

# 1. Textile Dyeing in Paisley 1800-1840

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## Introduction

Much has been written about the Paisley Shawl industry, particularly in respect of the design and production methods used by the weavers <sup>1</sup>. However, little is known of the textile dyers responsible for the production of the coloured yarns used by the Paisley weavers. Textile dyeing has a long history in the area, as it did in most areas of Scotland, but probably in view of the secrecy of the dyers' trade little was recorded for posterity. Among the questions to be answered are, "Did the weavers have their yarns dyed locally?" or "Did the weavers import dyed yarn from sources outside Paisley?". Perhaps the answer is they did both! This essay is an attempt to put together some of the threads of knowledge about dyeing in Paisley round about the early nineteenth century, with an indication of the extent of our knowledge about dyeing elsewhere in Scotland in the same period.

## Early History of Dyeing in Scotland

The technicalities of dyeing with natural dyes were recorded during the early and late 19th century in two major textbooks on the subject <sup>2</sup>. In addition the written history of most areas of Scotland, from the 12th century onwards, includes reference to dyers of cloth among the crafts and occupations listed in Scottish burgh records and particularly in the First Statistical Account <sup>3</sup>. These early references to the dyeing of wool and other textiles mention the use of native plant sources but also include mention of imported dyes. The dyers in Aberdeen were sufficiently organised that in 1504 the litsters (dyers) formed themselves into a society. The modern Society of Dyers and Colourists for the UK was only founded in 1884 but has had a Scottish Region since its foundation. Useful aspects of the history of dyeing in Scotland are given by Hubner <sup>4</sup> (mainly pre-1700), Fleming <sup>5</sup>, Grierson <sup>6</sup> and Quye et al <sup>7</sup>.

## Dyers in Paisley about 1800

Like most textile centres Paisley burgh had a Dyers Wynd from mediaeval times, although by 1783 there are only three Paisley dyers listed in the Trade Directory of that year. These were William Angelic in St Mirren's Wynd, John Cochran in Saucel and William King, in Dyers' Wynd <sup>8</sup>. In 1810 again there were just three dyers listed, William Blakie in Old Sneddon, Malcolm Lang in Dyers Wynd and William Moffat in Smithhills <sup>9</sup>. Most workers in the dye trade were probably working at the hundred or so bleachfields and printfields in Renfrewshire at the time. Fields such as Chapel at

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<sup>1</sup> Reilly, V., "Paisley Pattern; a design resource book", (London, 1989).

<sup>2</sup> Bancroft, E., "The Philosophy of Permanent Colours", 1st Edition. London 1794 (2nd Edition 1813 expanded to 2 volumes); Grace-Calvert, F. "Dyeing and Calico Printing", 3rd Edition, Palmer and Howe (Manchester 1878).

<sup>3</sup> Sinclair, J. (Ed.), The Statistical Account of Scotland, 21 volumes (Edinburgh 1791-1799).

<sup>4</sup> Hubner, J., "A Contribution to the History of Dyeing with special reference to Scotland" Journal of the Society of Dyers & Colourists, 30 (1914) 211-228.

<sup>5</sup> Fleming, R., "History of Dyeing in the Scottish Region" submitted for publication in the Society of Dyers & Colourists Centenary Booklet, Bradford, (1984).

<sup>6</sup> Grierson, S., "The Colour Cauldron: the History and Use of Natural Dyes in Scotland" Mill Books, (Perth 1986).

<sup>7</sup> Mercer, K., Burnett, J. and Quye, A., "The Practice of Wool Dyeing in Scotland, 1790-1840" submitted for publication in Folklore (September 2003).

<sup>8</sup> Directory of Glasgow and Paisley manufacturers and traders (1783).

<sup>9</sup> Paisley Directory of Merchants, Manufacturers, Traders etc, 1810 Archibald Bell, Paisley (1810).

Arthurlie had mills for grinding dyewood to produce printing dyes <sup>10</sup>. In the late eighteenth century the Renfrewshire bleachers and printers were using a remarkable array of minerals and dyes from around the world. In the 1790s Robert Osburn, the predecessor of the Crums at Newfield and Thornliebank in Eastwood Parish used American Bark, Ground Brazil, Logwood, Sugar of Leadgrass, Madder Grass, and Iron Liquor as dyes, plus Alum and Gum Senegal as mordants <sup>11</sup>.

By the 1830s there were seventeen dyeing establishments located in central Paisley on both sides of the River Cart between Abbey Bridge, Sneddon and Smithhills. <sup>12</sup> By this time the expansion of the textile industry was sufficient to support not only individual dyers but also dye factories at Saucel, Lonend and Blackhall. Malcolm Lang is the only name to have survived from the 1810 list.

#### **Dyers and Dyeing Factories in Paisley (1839) <sup>13</sup>**

1. David Barr & Co, 8 Marshall Lane
2. Barr & McNeil, Silk and Cotton Dyers, 4 Bridge St, Newtown
3. T & D Campbell, 2 Waterbrae and 1 Causeyside St
4. Crossley & McMaster, 2 Saucel
5. John Gemmel, Christie Lane, New Sneddon
6. John Gilchrist, Silk, Cotton and Wool Dyers, Blackhall Dyeworks
7. David Glassford, Silk Dyers and Renovators, 10 St Mirren St
8. Peter Hay, Silk Dyers and Renovators, 20 Smithhills St
9. David Hutcheson & Co, 56 Causeyside St
10. John Jamieson, 2 Saucel
11. John Lang, Dyer & Renovator, 16 Old Sneddon
12. Malcolm Lang, Burns Place
13. John Lawrence, Silk Dyer, Cart Lane
14. James Mitchell, 4 Charles Place, Seedhill
15. William McIntosh, 6 Snodgrass Lane, Seedhill
16. Andrew and John McLean, 8 Dyers' Wynd
17. J&J Reid, 12 New Smithhills
18. James Wallace, 56 New Sneddon
19. Wark, Leckie and Co, Lonend Dyeworks

Another way of measuring the scale of dyeing was by the colour of the so-called 'White' Cart water. The history records that from the early 1700s the pollution of the Cart from the dyers' establishments grew steadily worse as the textile industry increased its output. This was not helped by the contribution from the Levern further up the Cart, which also had numerous cloth and thread dyeing works. Much further upstream, substantial works at Pollokshaws, Cathcart and Busby contributed to the palette and general mix. The growth in the number of dyers in Paisley as the shawl production increased from the 1820s suggests that in this period many of the weavers probably had their yams dyed locally to the colours required.

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<sup>10</sup> Taylor C., *The Levern Delineated* (Glasgow 1831), p.7.

<sup>11</sup> National Archives of Scotland CC9/7/75: Last Testament of Wm. Osburn, bleacher Thornliebank, Eastwood parish (died June 1791). Mordants were chemicals which fixed the dyes and stopped them running.

<sup>12</sup> McCarthy, M., "A Social Geography of Paisley", B. Litt Thesis, University of Oxford, published in book form by Paisley Public Library, (1969), p.77.

<sup>13</sup> Taken from: Paisley Directory of Merchants, Manufacturers, Traders etc for 1838/39, Archibald Bell (Paisley 1839).

## Dyes used in Paisley Shawls

Dye and chemical analysis by Murrin <sup>14</sup> of a range of coloured yarns from a Paisley shawl dated to 1850-60 showed that the following dyes and mordants were used;

Brown on cotton weft	weft	madder on an iron mordant
Yellow on cotton weft	weft	old fustic on tin mordant
Red on wool weft	weft	cochineal on tin mordant
Green on wool warp	warp	indigo extract (sulphonated indigo) and fustic
Black on wool warp	warp	logwood on chrome mordant

Testing of coloured threads from shawls of the 1820-1860 period included reds on wool from cochineal (tin) and on cotton from madder (alum), yellows from weld, fustic and quercitron bark, blues on cotton from indigo, and on wool and silk from logwood blue, Prussian blue, indigo extract, chrome blue and Victoria blue (used on both wool and silk). Both of the last mentioned dyes are examples of synthetic dyes not available until after 1880 suggesting that the shawl sources were incorrectly dated.

These are the only known sources of information about the nature of the dyes used in the Paisley shawl industry so there is considerable scope for more investigations of this type. It is a pity that no written records have yet been found for the dyes used, or of the dyer's business with the weaving industry in Paisley. This contrasts with the excellent records for the 1780-1820 period available for the tartan weavers, Wilsons of Bannockburn <sup>15</sup>. However, the above lists of dyes used on Paisley shawls are included in the list of dyes known to have been used by Wilsons of Bannockburn, so perhaps there was a common source of these imported dyes available across the central belt of Scotland.

## Sources of Dyes

Although, as mentioned above, dye extracts from native plants were used extensively throughout Scotland in medieval times, by the eighteenth century such dye sources continued to be used only in the remoter rural areas, particularly in the highlands and the western isles. Most textile manufacturers in the north-east, the central belt and the borders used imported dyestuffs which were regularly traded from the 14th century onwards. Thus the Hallyburton records for 1492 to 1503<sup>16</sup> list prices of shipments to Scotland from the Netherlands, including dyestuffs such as woad, indigo and madder as well as alum used as a dye mordant. Custom records show that dyes were imported through many Scottish ports including Ayr, Greenock, Port Glasgow, Glasgow, Boness, Leith and Aberdeen. Custom records for Port Glasgow <sup>17</sup> show that large amounts of indigo were imported annually with over 2 tonnes being traded through the port as early as 1685.

For the period of the present study imports were disrupted by the Napoleonic wars and their aftermath. From the point of view of Paisley dyers an interesting record of dye imports is contained in the 1812 correspondence of R & J Henderson and Co, Drysalter, of High Street, Glasgow. <sup>18</sup> This firm were one of the largest dyestuff merchants in the country, and who eventually traded from their Paisley establishment as Henderson and Hogg. Their records recounts the price fluctuations in the London

<sup>14</sup> Murrin, B. J., "The Dyeing of the Paisley Shawl", HNC project, Paisley College (1972).

<sup>15</sup> Rawson, H. C., Burnett, J. and Quye, A., "The Import of Textile Dyes to Scotland: Case of Wm Wilson & Son, Tartan Weavers. Bannockburn, 1780-1820" *Review of Scottish Culture*, 13 (2000) 19-28.

<sup>16</sup> Hallyburton, A., "Ledger of Andrew Hallyburton, 1492-1503", Register House, Edinburgh, (1867).

<sup>17</sup> Smout, T. C., "Imports of Dyestuffs into late 17th century Scotland: the customs records as a source" *Dyes in History and Archaeology*, 13 (1994) 74-76.

<sup>18</sup> Henderson, Hogg & Co Ltd, "100 Years as suppliers to the textile industry", (Paisley 1976).

market (shipped to Scotland by sea) of many of the imported dyes and mentions particular purchases for their major customers such as A. & J. Crum, Dyers and Printers of Thornliebank and Jas Black & Co, Dyers of Alexandria. Undoubtedly R. & S. Henderson would supply the burgeoning dyeing industry in Paisley as it expanded over the 1810 to 1840 period. In the 1812 correspondence dyestuffs mentioned include indigo from different countries (the best quality a bargain at 5 shillings per pound), madder roots, Dutch madder, cochineal from Spain and Jamaica, Prussian blue, weld, safflower, brazilwood, peachwood, other dyewoods from East India merchants, etc. The correspondence gives an interesting insight into the successful bargaining tactics of these Glasgow based merchants.

### Colour Choices and Dye Selection

The choice of dyestuff available in the 1800 to 1840 period was partly determined by the nature of the textile yarn to be dyed (cotton, silk or wool) and partly by the skill of the dyer and the availability of the dyestuff at the right price and of the quality required. Political factors and the aftermath of the Napoleonic wars also influenced supplies in the early 1800's.

Most dyes could be applied to wool and silk and the principal dyes used for dyeing these yarns included:

Reds	Madder, Cochineal, Lac, Brazilwood
Purple	Orchil or Cudbear (from lichens)
Blues	Indigo , Woad, Indigo extract, Prussian Blue
Yellows	Old Fustic, Weld, Quercitron Bark, Yellow Wood
Black	Logwood

All of these dyestuffs can be applied directly to wool or silk but their colour and resistance to washing and light, can be improved by treating them with mordants (metal salts including alum, tin salts, etc). In early days cow and horse dung was used as the source of phosphate for brightening dye colours. Dyeing cotton is much more difficult and apart from indigo and woad (applied in vats with addition of various additives which resulted in chemical reduction of the dyestuff) the application of madder, logwood and the yellow woods required the preparation of the cotton with mordant salts such as alum, chrome salts, etc.

*Mordants merit the greatest attention. It is by them chiefly that we diversify the colours, give them their brilliance, fix them on stuffs, and render them more durable*<sup>19</sup>.

Alums and copperas ('green vitriol') were the most common mordants containing aluminium, chromium or iron as the central metal and were either sodium, potassium or ammonium salts. The original source of the ammonia required was often stale urine (hence the smelly reputation of early dyeworks). In Scotland the main sources of alum and copperas were at Hurler and Househill in Renfrewshire, and Campsie in Stirlingshire, major works developing on these sites from 1753.

The early texts mentioned previously (Refs. 2 & 3) give full details of the dyeing methods for natural dyes used by dyers in the first half of the 19th century, although later editions of Grace Calvert's text and the editions of Knecht et al<sup>20</sup> produced about the turn of the century also deal with the dyeing methods developed for the

<sup>19</sup> Berthelot, "Elements of the Art of Dyeing" (1791).

<sup>20</sup> Knecht E., Rawson, C. and Loewenthal R., "A Manual of Dyeing" 1st edition 1893, 8th Edition, 2 vols (1925).

early synthetic dyes produced from 1856 on. Up-to-date texts on natural dyes, nowadays used by craft dyers, include the texts of Grierson and others <sup>21</sup>.

### **Dyeing and the Chemical Revolution**

The development and expansion of the dyeing industry in the early 1800's in Scotland can be traced to the improvement in the understanding of the chemical principles of dyeing initiated in France, alongside the developments of the chemical industry in Scotland and the rest of Britain during the 18th century. This "chemical revolution" sits side by side with the beginnings of the industrial revolution in which the textile industry was the main focus. Prior to 1700 the quality of the colours resulting from the traditional dyeing process was poor and variable. Clow and Clow in the chapter on "the Philosophy of Colour" in their seminal text <sup>22</sup> quote Wolf's History of Technology as follows:

*During the earlier part of the 18th century the traditional method of dyeing was still followed. Improvements were introduced in the course of the century; and the practical improvements were intimately associated with advances in the chemical theory of dyeing.*

At that time, through the activities of Cullen, Black and Thomas Thomson in Glasgow and Edinburgh, Scotland was well advanced in the teaching and discussion of the applications of chemistry to industry and the textile dyeing industry was one of the earliest developments of industrial chemistry. Prestonpans was the site of the 1749 plant for the manufacture of sulphuric acid used in the developments of bleaching and dyeing. The previously mentioned alum works at Hurler and Campsie are also examples of the developments of the early chemical industry introduced to support the above-mentioned developments in dyeing.

Scottish contributions to the chemical revolution included those of Charles Tennant and George Macintosh who set up bleach and chemical works at Darnley, Hurler in Renfrewshire and Dunchattan near Glasgow, initially to produce bleaching powder. However, one of their earliest products was the purple lichen dye called Cudbear which required the use of large quantities (2000 gallons per day) of stale urine collected from the houses of Glasgow and its suburbs. Typically for the period everything was done at Dunchattan works to ensure secrecy. Walls ten feet high were built round everything and Highlanders speaking only Gaelic were employed. However, secrecy proved unnecessary as other companies who gained knowledge of the process could not match the Dunchattan works skills, which involved scientifically developed methods of production. A similar story surrounds Prussian Blue for which Macintosh & Co also developed a successful manufacturing method able to produce the consistent and high quality necessary for the product to be used as a successful dye, with large quantities being exported to China and sold across the world by the East India Company.

Macintosh and Dale (of New Lanark fame) along with others engaged a Frenchman P.J. Papillon with dyeing experience in Turkey and Paris to help them set up Turkey red dyeing works at Dalmarnock, using madder roots as the dye source but also involving a complicated set of at least nine stages. Again the secrets of Turkey red dyeing were hard to come by but the Dalmarnock works and eventually those of the Vale of Leven dominated the European trade in dyed and printed Turkey red cloths.

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<sup>21</sup> Clow, A. and Clow, N. L., "The Chemical Revolution", Batchworth Press, London 1952; Fraser, J., "Traditional Scottish Dyes and How to Make Them", (Edinburgh 1983).

<sup>22</sup> Brooklyn Plants and Gardens "Dye Plants and Dyeing" Plants & Gardens, 20 (1982) No.3.

The development of the first synthetic dye Mauveine by Perkin in 1857 crucially involved the development of dyeing and testing methods by Robert Pullar of Perth, judged by Perkin to be one of the most scientifically aware dyers in the country. Scotland continued to play an important role in dyestuff developments with Morton's setting up in 1922 <sup>23</sup> of Scottish Dyes Ltd (later part of ICI Ltd) at Grangemouth where the famous Caledon Jade Green vat dye (and many others were developed). Grangemouth was also the site in the mid 1930's of the discovery and development of Monastral Blue (Phthalocyanine Blue) as a pigment and a dye. The Paisley works of Ciba Colours (originally James Anderson & Co) are the major UK manufacturers of Phthalocyanine Blue today.

### **Conclusions**

The significant increase in the number of dyers, and the creation of textile dyeing factories in Paisley, between 1810 and 1840 parallels the increased activity in the shawl industry in Paisley so we can deduce that most of the coloured yarns used by the weavers during this period were dyed locally. The available collection of shawls from that period show a wide variety in the colours used suggesting that the Paisley dyers must have acquired sufficient skills in dyeing to compete with alternative dyed yarn suppliers from the West of Scotland and elsewhere in Scotland and even from Britain as a whole. (The dyes were often imported through London).

Achieving the commercial level of dyeing skills required must have meant that systems of technical skill transfer were available to Paisley dyers, which as discussed above, would probably include an appreciation of the necessary scientific application of these skills to achieve the required quality. The period in question saw the burgeoning of literary and scientific knowledge and practice long associated with the period of the Enlightenment in Scotland. Information was transferred through personal contact between practitioners (the Dyers Societies), discussions in Coffee Houses, of which Paisley had one from 1780, the development of subscription libraries (Paisley's was founded in 1803) and public lectures and talks (Paisley Philosophical Institution was formed in 1808).

It is interesting and perhaps relevant that Paisley's subscription Library had 3000 volumes in 1810 whereas the equivalent library donated to the Andersonian University in Glasgow in 1829 only had 300 volumes <sup>24</sup>. In addition the early lectures of the Paisley Philosophical Institution included a high proportion on industrial applications of chemistry (and probably dyeing). Certainly the summary reports of these early lectures in the minute book of the Institution show that the lecturers (mainly local personalities) had knowledge of remarkably up to date information on the theory and practice of industrial chemistry. Sociologists have long reported the ability of the Paisley weaver (and even their apprentices) to take part in high levels of discussion of engineering, literary, philosophical, religious and political matters. Perhaps the dyers were just as able in discussing the theories and practices of dyeing, although their traditions would inhibit discussion of technical detail outside their trade or profession. However, as indicated previously, they were not very good at keeping or passing on records of their businesses and skills for posterity.

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<sup>23</sup> Morton, J.R, "History of the Development of Fast Dyeing and Dyes" Journal of the Royal Society of Arts,77(1929) 544-574.

<sup>24</sup> The Royal Philosophical Society of Glasgow, "No Mean Society 1802 to 2002" p.40-42.