Report
Turkey red – Annotated bibliography
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Description


First publicly available method for dyeing Turkey red published by French Government. Provides description of typical ‘old process’ for Turkey red dyeing.

1776. L. d'Apligny, L’art de la teinture des fils et étoffes de coton : précédé d'une théorie nouvelle des véritables causes de la fixité des couleurs de bon teint, & suivi des Cultures du pastel, de la gaude, de la garance. Paris: Chez Servière, Libraire

Another French description of the ‘old’ Turkey red process as practiced in Darnetael, and in other manufactories of France.


This English translation of works of Hellot, Macquer, and d'Apligny provides the process described by d'Apligny for dyeing 100 pounds of cotton Turkey red. It further describes the role of oil (source of oil and how it should be applied on the cotton) and dung in the process.


The part second of the memoir by Thomas Henry, a chemist and member of the Manchester Philosophical Society, provides a detailed account of the ‘old’ Turkey red process for dyeing sixty-six pounds of cotton yarn employing fifteen successive operations and involves use of Alicante barilla, sheep dung, Gallipoli oil, gall decoction, Roman alum, Smyrna or Cyprus madder and sheep blood. Special emphasis on use of freshest possible dung and blood. In part third, he further discusses chemistry of
different operations and action of the substances employed in the preparation for the Turkey red.


*French chemist Berthollet provides ‘old’ process for dyeing Adrianople or Turkey red.*


*English translation of above text. Berthollet provides ‘old’ process for dyeing Adrianople or Turkey red in seventeen successive operations – Scouring, dung bath, white bath (bath with olive oil), four salt treatments (treatment with soda), washing, galling, alumming, washing from the alum, second white bath, three salt treatments, dyeing and brightening. He gave a detailed discussion of the chemistry of various ingredients and steps. He emphasized that the type of madder employed has great influence on the colour produced.*

1795. H. Thomas, XXVI. Continuation of Mr. Henry’s Considerations Relative to the Nature of Wool, Silk, and Cotton, as Objects of the Art of Dying, &c., The Repertory of Arts and Manufactures, 2: 192-207.

*In this third in a series of four articles on the topic, Henry describes particular preparatory operations practiced for dyeing Adrianople or Turkey red for sixty six pound of cotton. It gives description of first to ninth operation of fifteen step process.*


*Henry continues to give details of tenth to fifteenth operation of Turkey red process. Also describes theory of dyeing for the process.*
1798. S.P. Pallas, II. The Genuine Oriental Process for Giving to Cotton Yarn or Stuff the Fast or Ingrained Colour, Known by the Name of Turkey Red, as Practised at Astracan. Philosophical Magazine Series 1, 1 (1): 4–11.

In a series of two articles (for second part see 1806) Prof. Pallas describes Oriental process of Turkey red dyeing practiced by Armenians as recounted to him by a proprietor of a dye-house at Astracan. He describes the materials used and an overview of process employed in preparation and dyeing and mentions the use of fish oil for oiling. He further notes that by process of animalisation of yarn the application of oil blood, glue, or other animal matter being indispensably necessary.


Describes the operations of oiling, galling and aluming in TR process explaining the chemical principles, and the action of three mordants used in the process, viz. oil, galls and alum.


Felix provides an account of Turkey red method followed in the Grecian manufactories.

1802. J.M. Haussmann, XXXII. Observations on maddering; together with a simple and certain process for obtaining, with great beauty and fixity, that colour known under the name of the turkey or adrianople red. Philosophical Magazine Series 1, 12 (46): 170–75.

In the first of two texts, Haussmann describes his observations on maddering related to improvement in dyeing quality.

1802. J.M. Haussmann, XLIII. Observations on maddering; together with a simple and certain process for obtaining, with great beauty and fixity, that colour known under the name of the turkey or adrianople red. Philosophical Magazine Series 1, 12 (47): 260–66.

Haussmann's describes his Turkey red dyeing process, which unusually recommends an oil bath made with linseed oil containing
both aluminium (alum) and calcium (quicklime). The clearing step involves a boil with wheat bran.

1802. J.M. Haussmann, LVIII. Observations on dyeing with madder; followed by a simple and invariable process for obtaining, in its great beauty and solidity, the colour known by the appellation of Levant or adrianople red, The Repertory of Arts and Manufactures, 16 : 338-343.

Same text as in Haussmann's observations on maddering related to improvement in dyeing quality published in Philosophical Magazine Series 1.

1802. J.M. Haussmann, LXVIII. Observations on dyeing with madder; followed by a simple and invariable process for obtaining, in its great beauty and solidity, the colour known by the appellation of Levant or adrianople red, The Repertory of Arts and Manufactures, 16 : 398-410.

Same text as in Haussmann's description of his Turkey red dyeing published in Philosophical Magazine Series 1.


This is the description of Turkey red process communicated by Papillon to Dr. Black, a professor of Chemistry in Edinburgh, as a part of his agreement with commissioners and trustees and manufactures in Scotland. The method describes Turkey red process for dyeing one hundred pound of cotton in nine successive steps using alicante barilla, pearl ashes, quicklime, sheep's dung, oil of vitriol, gum arabic, sal ammoniac, galls, Roman alum, ox blood, madder. The process description is very similar to typical 'old' process, with some modifications like usage of oil of vitriol, gum arabic, sal ammoniac.


Here, Pallas describes the amounts of different materials used in 'old' Turkey red process using fish oil and time taken in completing different steps.
1812. J. Galt, Voyages and travels in the years 1809, 1810, and 1811: containing statistical, commercial, and miscellaneous observations on Gibraltar, Sardinia, Sicily, Malta, Serigo, and Turkey, London: Printed for T. Cadell and W. Davies

*Galt describes Persian, Greek, German and Glasgow method of Turkey red dyeing.*


*A section on ‘Rubia peregrina, Lin. Smyrna or Levant Madder, and its application for dyeing the Turkey Red’ gives an brief account of historical journey of Turkey red followed by detailed description of Papillon’s Turkey red process along with critical remarks on each step showing comparison with process practiced in Rouen. He cited want of chemical knowledge in Papillon’s description of using sulphuric acid, sal ammoniac and gum arabic, which he thought as peculiarity added by Papillon to render it more deserving of a reward. He further provides discussions on chemistry of Turkey red process citing works of contemporaries on suitability of different steps and ingredients used.*


*Details of Borrel’s process of dyeing Turkey red followed by Editor’s own process for dyeing an imitation of Turkey red. Remarks on type and quantities of ingredients such as madder, alum, barilla etc. used in different Turkey red methods with explanations and some reasons for preferring one process to another.*

1816. T. Packer, The dyer's guide: being an introduction to the art of dyeing linen, cotton, silk, wool, London: Sherwood, Neely, and Jones

*Provides a method for dyeing one hundred pounds of unbleached cotton Adrianople or Turkey red using alicant soda, fresh wood ashes, quicklime, sheep's dung and intestinal liquor, good olive oil, galls, alum, lizary madder, sheep's blood and white soap.*

Describes process of dyeing cotton or linen Turkey red. Homespun notes that the intensity of the red colour will be in proportion to the quantity of madder used in the dyeing: if the quantity of madder used is equal to the weight of cotton a red will be produced which will change to rose colour after freshening (clearing); for carmine colours two, three or even four parts madder should be used. Also suggests to add little chalk if water used do not contain it.


The section on dyeing gives description of Turkey red process by M. Haussman.


English translation of Berthollet’s description of Turkey red process by Scottish chemist Dr Andrew Ure. Also gives notes on different printing methods of Turkey red.


Cameron describes a cheap and simple process of for making cheap soda liquor by decomposing muriate of soda by pearl-ash for the use of the Turkey red dyers.

1828. C. Cameron, Method of making a cheap soda liquor, without crystallizing, for the use of the Turkey-red dyers, Journal of the Franklin Institute, 5(6), 388-389.

Same as Cameron’s earlier description entitled ‘III. Soda ley for dyers.’

The section under heading ‘Of dyeing red’ provides account of process as given by Dr. Bancroft and his remarks in reference to the process observed at Rouen in France.


The section under heading ‘Madder’ provides Papillon’s Turkey red process.


Provides a method for Turkey red dyeing of one hundred pounds of unbleached cotton. Also cites miscellaneous observations relative to Adrianople red by contemporaries.


English translation of description of Turkey red process given in Berthollet’s ‘Éléments de l'art de la teinture’ by Scottish chemist Dr Andrew Ure.


Ure discusses technological advances Turkey red dying, describes the process in a production environment and comments on methods from other dyers.

Gives description of six variations of Turkey red process practiced at different places: German process, Elberfeld process, M. Hausmann process, French process by M. Vitalis, Process of Messrs. Montieth and Co. and Improved French process.

1849. The dyer and colour maker's companion, Glasgow: William Mackenzie

Describes method for preparing cloth for Turkey red dyeing and gives recipes for producing white, yellow, green, blue and black discharges on Turkey red.

1860. C. O'Neill, A dictionary of calico printing and dyeing : containing a brief account of all the substances and processes in use in the arts of printing and dyeing textile fabrics

Gives a very brief overview of Turkey red process.

1860. S. Muspratt, E.N. Horsford, Chemistry, theoretical, practical, and analytical: as applied and relating to the arts and manufactures, London: W. Mackenzie

Section on Turkey red begins with brief details on its historical journey followed by description of Turkey red processes practiced in Glasgow and France. Further, it provides rationale of the Turkey-red Process explaining the action of the different ingredients employed.

1860. The dyer and colour maker's companion: containing upwards of two hundred receipts for making colours on the most approved principles, for all the various styles and fabrics now in existence. New ed. Philadelphia: Henry Carey Baird.

Gives very brief details of preparation of cloth for Turkey red dyeing followed by recipes for white, yellow, green, blue and black discharge for printing of Turkey red.
1862. C. O'Neill. A dictionary of calico printing and dyeing; containing a brief account of all the substances and processes in use in the arts of printing and dyeing textile fabrics. Manchester: A. Ireland and Co.

*Provides a brief general illustration of Turkey red process. Mentions increased usage of garancine in Turkey red dyeing during the period. See also for explanation of terms such as red liquor, dung substitute etc. Also give a description of various types of discharges on Turkey red.*

1869. D. Bremner, The industries of Scotland; their rise, progress, and present condition. Edinburgh: Adam and Charles Black

*A chapter entitled ‘Calico-Printing and Turkey-Red Dyeing’ provides an overview of introduction and progress of calico printing and Turkey red dyeing in Europe, especially in British context.*


*Provides details of eleven operation Turkey red process practiced in Elberfeld, Prussia.*

1872. W.B. Dick, Encyclopedia of practical receipts and processes, containing over 6400 receipts; embracing thorough information, in plain language, applicable to almost every possible industrial and domestic requirement, New York, Dick & Fitzgerald

*The section of Art of dyeing gives details of French process of dyeing Turkey red.*


*Provides critical overview of Turkey red process and its chemistry citing experiments of contemporaries. Also contains Turkey red samples dyed with madder and alizarin.*
1876. F.C. Calvert, Dyeing and calico printing; including an account of the most recent improvements in the manufacture and use of aniline colours. John Stenhouse and Charles Edward Groves (Eds.) 2nd Ed. Manchester: Palmer and Howe

This text provides an outline of the Turkey red process as practiced in Manchester and Glasgow during the period along with samples of Turkey red as dyed, Turkey red after first clearing and Turkey red finished provided by Messrs. Steiner and Co.

1876. T. Chateau, Critical and Historical Notes Concerning the Production of Adrianople or Turkey Red, and the Theory of This Colour. The Textile Colourist, 1: 172-178.

In first of eight part series of articles, Chateau gives historical account of origin of Turkey red and its migration to Europe.


In next three parts Chateau describes the details of processes of Turkey red dyeing at various places and by different dyers. This section gives details of Greek or Levantine process, Armenian process, Turkish process, Grecian process by Felix, Early French processes, Papillon process, Haussman process, Vogler process, Gmelin process and Chatpal process.

1876. T. Chateau, Critical and Historical Notes Concerning the Production of Adrianople or Turkey Red, and the Theory of This Colour. The Textile Colourist 1: 276-282.

Gives details of four process of Turkey red dyeing - Koechlin process, Vitalis process, Dumas process and Fries process.

1876. T. Chateau, Critical and Historical Notes Concerning the Production of Adrianople or Turkey Red, and the Theory of This Colour. The Textile Colourist 1: 384-397.

Gives details of Swiss process, Mercer and Greenwood process, Steiner process, Gastard process, Bernard process, Cardiner process, Rance process, Russian process and modern process by Schutzenberger.
1876. T. Chateau, Critical and Historical Notes Concerning the Production of Adrianople or Turkey Red, and the Theory of This Colour. *The Textile Colourist* 2: 27–33.

*Describes use of oil in Turkey red dyeing and various processes of preparing the oil.*

1876. T. Chateau, Critical and Historical Notes Concerning the Production of Adrianople or Turkey Red, and the Theory of This Colour. *The Textile Colourist* 2: 131–141.

*Comments on theory of Turkey red dyeing based on opinions of Pallas, Alpingy, Chatpal, Bancroft, Vutich, Dingler and Vitalis.*


* Provides accounts of Dumas, Persoz, Weisberger and Schützenbeger’s observations on theory of Turkey red dyeing.


*Continues to discuss theory of Turkey red dyeing based opinions of Henry, Wartha, Muller and M. Chateau and gives his conclusions on observations of different methods of dyeing and theory of dyeing.*


*A chapter entitled ‘Vale of Leven Industries: Turkey-red dyeing and printing’ discusses industrial history and progress of the art of Turkey-red dyeing on the banks of the river Leven.*

1881. G. Stewart, Curiosities of Glasgow citizenship; as exhibited chiefly in the business career of its old commercial aristocracy. Glasgow: J. Maclehouse

*See for story of Turkey red journey and people involved in establishment of Turkey red industry in Glasgow: David Dale of Rosebank, George Macintosh of Dunchattan, James Monteith of Anderston.*

*Gives a method for dyeing twist Turkey red by means of alizarin.*


*Sansone describes the present state of Turkey red dyeing, which at that time had recently adjusted to the 'new' process. He also proposes potential structures for the colour complex, discusses dye sources, and hypothesises about the chemistry of the process.*

1886. The life and labours of John Mercer, F.R.S., F.S.C. etc., the self-taught chemical philosopher: including numerous recipes used at the Oakenshaw Calico Print-Works, London : Longmans, Green

*A chapter entitled 'On Turkey red, madder and garancin’ comments on Mercer’s experimentations on simplifying and shortening the process. The appendix at the end gives specification of patents granted to John Mercer and John Greenwood for 'certain improvements in dyeing and printing Turkey red and other colours’ in 1846 and ‘improvements in the oiling process in Turkey red dyeing’ in 1852.*


*Vol. 1 gives a brief overview of a 7-step Turkey red process using caustic soda, alizarin oil, acetate of alumina, chalk, cow dung, alizarin and sumach. Vol. 2 contains samples of Turkey red.*


*(First Ed. Sept. 1885, Reprinted April 1886, 1888, 1890, 1893, 1896, 1898)*

*This book provides the most illustrative description of Turkey red process with fine details of ingredients, process conditions and machinery used. Though some specific details related to amount of alum and sodium carbonate used in different steps is missing. Hummel describes three different methods for producing Turkey red using alizarin: Emulsion process for dyeing 500 kilos. of Turkey-red yarn;*
Steiner’s process for dyeing 500 kilos. of Turkey-red cloth; and Sulphated oil process for dyeing 500 kilos. of yarn or cloth. Also gives details of machinery used in the process with drawings.


*Knecht provides a brief overview of the process under the heading ‘Turkey-Red (Adrianople Red; Indian Red)’ followed by details of three different TR methods: I. Old Process or Emulsion Process, II. Steiner’s Process for Turkey-Red on Cotton Piece Goods and III. New Turkey-Red Process (for Yarn and Piece Goods).*


*Two samples of dyed TR red in Pattern Sheet No. 7 Cotton: No. 37. Turkey red (Before oiling and steaming) and No. 38 Turkey red (After oiling and steaming).*


*Describes two process for dyeing Turkey red; a 12-step process using Gallipoli oil and a 7-step process using alizarine oil or Turkey-red oil. Suggests use of phosphate of soda in place of sheep dung for preparing green liquor used in ‘old’ process.*


*The section on ‘Turkey red dyeing’ begins with brief historical overview, followed by chemistry of Turkey red lake formation and preparatory step and overview of old and new Turkey red processes. A section on Turkey-red discharge style describes two methods for the discharge of Tukey red – the ‘cuve decolrante’ (decolorising vat) introduced by D. Koechlin and the caustic soda discharge.*

_Brief description of new Turkey-red process using Turkey red oil, alum, sodium carbonate, chalk and alizarin in nine steps- boiling off, oil preparing, stoving, chalking, dyeing, second oil preparing, steaming and clearing._

1905. J.C. Cain, J.F. Thorpe, The synthetic dyestuffs and the intermediate products from which they are derived. London: Charles Griffin and Co. Ltd.

_Describes method for producing Turkey red using Turkey red oil for oiling, aluminium acetate as mordant and alizarin as dye._

1906. J.J. Hummel, A. R. Foster, P.N. Hasluck, Colouring matters for dyeing textiles, Philadelphia: David McKay

_Descriptions of Turkey red process same as in ‘The Dyeing of Textile Fabrics’ by J.J. Hummel._


_Give brief overview of a 13 step emulsion or old process and a 9 step the Turkey red oil or new process for Turkey red dyeing with alizarin paste._

1908. Farbwereke vorm. Meister Lucius & Brüning, The coal tar colours of Farbwereke vorm. Meister, Lucius & Brüning, Hoechst on Main, Germany, applied in calico printing, Hoechst o/M

_Provides a new red process for dyeing Turkey red with Turkey red oil and alizarin. Also gives methods of discharging Turkey red by means of chloride of lime, glucose alkali process and hydro sulphite-caustic soda process with examples of printed fabric samples._
1908. *F. Dannerth*, The methods of textile chemistry; being the syllabus of a lecture course adapted for use in textile laboratories. New York: John Wiley & Sons

A section under heading Turkey red starts with comments on chemical control of the materials used in the turkey-red dyehouses followed by brief description of Old Style or Emulsion Method and New Style or Sulphated Oil Method. Describe different tests for examination of the bleached goods before dyeing, detection and determination of aluminium, calcium, and tin in the finished fabric, examination of the red for purity of shade, fastness of the red to various agencies and tests to distinguish turkey-red from other cotton reds.


*Carruthers describes a new process for dyeing Turkey Red and various other Alizarin dyestuffs discovered and patented by Mr. Rene Ott and the firm of Messrs. F. Bayer & Co., Elberfeld.*

1911. Pocket guide to the application of the dyestuffs of the Badische Anilin- & Soda-Fabrik, Ludwigshafen o/Rhine, New York: Badische Company

*Provides Turkey red process as new red, old red and simplified Turkey red process using alizarin as dye.*


*Detailed comments on mordant, oils and other substances used in Turkey red dyeing. Gives a summary of a method used on large scale for the production of a bluish Turkey red dyed with alizarin specially for discharging and a method of Turkey red dyeing patented by Erban and Spetch. Also gives details of acid and alkali discharge on Turkey red dyed cloths with examples of printed fabrics.*

Provides details of ‘old’ and ‘new’ Turkey red process for dyeing with alizarin paste recommended by Meister, Lucius and Brüning, old process taken from The Dyeing of Textile Fabrics by J.J. Hummel, a simplified process patented by Badische Company, Steiner process for Turkey red on cotton piece goods and Bayer’s patented process for dyeing Turkey red yarn.


Leigh describes his experiments involving different methods to determine the composition of Turkey red as it exists on the fibre in the commercial articles.


Gives details of two methods Turkey red dyeing with alizarin - old process or emulsion process for cotton yarn and new process or sulphated oil or Turkey red oil process for yarn and piece goods.

1920. J.M. Matthews, Application of dyestuffs to textiles, paper, leather and other materials, New York: Wiley

Gives the fourteen step old or emulsion process of dyeing summarized by Whittaker in adaptation from Pelsen’s ‘Turkish rot and Seine Concurrenten’ and a short nine step process for Turkey red.


Parks attempts to explain the chemistry behind steps involved in TR dyeing based experimental observations. It gives brief overview of historical developments and description of traditional long TR process followed by experimentation details and interpretation of results illustrating chemistry of the process. A short process for dyeing TR and its chemistry was also discussed by in similar manner.

Peel discusses rise and fall of Turkey red industry in Scotland. Provides a critical overview of transformation of Turkey red process over time giving description of technical advancements through old to new processes.


Comments on historical journey of Turkey red and transition from natural madder, garancine and synthetic alizarin in the industry.


A chapter entitled ‘secret recipes of Turkey red’ gives historical details, process of dyeing and trading.


Investigates the amount of the dyestuffs bound to mordanted cotton fibre and impact of number of oiling treatment of the cotton yarn in reconstructed Turkey red by using TLC (thin layer chromatography) and spectrophotometry.


Presents a historical account of Turkey red technology transfer in Scottish context. Also gives details of Papillon’s TR process.


Gives a brief overview of TR industry in Scotland, followed by details of Turkey red collection at National Museums Scotland and interpretation of pattern books.

Tells the history of the TR industry with examples of fabrics from archive of Turkey red patterns at National Museums Scotland.


Outlines the historical, geographic, and social context Turkey red to highlight its significance to Scottish cultural heritage.


Describes transfer of Turkey red techniques from East to West.


Provides historical and account and developments in Turkey red industry in French context.

2017. S. O. Demirkan, Rebirth of Turkey red, Scandinavian Weaving Magazine, 4: 18-21

Gives an outline of history of Turkey red and research in Cultural Heritage preservation and Natural dyes laboratory in Istanbul for its recreation for modern industrial practices.


Presents a multi-disciplinary investigation of the chemistry of TR textiles and processes in the context of 19th c. Scotland using historical material re-creations and modern analytical chemistry.

Presents an idea of authenticating Turkey red based on the presence of an oil treatment on the cotton through non-invasive Fourier transform infrared (FTIR) spectroscopy and micro-analysis by ultra-high-performance liquid chromatography (UHPLC).


Gives historical overview of TR dyeing in Europe in general and Scotland in specific context. Describes ‘old’ and ‘new’ TR process and chemistry, followed by historical recreation and analysis of reconstructed TR. Also gives historical overview of alizarin synthesis and laboratory recreation of synthetic alizarin following historical methods.


Presents an investigation on historical and replica TR textiles with diffuse reflectance infrared (DRIFT) spectroscopy to study the coordination complex between cellulose, fatty acids, and the aluminium ions that form the basis of the colour lake.


Provides analytical evidence for use of lead chromate, Prussian blue, and logwood for creating the distinctive prints on Turkey red calico from the 19th c.

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