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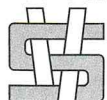
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Svenska Vävrådet



EDITORIAL

Turkey red is a legendary colour. The dyeing process is very complicated.

Thanks to some comprehensive research, the fundamentals have been rediscovered and dyeing can recommence.



TINA IGNELL
EDITOR-IN-CHIEF

THE COLOUR RED is hugely symbolic: of passion, exclusivity, power and love... Last June several of us took part in a red dye session. The gleaming red yarns, dyed with madder, cochineal, benibana, bengara and lac were hung up in the tree in the courtyard at Hemslöjden in Östergötland. Awaiting their transformation as warp and weft. You can see some of the results in this issue. We wove rosepath, half dräll, diamond twill and even a crocodile tapestry.

Symbolizing the same powerful characteristics as the colour red is the pomegranate motif, recurring in many patterns. Monnica Söderberg has written a set of thoughtful articles on this pattern, its use from the Middle Ages to more recent embroidery based on the Scanian long-armed cross stitch. Red is combined with gold in Queen Margareta's gown. This complex woven cloth was reconstructed at the Väfskolan in Borås under Christina Rinaldo's supervision. Read Amica Sundström's article a bit further on. Gold and red are also central to Birgitta Nordström's cope for the Dean at Gothenburg Cathedral.

Turkey red is a legendary colour. The dyeing process is very complicated. Thanks to some comprehensive research, the fundamentals have been rediscovered and dyeing can recommence. Professor Suhandan Özyay Demirkan takes us on a historical journey into Turkey red. Marie Ekstedt Bjersing's contribution details her own research into dyeing linen with madder.

One of the most exclusive reds is obtained from benibana, safflower. The flowers contain just a tiny amount of the red dyestuff. A truly deep red will need a lot of repeat dyeing. Once dyed, the cloth will fade when exposed to light. Paradoxically, this also gives the dye its unique quality and reinforces the mythical aspect. Benibana arrived in Japan via the Silk Road: Agneta Flock writes about it and other red dyes. Bengt Arne and I travelled over to Japan to see bengara and try dyeing with benibana. We came back with a yellow silk shawl, tinged with red at the edges, which is now lying in the dark corner of a cupboard. A warm welcome to this issue, glowing with red fervour!

VÄV

COVER

Agneta Flock

Good signs

Article on pp. 8–11

REBIRTH OF TURKEY RED

PROFESSOR SUHANDAN ÖZAY DEMIRKAN GIVES AN OUTLINE OF THE FASCINATING HISTORY OF TURKEY RED, A DYEING PROCESS THAT IS NOW BEING USED AGAIN IN TURKEY, THE OUTCOME OF EXTENSIVE RESEARCH.

TRACES OF RED can be seen throughout human history. Human beings first used the color about 27–25,000 years ago in the Cosquer Cave near Marseille, where the entrance tunnel is actually submerged. Other usages of red-like colors dates back to 18–17,000 BCE in the Lascaux Cave in Southwestern France and 15,500–13,500 BCE in the Cave of Altamira in Northern Spain, where prehistoric paintings of animals and signs onto walls were painted with mineral pigments, earthy iron oxide, clay ochre. Long before the discovery of writing, visual language was created and significant communication between the generations achieved...

Red is regarded as the most dynamic and passionate color symbolizing power, courage, rage and love; it has had a long history of extensive use since prehistoric times. The color red as the color of fire, blood and fertility has a primary emotional and psychological impact. It has both positive and negative aspects; as a sign it attracts attention more than any other color. In some cultures, it was regarded as the color of death as well as functioning for religious, ritual, artistic and magical use. Throughout history, all cultures have highly prized the color red. Since brilliant red was

one of the most difficult hues to create, it played a wide ranging role in art history and commerce.

Color in textiles has been produced by dyeing, painting or pattern dyeing from very early on. Until the nineteenth century, dyes were obtained from natural plants, insects and mineral pigment sources, all found in nature. It is known that red colors are either dyed with madder (root dye) or dye producing insects like lac, kermes, cochineal and others.

THERE ARE A VARIETY of red dyeing methods using madder (root dye). Most popular of them is the famous Turkey red dyeing. Rather than a color, Turkey red defines a very special and complex dyeing process used to create a vibrant and fast red color widely used to dye cotton. Madder red was also used for red cosmetics, and in medicine.

Madder-Kok Boya *Rubia Tinctorum* L a natural dye plant found both wild and cultivated, is a perennial shrub coming from the Rubiaceae family, native to West Asia. Growing in summer, it has spiky, thorny leaves which grow in whorls of 4 to 6, are lancet-shaped, 1/3 to 1 inch wide and 1 to 5 inches long. Its yellowish flowers develop into

deep violet, black berries by September, each year reaching up some 1,5 meters. Chemical alizarin extracted from the root of madder is the vital ingredient for the production of mordanted dyes. Madder also contains pseudopurpurin, munjistin and as many as 15 other anthraquinones as effective dyestuffs. It grows best on fertile, not too dry soil.

MADDER HAS BEEN used as a colorant for dyeing textiles since ancient times in Persia, Egypt and in India. However, it is important to underline that Indian madder *Rubia cordifolia*, which grows in India, does not contain alizarin dyestuff or very little which is essential to obtain the bright and fast red tone of Turkey red. Therefore the common belief that Turkey red originated or spread from India is not based on scientific evidence.

Among the earliest known samples of madder red in the Museum of Modern Art (MoMA) collection, is a fragment of a decorative polychrome border from a leather quiver found in upper Egypt, Egyptian Dynasty 11, in Thebes (Ca 2124–1981 BCE), and also a Sasanian textile, 6th century, a weft faced compound weave with dyes including madder. According to Dr. Elena Phipps, orange-red

Samples from Turkey Red Collection,
National Museums Scotland.

nms.ac.uk



colorant was presumably used throughout western Europe, in the Middle East, the Fertile Crescent and as far as eastern China. Interesting too is the application of madder as a lake or pigment painted on the surfaces of early Greek and Roman ceramic figurines and vessels now in the MoMA collection.

TURKEY RED DYEING is known as a complex, lengthy and painstaking process. The dyeing process, besides alizarin along with mordants of oil and alum to fix the dye to the cloth includes other ingredients such as sheep dung and rancid olive oil. During the actual dyeing the madder extract (alizarin) was combined with bullock blood. According to

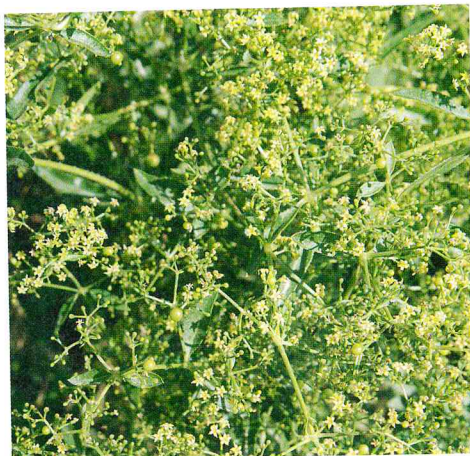
Prof. Dr. Recep Karadag, the authentic recipe, could involve up to 38 stages. In general, the dyeing process consists of oiling; mordanting with tannin; second mordanting with alum; dyeing and washing/fixation.

One of the most important terms bestowed by the Turks to textile literature and world textile heritage is "Turkey Red" also called "Andrinople Red" (Edirne, north-western city), a color dyeing recipe invented by Ottoman dyers in the 16th century. The recipe was closely guarded as a trade secret, handed from master dyer to apprentice. Europeans considered Turkey red to be one of the wonders of the Orient and a triumph of Islamic technology. In the sixteenth century

the Southeastern Anatolian city Gaziantep (formerly Aintab), was known as the center for the production of red dyed leather and cloth. The cultivation and use of madder red as the basis for the dyeing industry was important throughout the 18th century. The Ottoman Empire produced 2/3rds of the world's madder, together with silk and crops a very important export product for the empire.

TURKEY RED EXPANSION IN EUROPE

The Orient has been a focal point of attraction with its natural and mysterious look. The legendary silk road connecting east and west served as a network of trade routes connecting various northern and southern routes between



RECEP KARADAG



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Above left The red dye is obtained from the red stems of the madder plant.

Right Madder plant in blooming in flowers.

Left Dyeing Turkey Red process at DATU (The Cultural Heritage Preservation and Natural Dyes Laboratory).

the cities of Asia and the entrepôts of the eastern Mediterranean. Long trips had to be made to obtain the silk, spices and porcelain for which red was quite often used. Marco Polo and Vasco de Gama were the pioneers in establishing trade routes and meeting the plentiful demand, including for textile dyes.

WESTERN AND central Anatolia were the regions from which madder red originated. Its cultivation and use spread across the Mediterranean regions and into Europe at an early age: during Classical Greek and Roman times its use as a dye and pigment was common. From the 13th century it was cultivated in France, northern Italy, notably for dyeing wool, and was introduced to Spain by the Moors. In the 16th century it was cultivated in the Netherlands; in the 17th century in the south of France. Following the French revolution in 1789, the process was taken to Alsace.

It is known that in the west, madder was used to dye wool and silk but how to achieve a bright and fast red on cotton was a mystery. It

was the French, who became adept at dyeing Turkey red and set up the first successful dyeworks in Europe. By way of introducing the technique to western Europe in 1746, two master dyers were brought to Izmir (Smyrna), Turkey from France to discover the secrets of red dyeing. Much industrial espionage went into trying to find out the mystery behind the process. The color was introduced in Marseille, Rouen and later the process was taken to Lyon. Industry in Normandy was established. The centers where cotton manufacture were already dominant, became strong dye works producing Turkey red as in Manchester, Rouen and Muhlhouse.

HOWEVER, THESE early attempts at introducing Turkey red dyeing in France were not commercially successful. Partly, only cotton yarn could be dyed and the difficulty in applying the oil mordant evenly to cotton meant that skilled craftsmen were needed. The requisite steps in the process were also time consuming.

In Britain, the first successful Turkey red dyeing of cotton was introduced in Manchester and in Glasgow, where six dyeworks were established. George Mackintosh introduced Turkey red to Scotland in 1785. Pierre Jacques Papillon, a chemist from Rouen in Normandy, was invited to Scotland to set up the dyeing process. In Glasgow, extensive dye-houses were set up near Dalmarnock, later renamed Barrowfield, which became the first Turkey red works. In 1790, the industry expanded to the Vale of Levent where the cost was low and the region suitable for the Turkey red dyeing process.

Scotland had an important role in the production of decorative textiles and fashionable fabrics. Textiles with Turkey red dyed fast and washable shades became popular as export items with overprinted exotic patterns were produced and sold internationally to North America, West Indies, India, China, Africa and the Near East. Turkey red dyeing was also established in the Austrian Empire Germany, Holland and Switzerland.



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UNITED TURKEY RED Company Ltd. (UTR), formed of the three Scottish Turkey red firms in 1898, continued production till 1961. According to the records, the factory was closed, bringing the industry to an end after 200 years. As industrially produced chemical colors became established, natural dyes fell out of fashion in the 1850s. Today, the National Museums of Scotland holds an archive of 200 pattern books and circa 40,000 textile samples known as the "Turkey Red Collection" acquired after the demise of the industry in 1960.

Glasgow Museum, Muhlhouse and Military Museum in Istanbul have notable Turkey red collections. Despite the remarkable efforts made in France and Britain, the dyeing process could not be mastered to any great extent in western Europe. Although the "secret" was known, the process required skilled hands and its complexity made it difficult to copy. Simplifying the process did not bring the expected profits and production results to industry.

Around 1869, the use of madder began to decline since the main dye extracted from the root of the plant, alizarin, became available from British and German chemical factories. When synthetic dyes replaced the madder based Turkey red, the industry in Scotland was affected. Artificial alizarin generated simpler and more consistent dyeing processes that reduced labor costs and as they required less oiling and mordanting, less soap for cleaning,

material costs were reduced. The impact on the natural environment too was problematic with industrial pollution in the River Leven throughout the lifetime of the industry.

According to historians of chemistry, Turkey red was one of the most important colorants in the Industrial Revolution. Until the discovery of synthetic alizarin, madder was the important dyestuff in the preparation of the famous Turkey red. The period from the late 1700s to the late 1800s is regarded as the time of great experimentation that improved the growth of science, observation and discovery of the nature of materials.

TURKEY RED IS IN PANTONE CATALOG
Returning to the natural processes in the search for sustainable methods of textile production has brought natural dyes back into fashion. One of the most important attempts made in Istanbul, Turkey was the research conducted in the context of discovering the know-how for producing this mysterious red color.

Cultural Heritage Preservation and Natural Dyes Laboratory, the subsidiary of The Turkish Cultural Foundation (TCF) established 2010 in Istanbul, succeeded in rediscovering Turkey red, a natural dyeing process lost for over 200 years. With the leadership of Prof. Dr. Recep Karadag and his team, a project to determine the Turkey red color recipe was initiated and an analysis of micro samples of works dyed with Turkey

red from museum collections in Turkey and abroad undertaken. Internationally many universities, research labs and institutes have collaborated to achieve the original dyeing process. It involved three years of comprehensive research into the literature about this subject. With light shed through the analyses, the information and data obtained in this study, it has been possible to develop the original dyeing process for cotton. Prof. Dr. Karadag reports: *The formal registration of the Turkey red dyeing recipe is an important contribution to the preservation of our cultural heritage, art and science. It is now patented to the Turkish Cultural Foundation. We are happy to announce that Turkey Red will enter the Pantone Catalog next year.*

Notes: Harris, Jennifer; (1993), 5000 Years of Textiles, British Museum Press, London, UK.
Karadag, Recep & Dölen, Emre; (2007) "Re-Examination of Turkey Red", Annali di Chimica 97, Societa Chimica, Italy.
Pipps, Elena; (2010), Cochineal Red: The Art History of A Color, The Metropolitan Museum of Art, Yale University Press, New York, USA.

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