carthaginian and Etruscan areas, the word for henna was KPR in the Punic language, and camphire in Latin translations of texts. There are artifacts with body markings consistent with henna use for hair dye, as well as stains on palms, fingers, fingernails and soles. These red markings are on post-pubescent females and some appear to have bridal or fertility ceremony connections.

Other artifacts and texts may exist which have not been excavated and studied, and other areas may have grown or used henna without leaving artifacts or texts. This map only includes artifacts I have found to this date in English translations or publications.

Location of Artifacts Between 500 BCE and 700CE That Have Positive Evidence of Henna Use

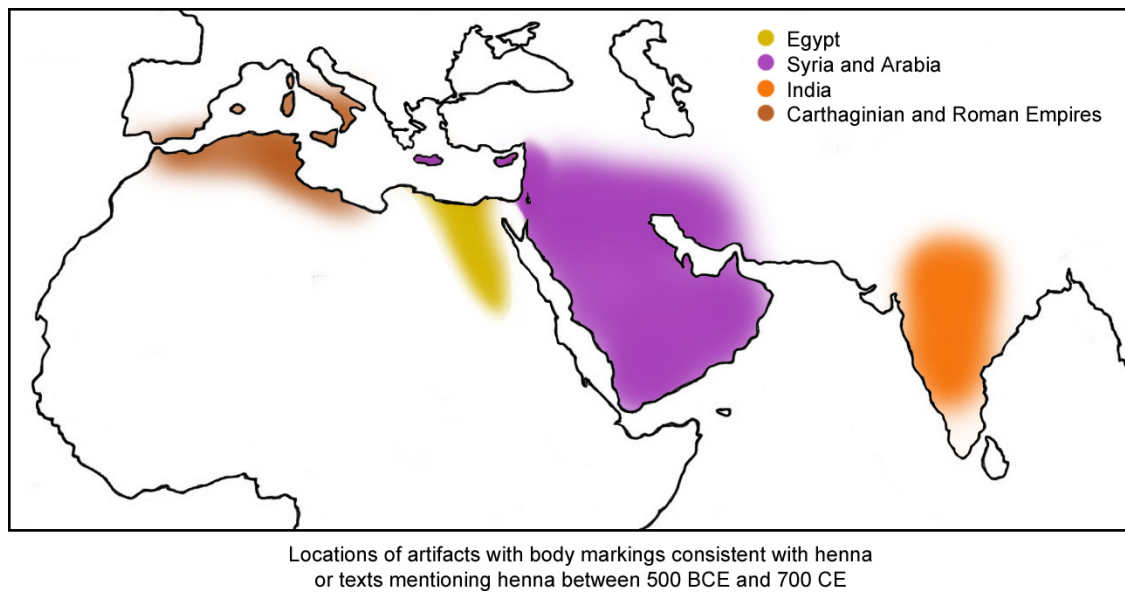


Figure 100: Areas of henna use in 500 BCE – 700 CE, as supported by Roman texts, Pre-Islamic texts, Indian texts, and artifacts that have body markings consistent with henna (map adapted from Kartographisches Institut Bertelsmann, 1989: 179). For larger map, see page 169.

In Egypt, between 500 BCE and 700 CE, there is evidence of henna use for medicinal purposes, fingernail dye, hair dye, and sole dye, and occasionally body art as recorded by Pliny III and the Ebers Papyrus (Lucas, 1930). The word for henna was *kopher*, and men, women and children used henna for skin rashes.

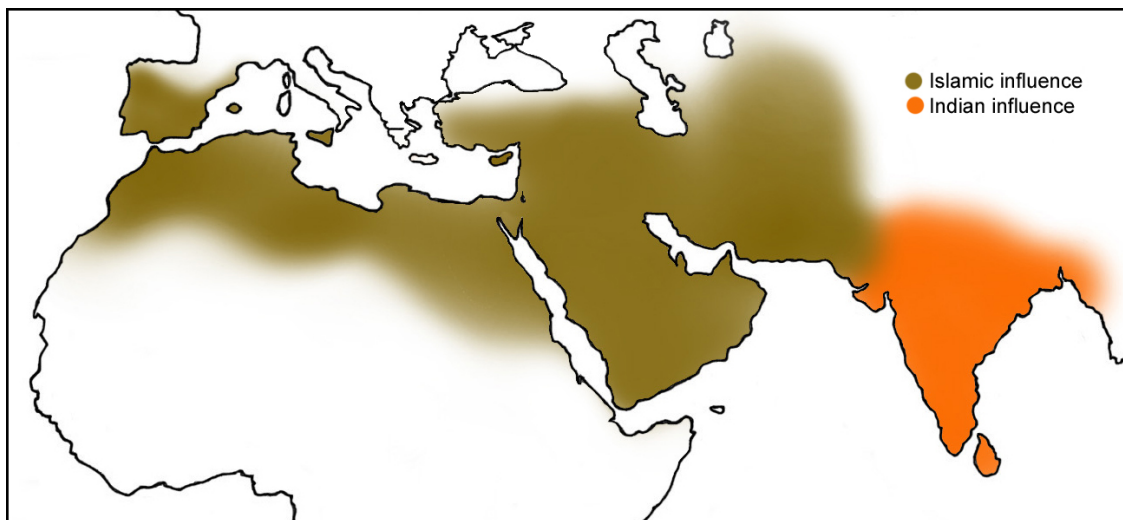
In Syria and the Arabian Peninsula, between 500 BCE and 700 CE, there is evidence of henna use for medicinal purposes, fingernail dye, hair dye, body art, and bridal celebration (Josephus and The Jewish Encyclopedia). The Semitic word for henna was HNA, cognate with the word for red, and related with the root for emotional tenderness. The use appears to be for primarily post-pubescent females.

Vedic and Buddhist India used henna for medicinal purposes, fingernail dye, and hair dye. Evidence in the Ajanta caves at 400 CE indicates that men and women used henna equally as a sole and palm stain.

In the Western Roman Empire and the Carthaginian world, there is evidence of henna use for medicinal purposes, fingernail dye, hair dye, and occasionally body art (Dialogues of Lucian; Ovid: *Ars amandi* III. 163, *Amores* 1. 14. 44 and *Tristien* II, 486). The primary use in the Roman world was as a hair dye by women.

Other artifacts and texts may exist which have not been excavated and studied, and other areas may have grown or used henna without leaving artifacts or texts. This map only includes artifacts found to this date in English translations or publications.

Location of Artifacts between 700 BCE and 1250 BCE That Have Positive Evidence of Henna Use



Locations of artifacts with body markings consistent with henna or text mentioning henna between 700 and 1250 CE

Figure 101: Areas of henna use in 900 CE – 1250 CE, as supported by European, Arabic, and Indian texts, and artifacts that have body markings consistent with henna (Kartographisches Institut Bertelsmann, 1989: 179) For larger map, see page 170.

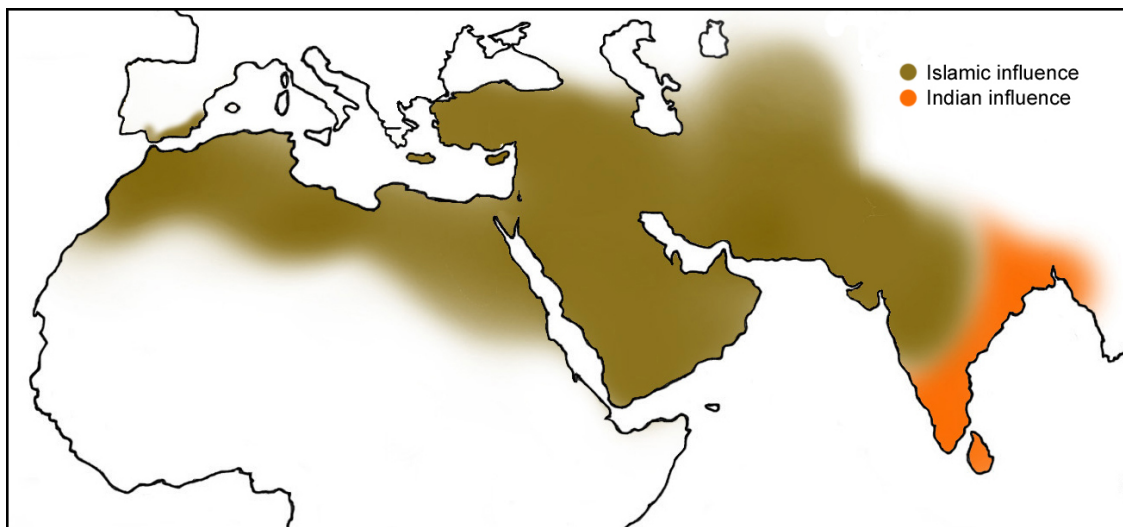
As the Islamic Empire expanded out of the Arabian Peninsula, the Arab traditions of Night of the Henna, henna for Ids and other celebrations expanded with it. Henna was used for medicinal purposes, fingernail dye, hair dye, body art, ceremonial, and everyday adornment. Henna was strongly gendered, with post-pubescent women frequently wearing henna, and men rarely wearing henna. During this period,

coinciding with the Medieval Warm period, henna was used further north than at any time since the Neolithic. Evidence of hand markings consistent with henna are in Christian manuscripts from north central Spain from around the year 1000 CE, such as the Valladolid Beatus (Valladolid B.U. 422 fol 98v) and the San Millan Beatus (Madrid R.A H. 33 fol 68). There are many depictions of body markings consistent with henna, and references to henna artists and henna mills in Medieval Spain during this period (Glick, 1979: 151-2 and 232-3). In the depictions of marked hands from Baghdad and Spain during this period, the patterns are often black or nearly black. This may indicate the people understood and used the techniques for darkening henna, such as adding distilled essential oils, such as perfumes, to make a fast dark stain, or adding heat and alkali following application. The word for henna in Arabic was henna, with variants of hinna, kina, or hinaa.

In post-Buddhist and Hindu India, henna was used for medicinal purposes, to dye hair, fingernails, palms and soles, but lac and other red dyes were often preferred to henna for their vivid red color. Both men and women were depicted with stained palms and soles.

Other artifacts and texts may exist which have not been excavated and studied, and other areas may have grown or used henna without leaving artifacts or texts. This map only includes artifacts found to this date in English translations or publications.

Location of Artifacts Between 1250 BCE and 1700 BCE That Have Positive Evidence of Henna Use



Locations of artifacts with body markings consistent with henna or texts mentioning henna between 1250 and 1700 CE

Figure 102: Areas of henna use in 1200 BCE – 1750 CE, as supported by Arabic, Persian, Indian, European texts and artifacts that have body markings consistent with henna (Kartographisches Institut Bertelsmann, 1989: 179) For larger map, see page

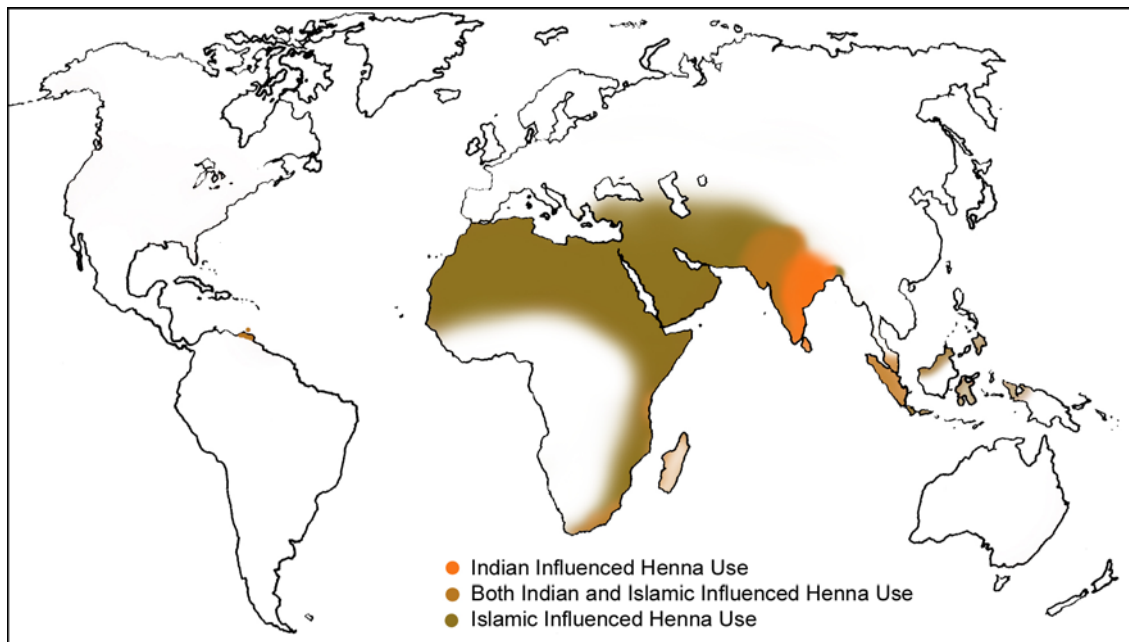
171.

Henna was used for medicinal purposes, fingernail dye, hair dye, body art, ceremonial, and everyday adornment throughout the area of Islamic influence. Christians and Jews also used henna in these areas, though may have been to a lesser extent than their Muslim neighbors. There are records of bridal henna among Christians and Jews in the

areas of Islamic influence, as well as every day use for hair, fingernail and sole dye. Henna continued to be strongly gendered, with women being the primary users. During this period, henna was outlawed in Spain, and use of henna was punishable by death (Lea, 1968, pp. 228-90). Among Muslims, sacrificial animals such as the Id lamb, dearly beloved pets such as a dog, and high status animals such as the ruler's horse, were often hennaed. The depictions of body markings in typical henna placement are both red and black, indicating to the understanding and use of heat, alkaline and monoterpene alcohols to darken henna stain. During this period, henna patterning reached a peak of complexity in the Safavid courts. The major occasions for henna use were weddings, Ids, and circumcision, though women used henna regularly on their hair, nails, and soles. The word for henna in Arabic was henna, with variants of hinna, kina, or hinaa.

In Hindu India, henna was used for medicinal purposes, to dye hair, fingernails, palms and soles, but lac and other red dyes were often preferred to henna for their vivid red color. Both men and women are depicted with stained palms and soles, though the stains are seen more frequently on women with Islamic influence. There are many depictions of cows and horses with red markings for ceremonial occasions. There are numerous variants of the word for henna in the many Indian languages. Other artifacts and texts may exist which have not been excavated and studied, and other areas may have grown or used henna without leaving artifacts or texts. This map only includes artifacts found to this date in English translations or publications.

Areas of Henna Body Art Practices in the Early Twentieth Century



Areas of henna body art practices in the early 20th century

Figure 103: Areas of henna body art practice in the early 20th century

(Kartographisches Institut Bertelsmann, 1989: 211) For larger map, see page 172.

At the beginning of the twentieth century, henna body art practice was embedded in the regions influenced by Islamic and Indian cultures, applied at their holidays, such as Id, Diwali, and weddings, when within the growing range of henna. These included some immigration areas, such as Indian communities in South Africa, Trinidad and Tobago, and Fiji. Areas that had strong trading and cultural ties to Arabia, such as Malaysia,

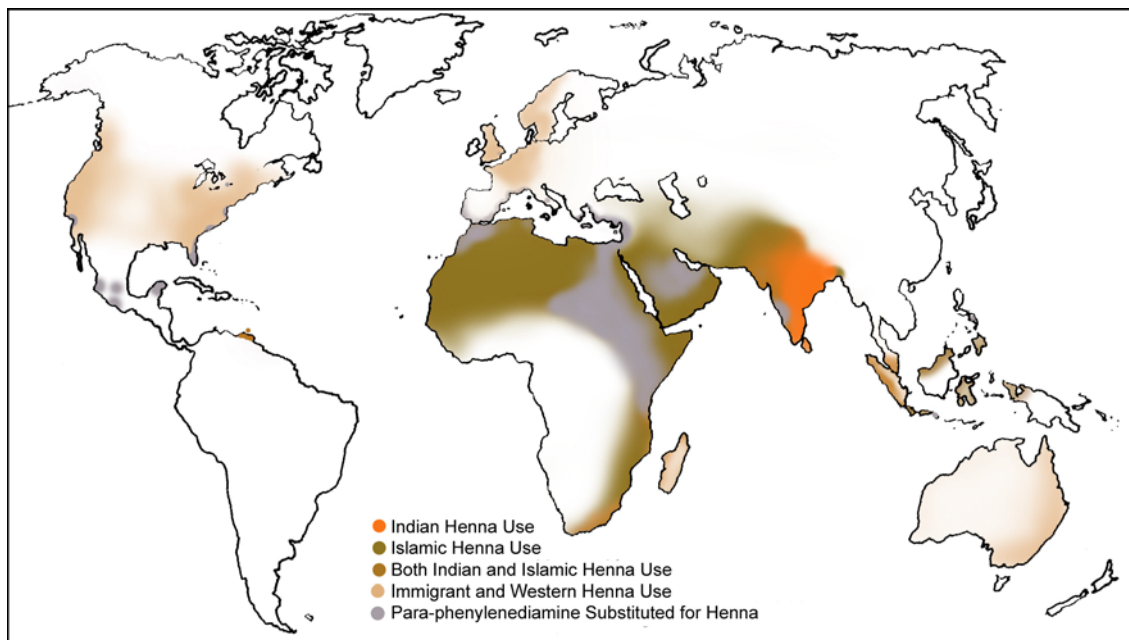
islands in the Indian Ocean, and the east coast of Africa, also had developed henna body art practices (Applegate, 2006).

The geographies of henna from the late 19th century through the mid 20th century are well documented through traveler's reports, diaries, photographs, and anthropological studies. Eyewitness and ethnological accounts of henna use can be found in Westermarck (1914), Legey (1926) Gaudry (1929) Masse (1938) (Husain, 1976: 108), Messina (1988) and many others. When all the mentions of henna gathered through these sources are mapped, the geography of henna is revealed. More complex geographies of henna could be mapped decade by decade through the century, with separations for methods, traditions, and gendered uses.

Between 1900 and 1970, there was a gradual erosion of the indigenous henna using geography due to pressure from western fashion and cosmetics available in urban areas. For instance, Turkish and Iranian henna traditions vanished among the urban upper classes, to the point that only villagers kept up the traditions. In Egypt, henna was reported as only kept up by old women and villagers, and as old-fashioned and untidy by Cooper (1914: 154). In Morocco, Fatima Mernissi describes her father urging her mother to abandon henna and traditional cosmetics for western beauty products (Mernissi, 1995). Kaftal (1997) saw immigrants entering Israel through the 1950's and 1960's with henna traditions and quickly abandoning them in favor of "modern" fashion. Arlene Brill (2005) lived between 1990 and 2004 in Turkey without ever

seeing evidence of henna body art, until one of the old women brought out her old henna traditions for Id. These changes are reflected in the differences between Figure 103 and Figure 104. The changing geographies of henna, if taken decade by decade through the twentieth century would illuminate patterns of western influence, immigration, and modernization.

Areas of Henna Body Art Practices in the Early Twenty-first Century: Tradition, Immigration, Westernization and Para-Phenylenediamine



Areas of henna body art practices between 2000 and 2006

Figure 104: Areas of henna body art practice in the early 21st century

(Kartographisches Institut Bertelsmann, 1989: 211) For larger map, see page 173.

Between 1996 and 2006, the geographies of henna changed rapidly. People who immigrated from henna using cultures were able to continue their henna traditions as henna became available in North America and Europe. Westerners began experimenting with henna body art as a novelty temporary tattoo. Information about henna was disseminated through the Internet rather than from person to person. Para-

phenylenediamine was substituted for henna to make a fast, black stain in both traditional using henna regions and in tourist areas in Europe, North America and the South Pacific.

Since I have been running an online henna business during this time, I've been able to track these changes by monitoring news releases, emails, personal contacts, business communications and server access logs. Figure 104 reflects the data between 2000 and 2006, mapped as geographies of henna. The tan areas show places where I have found news articles about henna body art activities in the west, as well as my own business communications requesting henna products and information from people with South Asian, Arab and Levantine surnames, as well as European surnames. The gray areas show where I have received information about injuries from para-phenylenediamine being added to, or substituted for henna. The olive green areas show where I have current information indicating that people still have Islamic henna traditions of night of the henna and Ids, and the orange areas show where people have Indian henna traditions for Diwali and weddings.

These changes between Figures 103 and 104 reflect factors not directly related to henna: immigration demographics, manufacture and shipping advancements, internet dispersion of information and images of henna, western pop culture, and the penetration of synthetic dyes into the marketplace.

The Geographies of Henna Emergence in the West

The tan areas in Figure 104 reflect henna body art use by immigrants in the west, as well as adaptation of henna by westerners. South Asians had lived in the UK for decades, but were harassed as a minority. Henna stains last for weeks on hands, so if a person hennaed for a celebration prior to the 1990's, that person would endure "Paki Bashing" for most of a month (Bahar, 2006). In Europe and North America the situation was similar. When I taught henna in a library in Barberton, Ohio in 1997, one of the students said, "Oh, yes, I know what that is. This boy in our class came back from a wedding with it all over his hands. We called him "Disease Boy". Immigrants were reluctant to maintain their henna traditions in the west until the late 1990's; and westerners did not take interest in henna body art until then.

The change in Indian-American use of henna body art between 1990 and 2005 reflects their changing demographics. The U.S. Census of 2000 counted 1.679 million people in the category "Asian Indian", accounting for 0.60% of the total U.S. population. This was an increase of 105.87% from the U.S. Census of 1990 with annual growth averaging 7.6%. According to the 2000 U.S. Census, Indian-Americans have the highest median income of any national origin group in the U.S. (\$60,093), and that one in every nine Indians in the US is a millionaire, comprising 10% of US millionaires. There were similar changes in Indian immigrant communities in Canada and the UK.

The effect of this change in the Indian-American's numerical and financial status on henna was three-fold. Indian-Americans were less reluctant to wear marks of ethnic identity. The Indian-American communities had enough buying power to support more ethnic markets where henna could be purchased: good quality henna was increasingly available. As the second and third generation of Indian-Americans grew up in western neighborhoods their white peers became increasingly interested in, and accepting of the henna markings on classmates hands.

The cost and reliability of airfreight from henna using countries to the west, as well as faster financial transactions and communication via the Internet in the late 1990's changed the price, freshness, and availability of henna in the west. In the summer of 1999, Jamila henna was shipped freshly processed from a June 20th harvest to the International Henna Conference in New York State by July 10th, working with email and FedEx.

The physical quality of henna powder also changed in the late 1990's. Commercial henna processing began in 1957, and the Sojat city regulated henna market has sought to improve service, quantity and quality control with government support. In 1962, stone burr mills were installed to improve henna leaf grinding. In the 1980's hammer mills and temperature controls were introduced and modified to improve the quality, texture and sift of the henna powder. In the 1990's pulverizers were installed to further improve the quality of the henna powder (Chand, Jangid, Roy & Singh, 2005). These

change facilitated the delicate, complex designs presently seen in henna body art, rather than thick, simple patterns as are seen in Figure 49.

These changes in production and transportation are a significant factor in changing the acceptance and popularity of henna. The pop stars such as Madonna, Gwen Steffani, Sting and Demi Moore would probably not have taken interest in henna if it could not have been done in elegant, complex, fashionable patterns. Once henna was on rock stars featured on MTV, henna's popularity spread quickly beyond the ethnic communities.

By 2006, across North America and Europe, nearly every town henna had body art offered within some event or wedding, where no henna existed prior to 1995:

- The Indian Association of Chattanooga applies henna at the Chattanooga, Tennessee "Market Sunday" (The Chattanooga, 2006)
- "The Art of Henna" is taught in the summer library program in Casper, Wyoming The Art of Henna (Star Tribune, 2006)
- In Evansville Indiana, henna body art was offered as part of a fund-raiser for the building of a new Hindu Temple for the area's 300 Hindu families (Orr, 2006).
- The Calgary Stampede had a booth providing henna body art (White, 2006)
- "The bride wore an imported white-and-gold sari, her hands decorated with henna." (Linn, 2006)

The Geographies of Para-phenylenediamine “Black Henna” as Body Art

The purple areas of Figure 104 reflect known use of para-phenylenediamine as an additive or substitute for henna. This does not seem to be an invention of the west, and may have emerged many places independently. Beauticians would have noticed through accidental contact that inexpensive black para-phenylenediamine black hair dye, such as that manufactured by Bigen, quickly dyes skin black, just as henna dyes skin reddish brown. Para-phenylenediamine is produced by Dow Chemical, and is specifically prohibited for use on skin because of severe allergic reactions and deaths (Calman, 1967, and Shemesh, Mishai, Baruchin, Viskoper, & Azuri, 1995).

Between 1984 and 1989 thirty-one Sudanese children were hospitalized after being painted with a mixture of henna dye and para-phenylenediamine (Hashim, Hamza, Yahia, Khogali, & Sulieman; 1992). In 1996, Abdullah and Davidson published a medical paper on a woman who seems to have had a deadly allergic reaction to PPD being used as henna in Saudi Arabia. The earliest reports of PPD being used as a substitute for henna in the USA came in 1997, after Madonna had her hands decorated with black dye for her video “Frozen”. Artists, wishing to profit from the popularity of henna but unaware of how to properly prepare it, used PPD to make fast, black stains. The first reports of PPD temporary tattoo injuries in the USA came from Venice Beach, and other beach communities where unregulated artists were allowed to set up on

boardwalks, and first medical reports were published soon after (Wakelin, Creamer, Ryroft, White, & McFadden, 1998). Since these injuries appeared a week or more after the paste was applied, when the patron had gone home, the artists didn't see the damage they were doing. PPD "black henna" continues to infest vacation areas around the world, as shown by the purple areas in Figure 104.

In the first years of the 21st century, many news articles on henna focused on this problem of Para-phenylnediamine being painted on people, particularly children:

- In Weymouth, Dorset, UK, a child was scarred after being painted with a "henna tattoo" mixed with para-phenylenediamine. There is no provision in the 1871 Pedlars' Act for regulating henna, or identifying a street side artist who is mixing dangerous ingredients into it. (Griffin, 2006)
- The CBC reported a person thought he was getting a "safe, natural henna tattoo", but "But Evan Kirk discovered otherwise while on vacation in Florida. He got a Chinese design painted on his back. A day later, he was in agony. I couldn't really see because it was on my back but you could feel it dripping and I had to put a cloth on it because there was so much puss." Kirk was told the tattoo was applied using natural henna. (CBC Marketplace, 2003)
- The BBC reported, "A nine-year-old girl might be scarred for life after getting a henna tattoo on holiday. Jade Yates was on the Greek island of Kos when she persuaded her mum to let her get a small picture of a flower put on her back, but within hours she broke out in blisters around the design. Although henna is

a natural product ... it can cause a reaction if it is not prepared properly.”

(CBBC Newsround, 2003)

The phrase “not prepared properly” points to the critical problem of the new geographies of henna: henna has moved into western culture, but artists, consumers, health care providers and importers and lawmakers do not have the information necessary to determine what is safe henna and what is unsafe.

The Geographies of Traditional Henna Use in the Early 21st Century

Henna body art practices in traditional geographies, shown in brown in Figure 104, are easier to observe now than at any time before. Google Internet searches harvest mentions of henna from worldwide Internet media daily, as well as personal web pages. As more newspapers come online, and as more people around the world have weblogs and homepages, the more easily one can find information on henna in traditional areas, and see it from the viewpoint of a participant in the culture. When the fragments from thousands of webpages, business records, and correspondences are mapped, they reveal not only continuations of traditional geographies, but nuances not seen in old texts.

The most frequent news mentions are for the relatively well-known use as a traditional adornment for Hindu and Muslim weddings in both traditional areas and the west:

- “Anjali and Vinisha, bow their heads as family members anoint their heads and limbs with a mixture of yoghurt and turmeric. Their hands and feet have already been covered with swirling patterns of henna.” (Lloyd-Roberts, 2006)
- “Once the festivities have subsided, the henna on the fingers all faded... there is a very real life waiting to be lived” (Zakaria, 2006)

Other articles in June, 2006, reflect a random sampling of aspects of henna beyond the better known bridal henna traditions:

- Male henna artists in Kashmir are forced to leave their jobs, because they may no longer touch women (De Sarkar, 2006)
- Shams Abdallah, 70, came to the Al-Kadhim shrine to anoint herself with henna - a symbol of thanks for the death of Abu Musab al-Zarqawi in Iraq. (Geller, 2006)
- A charitable association in Gwailor, India, teaches impoverished girls to do henna, “They are poor girls who wish to learn but beauty parlours charge a fees of Rs. 5,000 which is unaffordable for them. Hence they come here and learn these techniques to perfection,” said Dr. Rekha Shere, President, Ankur Women Training Camp.” (Pal, 2006)
- In Islamabad, 200,000 devotees came to celebrate the death of Bari Imam, with henna, as the death a Sufi saint is believed to be a marriage with god, and that

henna would celebrate the marriage. “Hundreds of people, including transvestites, placed their henna plates at the tomb. The ‘hujra’ (the room where the saint is buried) was then locked and reopened at 3am, he said. When the plate of henna was taken back before dawn, said Jafar, the impression of Bari Imam’s hand could be seen on it.” (Shehzad, 2006)

- “Sheikh Muhammad Hassan Abu-Tir has something every politician craves: Instant recognizability. His long beard dyed bright orange with henna is very conspicuous indeed. Actually it is a religious symbol: The prophet, for whom he is named, used to dye his beard the same way.” (Avnery, 2006)

By the beginning of the 21st century, there are abundant sources of data for mapping the geographies of henna. The Google search engine returns 7,010,000 entries for the word “henna”, with new inclusions ever week. The farther one goes into the past geographies of henna, the more information will have been lost, so there can never be as thorough a map of henna in the past as present, and the farther past, the less complete it will be.

Maps, such as I have presented in Chapter Four should assist further study of henna and evaluation of historical artifacts. If texts and artifacts are systematically examined for evidence of henna, as proposed in Chapters Two and Three, then mapped, the geographies should help address some of the problems mentioned in Chapter One.

Chapter V:

Conclusion: The Potential of a Geographical Approach to Henna

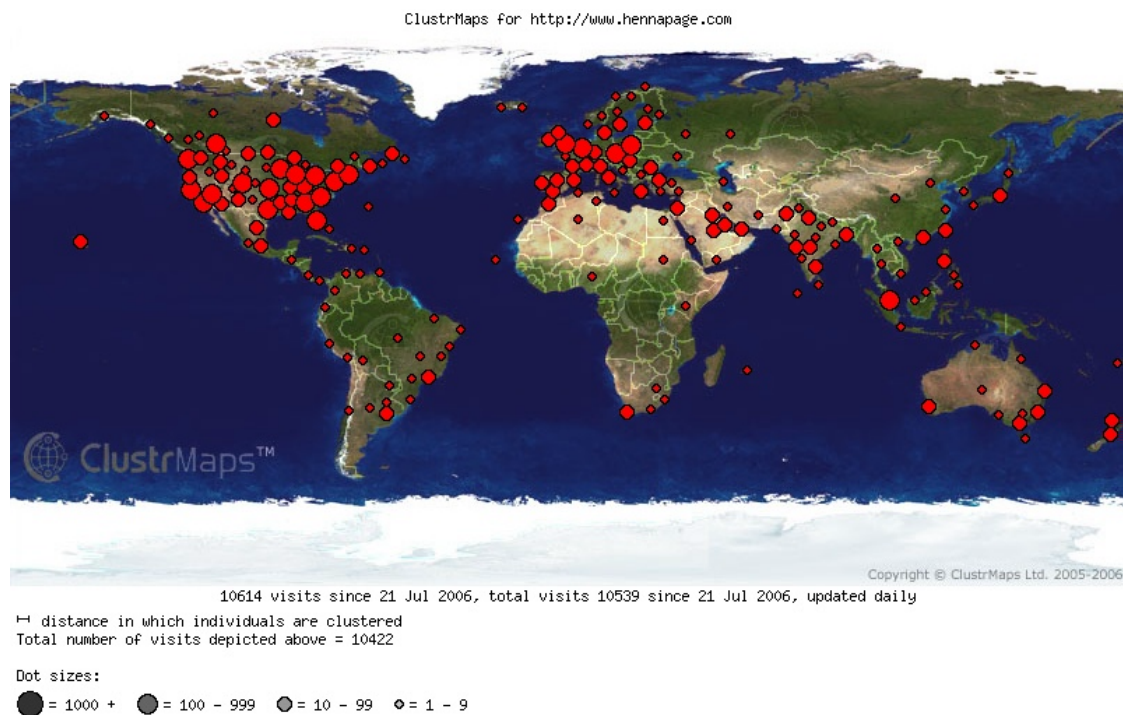


Figure 105: A dynamic map of accesses to <http://www.hennapage.com> for nine days in July 2006 (Clustrmaps TM Beta, 2006) For larger map, see page 174.

The dynamic map of accesses to <http://www.hennapage.com> between July 21 and 30, 2006, Figure 105, clearly shows the new global interest in henna. People access Hennapage.com to get information about henna art, science, history and traditions. Interest is clearly no longer limited to henna's indigenous geographies. To serve this dispersion into new areas, there must be systematic investigation of henna to support the inquiry.

When there is no systematic investigation of a particular subject, laws, regulations, pronouncements and claims will be made in error and ignorance. During my sixteen years as a professional henna artist and teacher, researcher, consultant, Webmaster, and business owner, I have seen how much misinformation is circulating about henna, and the damage it can do.

Vacationers purchase "black henna" tattoos from sidewalk artists around the world, unaware that there is no such thing as "black henna", and subsequently develop severe allergic reactions. I get emails from these people almost daily, frantic because they or their children (as young as two years old) have blistering, open sores, or worse, full body allergic reactions. I forward them the information to take to their physicians for treatment, when their doctors do not appear to know the difference between paraphenylenediamine and henna. I have worked with the State of Florida and Health Canada to implement legislation and enforcement to prevent these injuries. I forward

injury reports to Edith Coulter, the Environmental Manager of the Florida Board of Environmental Health, so the “black henna” artists can be prosecuted. I worked with Health Canada to set up guidelines for recognizing the difference between safe, natural henna and para-phenylenediamine (Health Canada, 2003).

I have taught henna in a Hillel in Los Angeles where two rabbis were deeply concerned that Jews could not henna because they believed it might be a tattoo or sacred Hindu ritual. They were unaware that Jewish people in Morocco, Algeria, Yemen, India and Iraq have used henna since the Song of Solomon was written. I have received emails from Christian girls who were chastised for wearing henna to church, and told that henna was heathen and sinful, even though it was clearly used in the Holy Land at the time of the birth of Christ, and continues to be used by Coptic and Armenian Christians. I have had conversations with South Asians who cannot believe there is henna outside of India, nor that a non-Indian could do henna. I have been contacted by clerics who doubt that hennaed hands can be properly washed for prayer. People hoping to open henna parlors in Lebanon and Jordan have contacted me for products and information, thinking that they are bringing henna to their countries for the first time in history. Once, when handing money over the counter for a fast food meal with my hennaed hand, the cashier leapt back, fearing that the henna was a Voodoo curse.

There has been no systematic study of the history, traditions, art and science of henna up to this point. The investigation of body marking as part of material culture, and its function in social hierarchy, cultural reproduction, and ritual is relatively new in academic studies. There has been a strong prejudice against studying body marking, probably because western academics carried the classic Greek and Roman attitude that body markings are “frivolous” and “barbaric”, and not worthy of serious attention. Western academics have rarely taken notice of henna, though it is several millennia old and widespread practice. Not only does the general prejudice against body art incline them against investigating henna, but approaching this body art would have been hindered because it was largely out of reach of male researchers; henna was primarily a women’s art in countries where women’s seclusion from men, especially foreign men, was the rule.

This absence of investigation and information may be the reason for the lack of any organized and rigorous approach to the academic study of henna. The criteria groups and geographies of henna that I’ve proposed in this essay are an attempt to provide a basis for arranging the scraps of information that we do have, so the body of knowledge on this subject can be organized and expanded. An enlarged collection of artifacts and texts about henna can be mapped further, to provide information about the spread of religious and cultural rituals, gender and class, climate and cultural migration or dispersion, particularly in the late Bronze age development of henna traditions around the southern and eastern Mediterranean, and the flowering of henna technique in the

Safavid, Turkoman and Ottoman courts. Mapping of henna body markings in the last two hundred years would provide information on the effect of westernization on henna and related body arts in South Asia, the Middle East and North Africa, as people adapted their construction of beauty from an indigenous model to a western model.

Mapping the spread of henna body markings in the last thirty years would provide information on the effect of immigration patterns from South Asia, the Middle East and North Africa into Europe and the USA, the adaptation of henna into the body model of immigrant communities of the west, and the western adaptation of henna as a “temporary tattoo”, a novelty to be purchased on vacation.

Taken together, a geographic approach to henna should provide a systematic structure within which the serious study of henna’s science, art, traditions and history may begin.

Appendix:

Larger versions of maps included in Chapter IV:

Mapping the Historical Regions of Henna

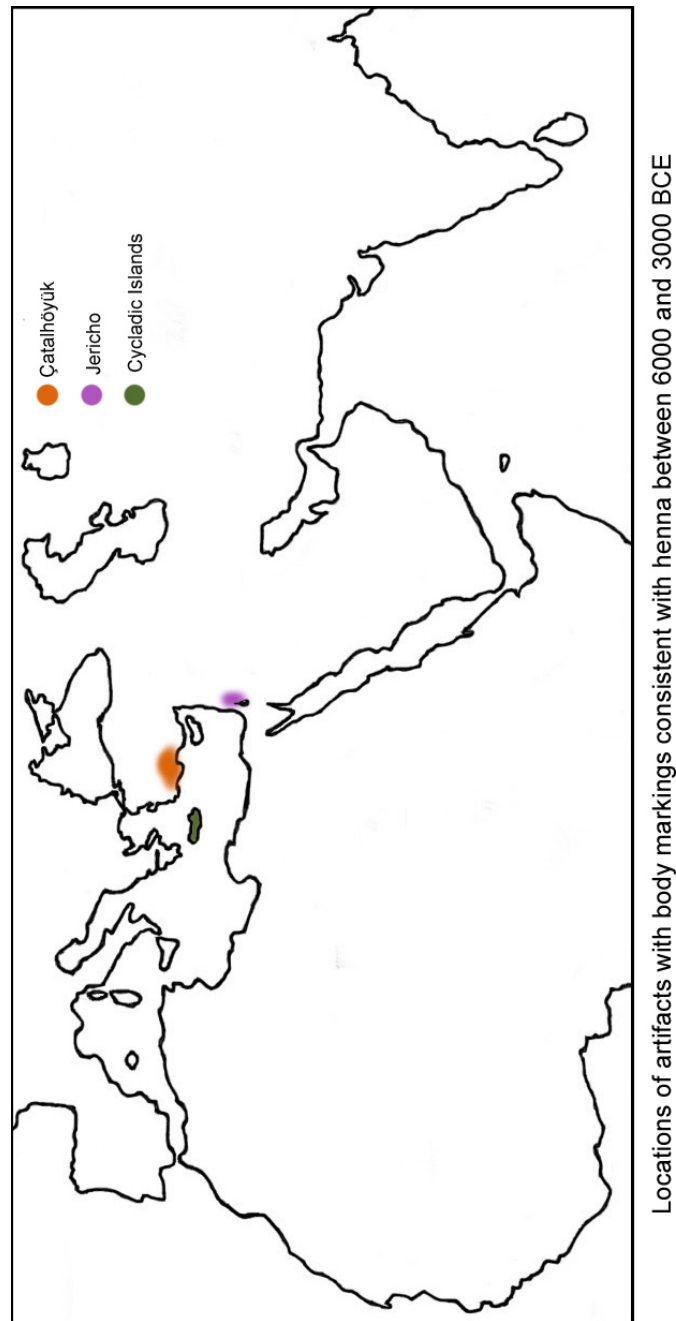


Figure 106: Areas of possible henna use between 6000 and 3000 BCE, based on artifacts that have body markings consistent with henna
(Kartographisches Institut Bertelsmann, 1989: 179)

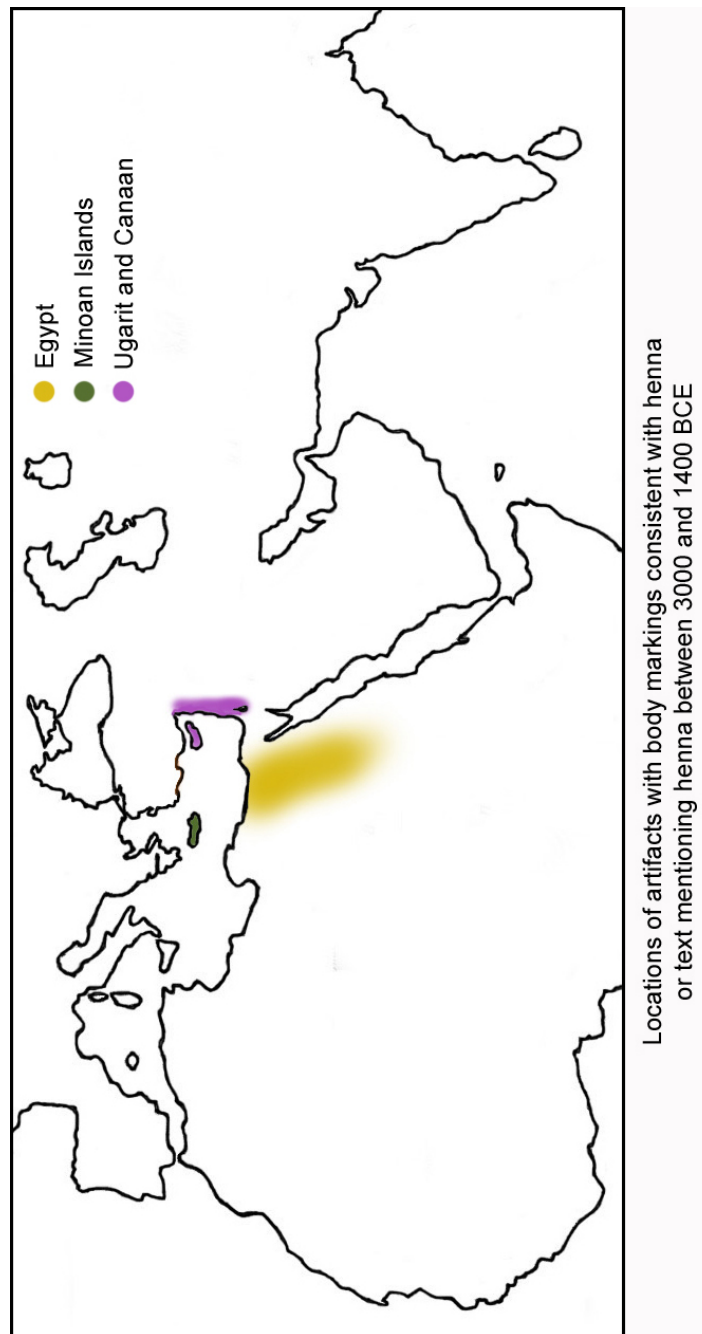


Figure 107: Areas of possible henna use between 3000 and 1400 BCE, based on artifacts that mention henna or body markings consistent with henna

(Kartographisches Institut Bertelsmann, 1989: 179)

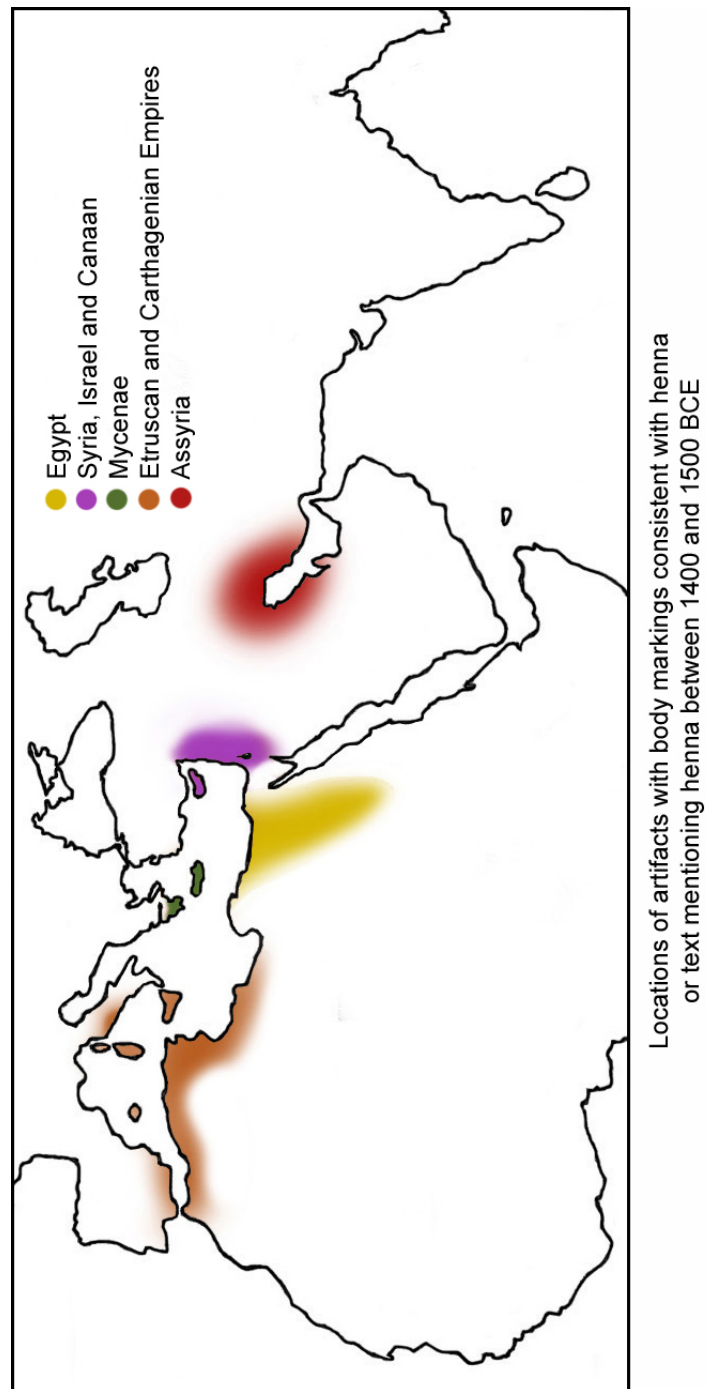


Figure 108: Areas of henna use in 1400 – 500 BCE, as supported in ancient texts and artifacts that have body markings consistent with henna
(Kartographisches Institut Bertelsmann, 1989: 179)

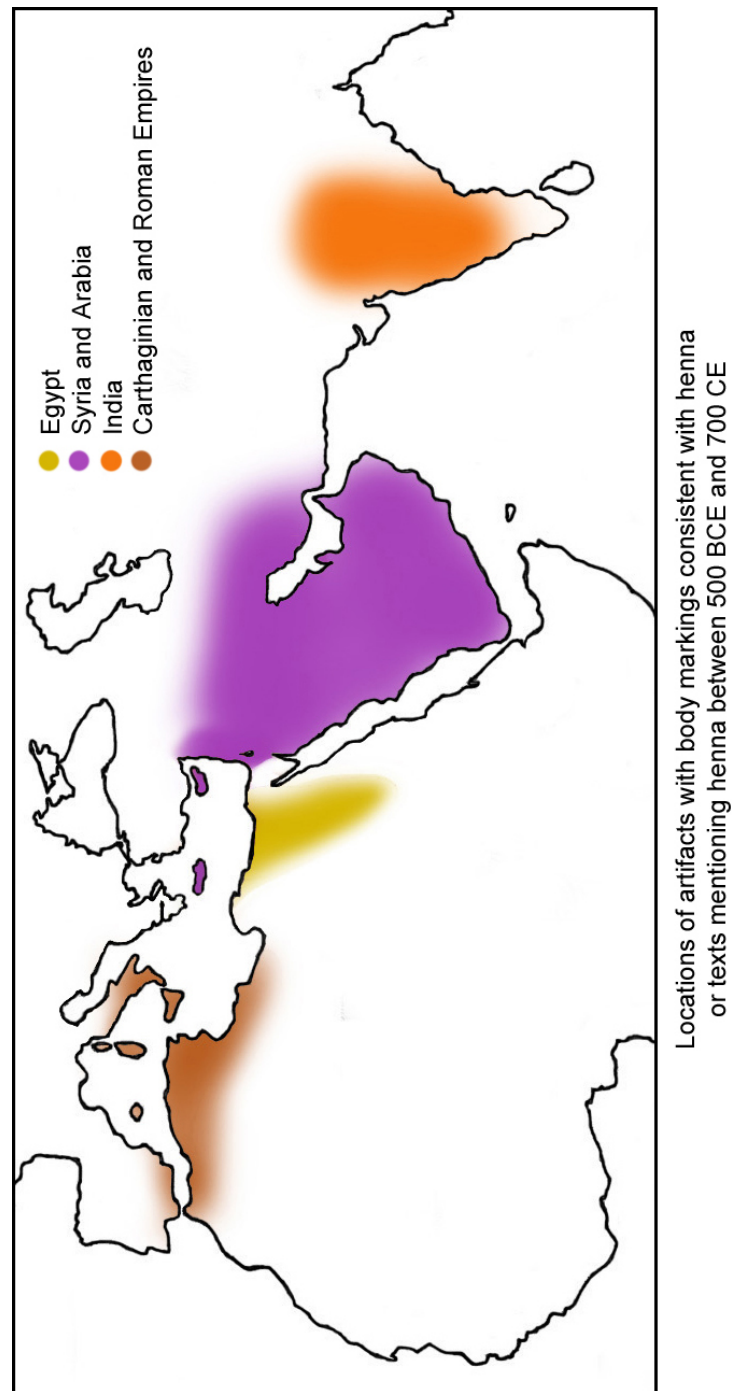


Figure 109: Areas of henna use in 500 BCE – 700 CE, as supported by Roman texts, Pre-Islamic texts, Indian texts, and artifacts that have body markings consistent with henna (Kartographisches Institut Bertelsmann, 1989: 179)

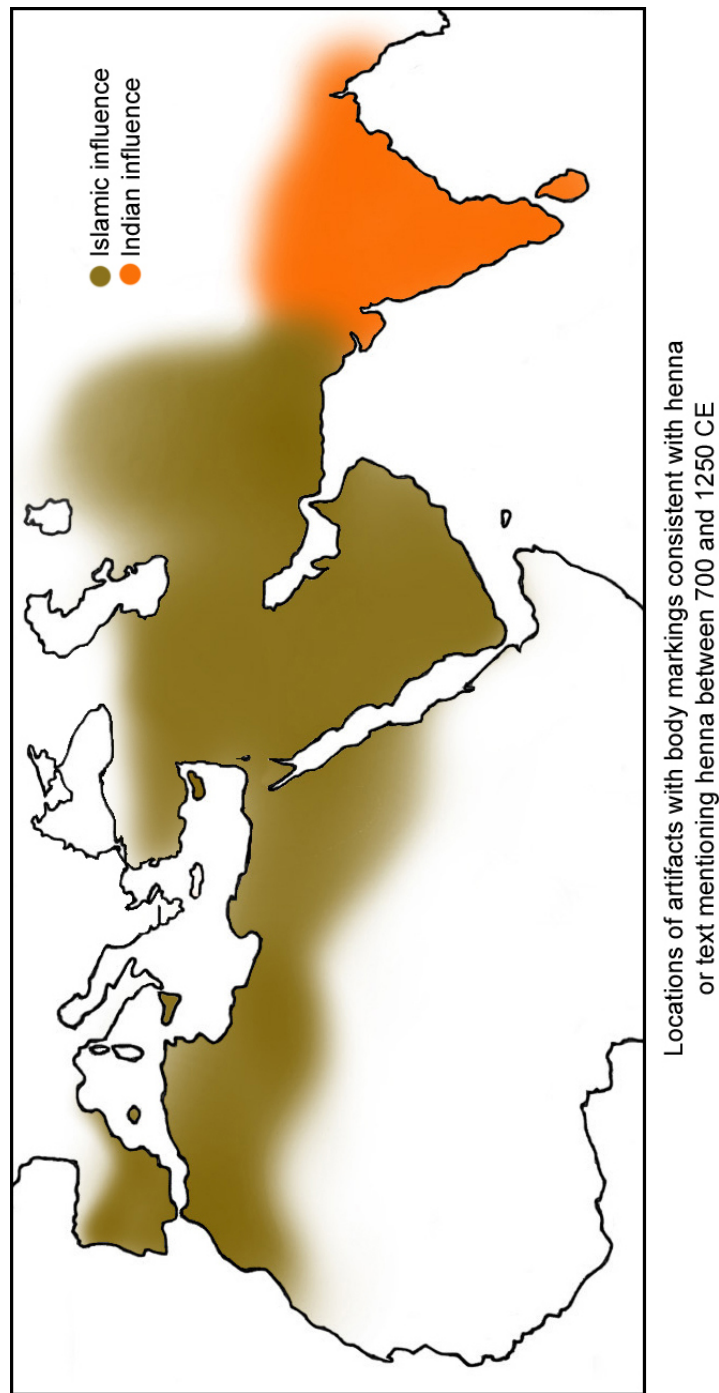


Figure 110: Areas of henna use in 700 CE – 1250 CE, as supported by European, Arabic, and Indian texts, and artifacts that have body markings consistent with henna

(Kartographisches Institut Bertelsmann, 1989: 179)

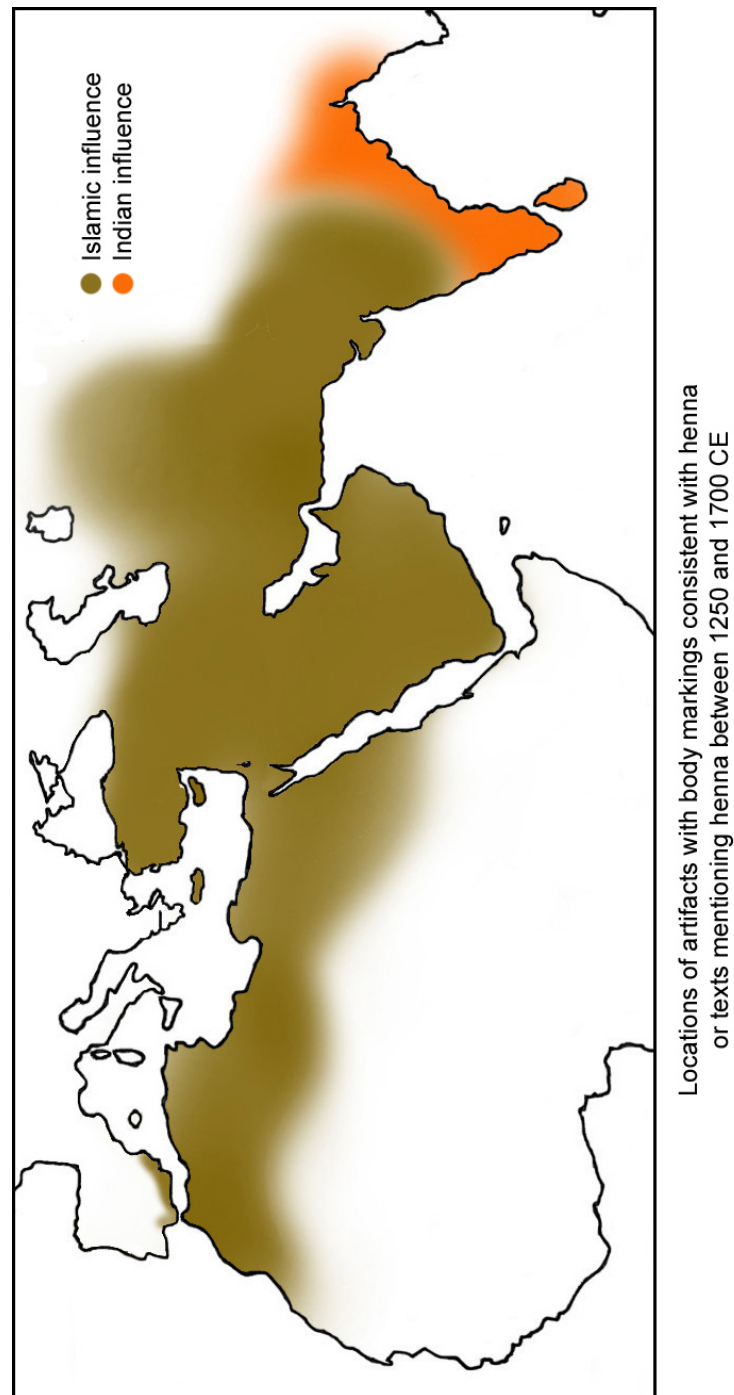


Figure 172: Areas of henna use in 1250 BCE – 1750 CE, as supported by Arabic, Persian, Indian, European texts and artifacts that have body markings consistent with henna (Kartographisches Institut Bertelsmann, 1989: 179)

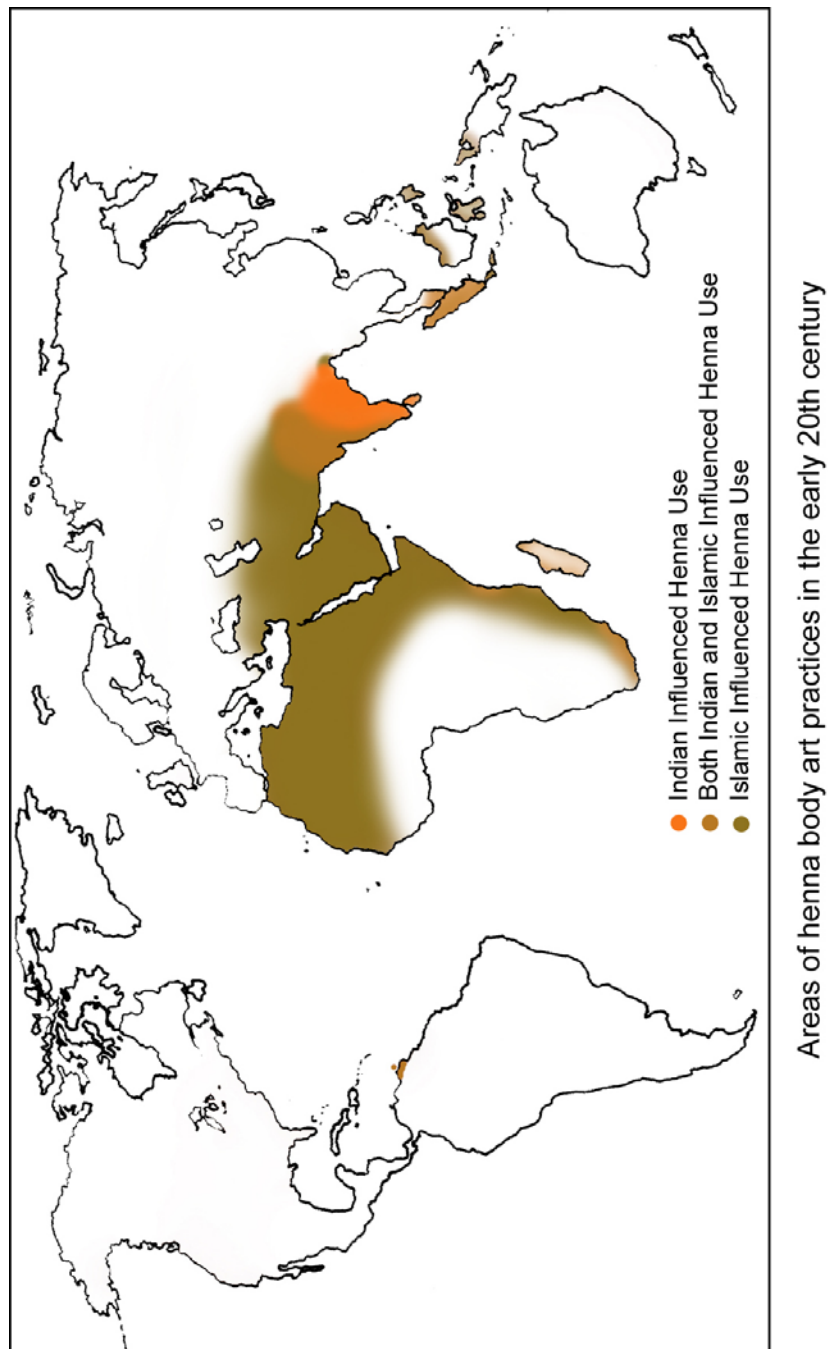


Figure 112: Areas henna body art practices in the early 20th century (Kartographisches

Institut Bertelsmann, 1989: 211)

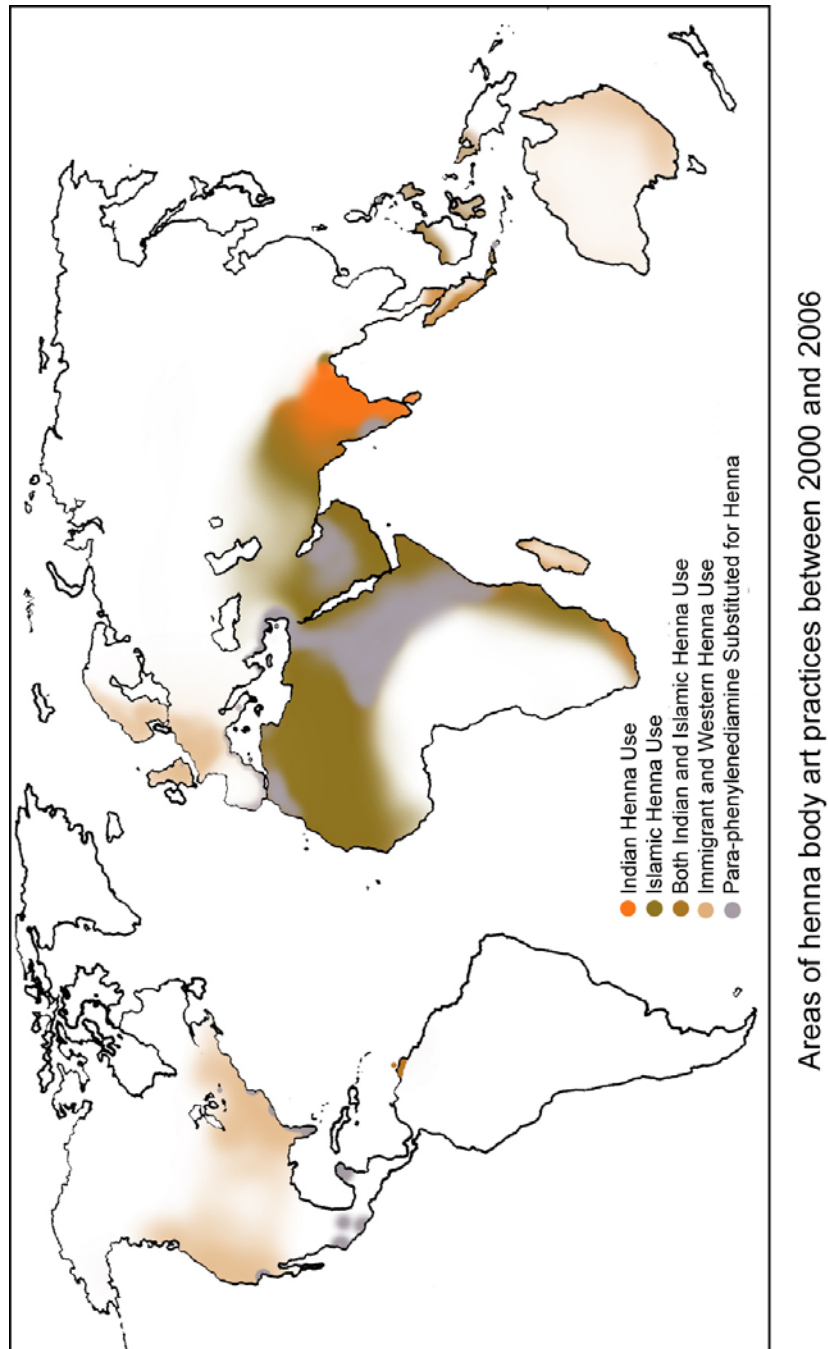


Figure 113: Areas of henna body art practice in the early 21th century

(Kartographisches Institut Bertelsmann, 1989: 211)

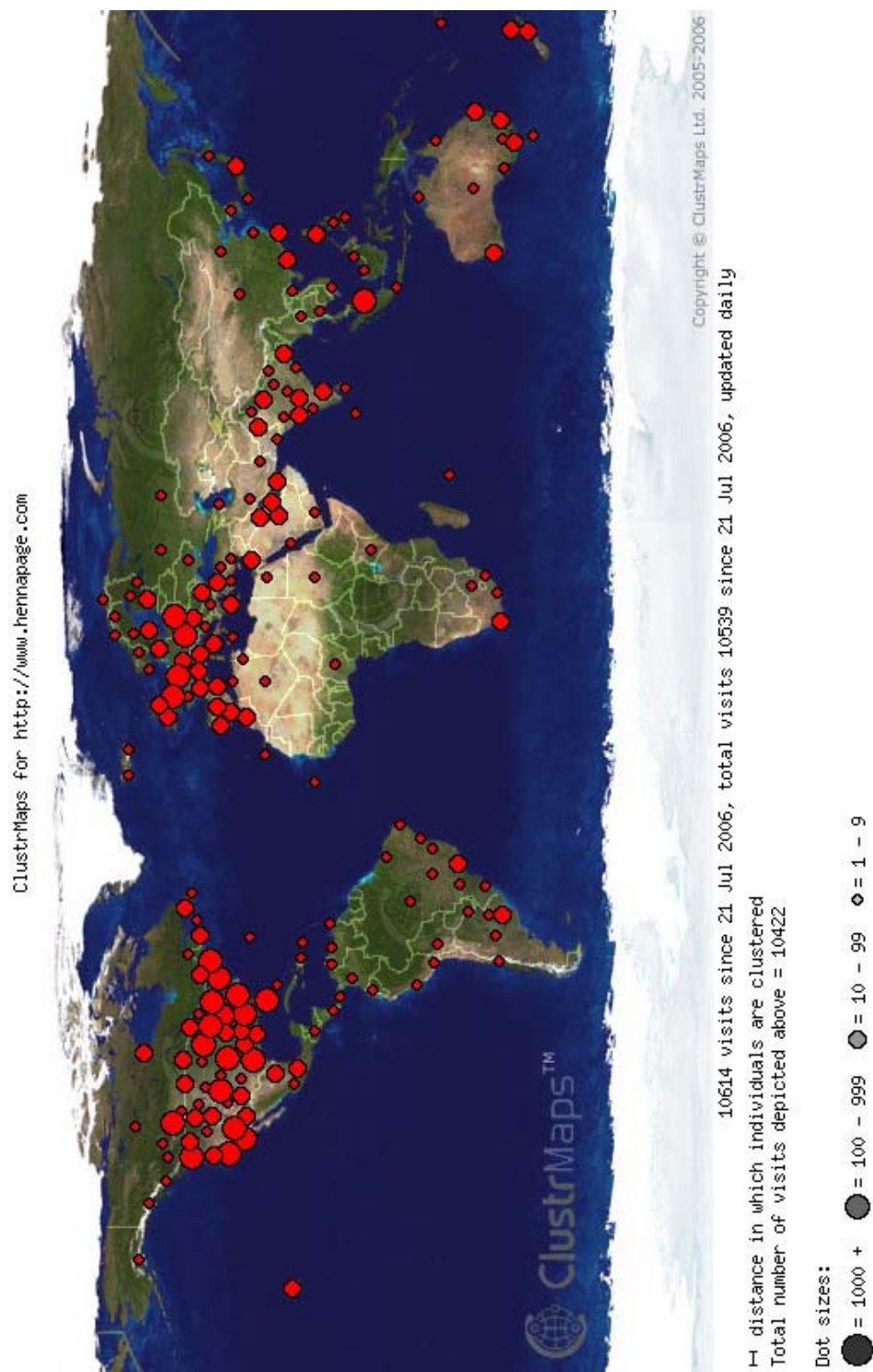


Figure 114: A dynamic map of accesses to <http://www.hennapage.com> for nine days in

July2006 (Clustrmaps TM Beta, 2006)

References:

Abdulla K.A., and Davidson N.M., (1996) A Woman who Collapsed after Painting Her Soles. *Lancet*: 348: 658

Adam and Eve (1963). *The Lost Books of the Bible and The Forgotten Books of Eden*. Cleveland, Ohio: Meridian, The World Publishing Company

Al-Jawziyya, I. Q. translation by Johnstone, P. (1998). *Medicine of the Prophet*. Cambridge, UK: The Islamic Texts Society

Auboyer, J. (1965). *Daily Life in Ancient India from 200 BC to 700 AD*. London: Phoenix Press.

Avnery, U. (2006). Meeting Hamas Arab News, Tuesday, 20, June, 2006; 24, Jumada al-Ula, 1427. Jeddah, Saudi Arabia: ArabNews. Retrieved July 22, 2006 from <http://www.arabnews.com/?page=7§ion=0&article=83444&d=8&m=6&y=2006>

Bakshi, G. (1984). *Flora of Murshidabad District West Bengal India*. Jodhpur, India: Scientific Publishers.

Balout, L., Roubet C. & Desroches-Noblecourt C. (1985). *La Momie de Ramsès II*: Paris: Contribution Scientifique à l'Égyptologie Éditions Recherche sur les Civilisations

Bassano da Zara, L. (1545). *I Costumi et it modi particolari ce lat vita de Turchi*. Rome

Batra, S. (1999). *The Art of Mehndi*. New York: The Penguin Group.

Behl, B K. (1998). *The Ajanta Caves: Artistic Wonder of Ancient Buddhist India*. London: Thames and Hudson.

Bentham, G & Hooker J. D. (1862). *Genera Plantarum and Exemplaria Imprimis in Herbariis Kewensibus Servata, Vol I*. London.

Besancenot. (1988). *Costumes of Morocco*. Aix-en-Provence, France: Edisud.

Boddy, J. (1989). *Wombs and Alien Spirits, Women, Men and the Zar Cult in Northern Sudan*. Madison, Wisconsin: University of Wisconsin Press.

Bookish Gardener (2004) Bongsunghwa nail dye. *Bookish Gardener: Korea*. Retrieved July 10, 2006 from <http://www.bookishgardener.com/korea/index.html>

Brauer, E. (1993). *The Jews of Kurdistan*. Detroit, Michigan: Wayne State University Press

Brice, W.C. (1981). *An Historical Atlas of Islam*. Leiden, Germany: Brill Academic Publishing

Bryan, C. (1974). *Ancient Egyptian Medicine: The Papyrus Ebers*. Chicago, IL: Ares Publishers Inc.

Burd, A. (2005)

“Hypertrophic Response and Keloid Diathesis: Two Very Different Forms of Scar”
Plastic & Reconstructive Surgery, Vol. 116 Issue 7: 150-157.

Calman C.D. (1967) "Hair Dye Reaction" *Contact Dermatitis Newsletter* 1:16

Cassuto, U. (1965). *The Goddess Anath*. Jerusalem, Israel: Perry Foundation for Biblical Research, The Hebrew University of Jerusalem,

CBBC Newsround. (2003) Girl scarred by henna tattoo. London, UK: BBC. Retrieved July 22, 2006, from http://news.bbc.co.uk/cbbcnews/hi/uk/newsid_3182000/3182545.stm

CBC Marketplace. (2003) *Temporary tattoos could lead to permanent problems*. Toronto, Canada: CBC Canada. Retrieved June 22, 2006 from <http://www.cbc.ca/consumers/market/files/health/henna/>

Chadwick, J. (1976). *The Mycenaean World*. Cambridge, UK: Cambridge University Press

Chand, K., Jangid, B. L., Roy, P. K., & Singh, Y. V. (2005) "Henna Marketing Processing and Trade in India". *Henna Cultivation, Improvement and Trade*. Jodhpur, India: Central Arid Zone Research Institute:

Chemist and Druggist (1925) *Turkish Cosmetics*. Vol 103: 127

Chemist and Druggist (1926). *Commercial Compendium*. Vol 105: 753

Chemist and Druggist, (1932). *Perfumery in Etruscan and Roman Times*. Vol. 116: 747-8

Clarity, B., Stowasser, K., Wolfe, R., Woodhead, D. R., & Beene, W. (2003). *A Dictionary of Iraqi Arabic*. Washington, D C: Georgetown University Press

Cobbold, C. A, Sherratt, J. A. (2000). Mathematical Modelling of Nitric Oxide Activity in Wound Healing can explain Keloid and Hypertrophic Scarring. *Journal of Theoretical Biology, Volume 204, Issue 2: 257-288*. Centre for Theoretical Modelling in Medicine, Department of Mathematics, Heriot-Watt University, Edinburg: Elsevier Science Direct

Codrain, R. (1992). *Dubai, An Arabian Album*. London, UK: Motivate Publishing

Comfort, A. (1966). *The Illustrated Koka Shastra*. NY, NY: Simon and Schuster Editions

Cooper, E. (1914). *The Women of Egypt*. NY, NY: Frederick A. Stokes Company

Craigie, P. (1983). *Ugarit and the Old Testament*. Grand Rapids, Michigan: William B. Eerdsman's Publishing Company

Crampton, W. G. (1990). *The World of Flags*. London, UK: Studio Editions, Ltd.

Crooke, W. (1906). *Things Indian*. London, UK

Dallon, J.A., Sherratt, P.K., Maini, M., & Ferguson, W.J. (2000). Biological implications of a discrete mathematical model for collagen deposition and alignment in wound repair. *IMA Journal of Mathematical Medicine and Biology*, 17, 379-393.

Oxford, UK: Oxford University Press

De Moor, Johannes C. (1971). *The Seasonal Pattern in the Ugaritic Myth of Ba'lu According to the Version of Ilimilku*. Neukirchen – Vluyn, Germany: Verlag Butzon & Berker Kevelaer

De Sarkar, B. (2006) “How clean was my valley: The Talibanisation of Kashmir is at the doorstep” Calcutta, India: The Telegraph, May 21, 2006. Retrieved July 22, 2006 from http://www.telegraphindia.com/1060521/asp/opinion/story_6245901.asp

Desai, D. (2006). *Hindu Wedding*. Stow, OH: TapDancing Lizard Publications

Devi, V. and Jha, H. (2006) “*Gajalakshmi: Madhubani Painting on Hand Made Paper treated with Cow Dung*”. Delhi, India: Exotic India, Online Shop for Indian Arts.

Retrieved July 19, 2006 from

<http://www.exoticindiaart.com/paintings/FolkArt/madhubani/2/>

Doumas, C. (1992). *The Wall-Paintings of Thera*. Athens, Greece: The Thera Foundation

Drewal, H. J., & Pemberton, J. III, (1989). *Yoruba, Nine Centuries of African Art and Thought*. NY, NY: The Center for African Art in association with Harry N Abrams Inc.

Fabius, C. (1998). *Mehndi : The Art of Henna Body Painting*. NY, NY: Three Rivers Press

Fabius, C. (2002). *Ceremonies for Real Life*. Berkley, CA.: Wildcat Canyon Press

Father Peter Joseph (2002). The Morality of Tattoos and Body Piercing. *Latin Mass Magazine, Journal of Catholic Culture and Tradition, Summer 2002*. Retrieved July 2006 from http://www.latinmassmagazine.com/articles/articles_2002_SU_Joseph.html

FDA IA #53-19, (1997). *Detention without physical examination of henna based skin color* 8/5/97. Attachment Revised 11/28/05. Washington DC: USFDA

Field, H. (1958). *Body Marking in Southwestern Asia*. Cambridge, MA: Peabody Museum

Fisher, A. (1984). *Africa Adorned*. NY, NY: Harry N Abrams

Fitton, J. L. (1989). *Cycladic Art*. London, UK: The British Museum Press

Fitton, J. L. (2002). *Minoans*. London, UK: The British Museum Press

Fundaberk, E. L, & Foreman, M. D. (1957). *Sun Circles and Human Hands*. Alabama:
Emma Lila Fundaberk

Gabbay, U. (2003) Dance in Textual Sources from Ancient Mesopotamia. *Near Eastern Archaeology*, Vol. 66 Issue 3, 104-105.

Gaudry, M. (1929) *La Femme Chaouia De L'Aurès*. Paris, France: Librairie
Orientaliste Paul Geuthner

Geller, A. (2006) “ Our ‘Happiest Day’ Triumphant Iraqis Dance in Streets” *New York Post*, June 9, 2006. NY, NY: NYP Holdings, Inc. Retrieved July 22, 2006 from
<http://www.nypost.com/news/worldnews/64937.htm>

Getz-Preziosi, P. (1994). *Early Cycladic Sculpture*. Malibu, CA.: The J. Paul Getty
Museum

Gil, S. (2001). *A Comprehensive Indian Wedding Planner*. Vorhees, NJ: Bookmark Press

Glick, T. (1979). *Islamic and Christian Spain in the Early Middle Ages*. Princeton, NJ: Princeton University Press

Griffin, M. (2005) Ancient street stall laws risk public health. *Daily Echo*.
Bournemouth, Dorset, UK: Newsquest Media Group, A Gannett Company. Retrieved
July 22, 2006 from <http://archive.thisisdorset.net/2005/8/27/110676.html>

Hammoudi, A. (1993). *The Victim and Its Masks, an Essay on Sacrifice and Masquerade in the Maghreb*. Chicago, IL: The University of Chicago Press

Harold, R. (2004) *Mehndi Tattoos and a Taste of India*. Coshocton, Ohio: Coshocton, Ohio Public Library. Retrieved July 2, 2006 from
<http://www.cplrmh.com/mehndipics.html>

Hashim, M.S., Hamza, Y.O., Yahia, B., Khogali, F.M., & Sulieman, G.I. (1992)
Poisoning from henna dye and para-phenylenediamine mixtures in children in
Khartoum. *Annals of Tropical Paediatrics: International Child Health*, Vol. 12, 1: 3-6.

Health Canada (2003) *Advisory 2003-66: Health Canada alerts Canadians not to use "black henna" temporary tattoo ink and paste containing PPD*. Ottawa, Canada.

Retrieved July 21, 2006 from http://www.hc-sc.gc.ca/ahc-asc/media/advisories-avis/2003/2003_66_e.html

Hepper, N. & Friis, I. (1994). *The Plants of Pher Forsskal's 'Flora Aegyptico-Arabica' Collected on the Royal Danish Expedition to Egypt and the Yemen 1761 – 63*. London, UK: Royal Botanic Gardens, Kew, In Association with the Botanical Museum, Copenhagen

Holy Bible: Authorized King James Version. (1998) Authorized King James Version with Apocrypha Bible: introduction and notes by Robert Carroll and Stephen Prickett. Oxford, UK: Oxford University Press

Hooke, S. H. (1965). *Middle Eastern Mythology*. Middlesex, UK: Penguin Books

Husain, A. (1976). *Marriage Customs Among Muslims in India*. Delhi, India: Sterling Publishers LTD.

Josephus: Wheaton W. tr (1845). *Wars of the Jews* 2 Volumes. London, UK

Jung, P., Sesztak-Greinecker, G., Wantke, F., Götz, M., Jarisch, R., & Hemmer, W. (2006). A painful experience: black henna tattoo causing severe, bullous contact dermatitis. *Contact Dermatitis, Blackwell Publishing Limited, Vol. 54 Issue 4*, 219-220.

Juvenal. (1820). *Junii Juvenalis Opera Omnia*. 3 Volumes. London, UK

Khandelwal, S., Gupta, N., & Sahu, M. (2002). Effect of Plant Growth Regulators on Growth, Yield, and Essential Oil Production of Henna (*Lawsonia Inermis*). *Journal of Horticultural Science and Biotechnology*, 77, 1: 67-72

Khem Chand, Jangid, B.L., Roy P. K., & Singh, Y.V. (2005). Henna Marketing, Processing and Trade in India. *Henna Cultivation, Improvement and Trade*: 51-54. Pali-Mawar, India: Central Arid Zone Research Institute, Regional Research Station

Klass, M. (1961). *East Indians in Trinidad : a Study of Cultural Persistence*. NY, NY: Columbia University Press

Kossak, S. (1997). *Indian Court Painting, 16th - 19th Century*. NY, NY: Metropolitan Museum of Art

Kumar S., Singh Y. V., & Singh, M. (2005). Agro-History, Uses, Ecology and Distribution of Henna (*Lawsonia inermis* L. syn. *Alba* Lam). *Henna Cultivation, Improvement and Trade* 11- 12. Jodhpur, India: Central Arid Zone Research Institute,

Lea, H. C. (1968). *The Moriscos of Spain, Their Conversion and Expulsion*. NY, NY: Burt Franklin

Leen, S. (2006). Visions of Earth. *National Geographic*, Vol. 209. No. 3: 18. Washington, DC.

Legey, F. (1926) *The Folklore of Morocco*. London, UK: George Allen and Unwin LTD.

Linn, S. (2006) "Variations on a theme: Changes are coming to the chapel: More and more couples are opting for fun and original personalized ceremonies over traditional weddings" *The Tribune*, June 16, 2006. San Luis Obispo, CA. Retrieved June 16, 2006 from <http://www.sanluisobispo.com/mld/sanluisobispo/14832156.htm>

Lloyd-Roberts, S. (2006) "The illegal child brides of India" *Daily Mail*, June 7th, 2006 London, UK: Retrieved July 22, 2006 from http://www.dailymail.co.uk/pages/live/femail/article.html?in_article_id=389469&in_page_id=1879

Mahabir, K. (2001). *Medicinal and Edible plants used by East Indians of Trinidad & Tobago*. Trinidad, West Indies: Chakra Publishing House

Maira, S. (2000). Henna and Hip Hop: The Politics of Cultural Production and the Work of Cultural Studies. *Journal of Asian American Studies - Volume 3, Number 3*: 329-369. Baltimore, Maryland: The Johns Hopkins University Press

Marron, A. (1998) *The Henna Body Art Kit: Everything You Need to Create Stunning Temporary Tattoos*. London, UK: Edison

Massé, H. (1938) *Croyances et Cotumes Persanes*. Paris, France: Librairie Orientale et Americaine

Mazar, A. (1990). *Archaeology of the Land of the Bible: 10,000 – 586 BCE*
NY, NY: Center for Judaic –Christian Studies, Doubleday,

Mentre, M. (1996) *Illuminated Manuscripts of Medieval Spain*. London, UK: Thames and Hudson

Mernissi, F. (1987) *Beyond the Veil, Male-Female Dynamics in Modern Muslim Society*. Bloomington, Indiana: Indiana University Press

Mernissi, F. (1995). *Dreams of Trespass: Tales of a Harem Girlhood*. Addison Wesley Publishing Company, Boston, MA

Messina, M. (1988). Henna Party. *Natural History*, Vol 97, Issue 9: 40 - 47

Morgan, P. J. (1995). Family Affairs: Weddings in Egypt. *Saudi Aramco World*, Volume 46, Number 5: 34 - 39

Moscatti, S. (1999). *The Phoenicians*. NY, NY: Rizzoli

McCurry, S. (1999). *Portraits*. London, UK: Phaidon

Mellaart, J. S. (1963). Excavations at Catal Huyuk,: Second Preliminary Report, 1962
Anatolian Studies 13: 43 –103,

Mookerjee, A. (1985). *Ritual Art of India*. London, UK: Thames and Hudson

Musselman, L. J. (2005) *Old Dominion University Plant Site: All the Plants of the Bible: Henna*. Retrieved July 1, 2006:

<http://web.odu.edu/webroot/instr/sci/plant.nsf/pages/henna>

Narain, P., Singh, M., Roy, P.K., Khem Chand, Jangid, B. L., & Singh, Y.V., (2005). *Production, Trade and Future Prospect of Henna*. Jodhpur, India: Central Arid Zone Research Institute

Ninety-Sixth Congress, First Session, (1979). *Safety of Hair Dyes and Cosmetic Products, Hearing before the Subcommittee on Oversight and Investigations of the Committee on Interstate and Foreign Commerce, Houser of Representatives, Serial Number 96 – 105*. Washington, DC: US Government Printing Office

O'Donnell, B. P., Mulvaney, M. J., James, W.D., McMarlin, S. L., (1995)
Thin tangential excision of tattoos. *Dermatologic Surgery* Volume: 21, Issue 7: 601-603.

Orr, S. (2006) “Work to begin soon on Tri-State's first Hindu temple” *The Evansville Courier & Press* *Courier Press*, July 22, 2006. Evansville, IN. Retrieved July 23, 2006, from <http://www.courierpress.com/news/2006/jul/22/work-to-begin-soon-on-tri-states-first-hindu/>

Pal, A. (2006) “Gwalior's voluntary organisations making summers meaningful for women and kids”. *New Kerala*, May 28, 2006. Kerala, India: NewKerala.com.
Retrieved July 22, 2006, from
<http://www.newkerala.com/news3.php?action=fullnews&id=1660>

Pratibha, G. & Korwar, G. R. (2005). Scope of Henna in Semi-arid Tropics of Southern India. *Henna, Cultivation, Improvement and Trade*: 8 – 10. Hyderabad, India: Central Research Institute for Dryland Agriculture

Rabbi Jack (2005). *Tattoos*. NCSY Message Board, National Congress of Synagogue Youth. Retrieved July 1, 2006 from <http://www.ou.org/ncsy/projects/AskNCSY%20Message%20Board/tattoos.htm>

Rao, S. S., Regar, P. L., & Singh, Y. V. (2005) Agrotechniques for Henna (*Lawsonia Inermis* L.) Cultivation. *Henna, Cultivation, Improvement and Trade*: 25 – 27. Pali-Marwar, India: Central Arid Zone Research Institute, Regional Research Station

Rees, J. (2004). The Genetics of Human Pigmentation: The Case for Red Hair *Dermatology* Vol. 9 Issue 2: 29-33

Roy, P. K., Singh, M., & Tewari, P. (2005). Composition of Henna Powder, Quality Parameters and Changing Trends in its Usage. *Henna, Cultivation, Improvement and Trade*: 39 – 40. Jodhpur, India, Central Arid Zone Research Institute

Roome, L. (1998) *Mehndi : The Timeless Art of Henna Painting*. NY, NY: St. Martin's Griffin

Rubens, A. (1967). *A History of Jewish Costume*. NY. NY: Funk and Wagnalls

Saksena, J. (1979). *Art of Rajasthan, Henna and Floor Decorations*. Delhi, India:

Sundeep Prakashan,

Scheindlin, R. (1998). *Short History of the Jewish People from Legendary Times to Modern Statehood*. Oxford, UK: Oxford University Press

Schmidt, A. (1924) *Drogen und Drogenhandel im Altertum*. Leipzig, Germany.

Searight, S. (1984). *The Use and Function of Tattooing on Moroccan Women Vols. 1 –*

3. HRAFlex Books, MW1-001, Ethnography Series. New Haven, CT: Human

Relations Area Files Inc.

Shanks, H. (1993) *In the Temple of Solomon and the Tomb of Caiaphas*. Washington,

DC: Biblical Archaeology Society

Sharma, K. (1997). Henna of Bhils. *Journal of Economic and Taxonomic Botany*,

Volume 21, Number 1. Jodphur, India

Shehzad, H. (2006). Bari Imam urs ends: 'If government improved living standards,

people would stop making manats' *Daily Times Pakistan*, May 19, 2006. Lahore,

Pakistan: Daily Times. Retrieved July 22, 2006 from
http://www.dailytimes.com.pk/default.asp?page=2006%5C05%5C19%5Cstory_19-5-2006_pg11_5

Shelmerdine, C. W. (1985). *Perfume Industry of Mycenaean Pylos*. Goteborg, Sweden: Paul Astroms Forlag

Sijelmassi, M. (1974). *Les Arts Traditionnels Au Maroc*. Casablanca, Morocco: Sijelmassi

Sims, E. (2002). *Peerless Images, Persian Painting and Its Sources*. New Haven, CT: Yale University Press

Singh, M., Jindal, S. K., Kavia, Z. D., Jangid, B. L., & Khem Chand (2005). Traditional Methods of Cultivation and Processing of Henna. *Henna, Cultivation, Improvement and Trade*: 21 – 14. Jodhpur, India: Central Arid Zone Research Institute

Singh, M., Jindal, S. K., & Singh, D. (2005). Natural Variability, Propagation, Phenology and Reproductive Biology of Henna. *Henna, Cultivation, Improvement and Trade*: 13 – 18. Jodhpur, India: Central Arid Zone Research Institute

Singh, M. P., & Lodha, S. (2005). Plant Protection in Henna and Henna for Pest and Disease Management *Henna, Cultivation, Improvement and Trade*: 35 – 38. Jodhpur, India, Central Arid Zone Research Institute

Singh, Y. V., Regar, P. L., Rao, S. S., Jangid, B. L., & Khem Chand (2005). Potential of Planting Configuration and Water Harvesting in Improving the Production of Henna in Arid Fringes. *Henna, Cultivation, Improvement and Trade*: 28 – 30. Pali-Mawar, India: Central Arid Zone Research Institute, Regional Research Station

Sosted, H.; Johansen, J. D., Andersen, K., E., Menné, T. (2006). Severe allergic hair dye reactions in 8 children. *Contact Dermatitis*, Blackwell Publishing Limited, Vol. 54 Issue 2: 87-91

Speedy, A. (2004) *Grassland Species and Profiles: Baphia nitida Lodd*. NY, NY: Food and Agriculture Organization of the United Nations. Retrieved July 9, 2006 from <http://www.fao.org/ag/agp/AGPC/doc/GBASE/data/Pf000146.HTM>

Stante, M., Giorgini, S., & Lotti, T. (2006). Allergic Contact Dermatitis from Henna Temporary Tattoo. *Journal of the European Academy of Dermatology & Venereology* Vol. 20 Issue 4: 484-486

The Star-Tribune (2006). *The Art of Henna*. Retrieved July 26, 2006 from
<http://www.casperstartribune.net/articles/2006/06/26/news/casper/a67a580999ebfb2487257199006d38b9.txt>

Sunan Abu-Dawud. *Hadith 41, 4910*: Abu Hurayrah

Tannen, L. (2002). *I Loved Lucy: My Friendship with Lucille Ball*. NY, NY: St. Martin's Griffin

Tatton-Brown, V. (1997). *Ancient Cyprus*. London, UK: British Museum Press

Tauzin A. (1998). *Le Henne' art des femmes de Mauritanie*. Paris, France: Unesco: Ibis Press Editions

Taylor, Lord William (1999). *The Mycenaeans*. London, UK: Thames and Hudson

The Chattanooga. (2006) East Meets West At Chattanooga Market Sunday. *The Chattanooga*, May 31, 2006. Chattanooga Tennessee. Retrieved May 31, 2006 from
http://www.chattanooga.com/articles/article_86794.asp

Thevoz, M. (1984). *The Painted Body*. NY, NY: Rizzoli

Tobin, D.J., Paus, R. (2001). Graying: Gerontobiology of the Hair Follicle Pigmentary Unit. *Experimental Gerontology*, 36: 29-54

Tubb, Jonathan N. (2003). Phoenician Dance. *Near Eastern Archaeology*, Vol. 66, Issue 3: 122-125

Van der Kolk, B. (1988). The Trauma Spectrum: The Interaction of Biological and Social Events in the Genesis of Trauma Response. *Journal of Traumatic Stress*, Vol. 1, Issue 27: 3-290

Van den Klybus, C.; Morren, M.A.; Goossens, A. (2005). Walking Difficulties Due to an Allergic Reaction to a Temporary Tattoo. *Contact Dermatitis* Vol. 53 Issue 3: 180-181 Blackwell Publishing Limited

Verlagsgruppe Bertelsmann GmbH, (1989). *The Great World Atlas*. Berlin, Germany and NY, NY: RV Reise und Verkehrsverlag GmbH and American Map Corporation

Verswijver, G. (1996). *Mekranoti: Living among the Painted People of the Amazon*. Munich, Germany: Presetl-Verlag

Vivaha, (2001) Volume II, Issue 3. Faridabad, India: Thompson Press

Wakelinm S.H., Creamerm D., Ryroft, R.J. G., White I., & McFadden, R. (1998)

“Contact Dermatitis from para-phenylenediamine used as a Skin Paint” *Contact Dermatitis*, 39: 92-3

Walrath, J. (1977). *Cancer Incidence Amongst Cosmetologists, A Dissertation Presented to the Faculty of the Graduate School of Yale University in Candidacy for the Degree of Doctor of Philosophy*. Hartford CT., Yale University Press

Westermarck, E. (1914). *Marriage Ceremonies in Morocco*. London, UK: Macmillan and Company, Limited

Westermarck, E. (1926). *Ritual and Belief in Morocco Vols 1 & 2*. London, UK: Macmillan and Company, Limited

White, R., White P. (2002) *Hollywood & the Best of Los Angeles Alive!* Edison, NJ: Hunter Publishing, Inc

White, T. (2006). “Get ‘Yer Bodies a Treat”. The Calgary Sun, July 15, 2006. Calgary, Canada: The Calgary Sun. Retrieved July 22, 2006, from <http://calsun.canoe.ca/News/Alberta/2006/07/15/1685941-sun.html>

Willett, M. (2005a). *Debate Unlimited: Mixed Feedback June/July 2005*

Retrieved June 30, 2006 from <http://mwillet.org/Feedback/June-2005.htm>

Willit, M. (2005b). *alt.religion.christian.biblestudy* . Retrieved from Google Group

Cache July 1, 2006:

http://groups.google.com/group/alt.religion.christian.biblestudy/browse_frm/thread/7e1d83748bf41f8/2ea8e5f1aec5b59d?lnk=st&q=henna+tattoo+holy+sign&num=1&hl=en#2ea8e5f1aec5b59d

Ya-Xian, Z., Suetake, T., & Tagami, H. (1999). Number of Cell Layers of the Stratum Corneum in Normal Skin – Relationship to the Anatomical Location on the Body, Age, Sex, and Physical Parameters. *Archives of Dermatology Research*, 291: 555 – 559

Zakaria, I. (2006). “Aku terima nikahnya...” *Malaysiakini*, June 13, 2006. Renkatini, Kuala Lumpur, Malaysia. Retrieved July 22, 2006, from <http://www.malaysiakini.com/rentakini/52413>

Maps and Mapping Data references:

Atlas of World History (1998) Ann Arbor, Michigan: Borders Press and Harper Collins

Cheilik, M. (1969). *Ancient History*. NY, NY: Harper Collins College Outline

ClustrMaps TM Beta (2006) *Map of accesses to hennapage.com*. Retrieved July 24, 2006, from <http://clustrmaps.com/counter/maps.php?url=http://www.hennapage.com>

Verlagsgruppe Bertelsmann GnbH, (1989). *The Great World Atlas*. NY, NY: RV Reise und Verkehrsverlag GmbH, American Map Corporation

Knowledgeable sources:

Abid and Co. 1999 – 2006

Henna processor and exporter, Pakistan

Al-Ashaf, Mohammed, 2002

Henna processor and exporter, Yemen

Applegate, Karam, 2006

Henna artist born in Malaysia, presently in UK,

Bahar, Riffat, 2006

Professional henna artist born in Pakistan, presently in London UK

Bonev, Boyan , PhD, 2005

School of Biomedical Science, University of Nottingham, UK

Brill, A. 2004

Informant on Turkish string resist techniques

Foster, Mark, 2004

Henna artist, UK

Icertified.net, (2003 – 2006). *Stat Logs and FTP access logs for hennapage.com*.

Grand Terrace, CA: Visox

Kaftal, E. (1997)

Israeli resident, informant on Israeli and Yemeni henna techniques

Sahib, K. (2006)

Henna artist, London

Sharma, N. (2005)

Henna artist born in Gujarat, presently in Bay Area, California

Additional photographs and drawings provided by author:

Cartwright-Jones, Catherine (2001 – 2006) Stow, Ohio: TapDancing Lizard LLC and

The Henna Page