Pathways in the Nineteenth-Century British Textile Industry

Edited by
Philip A. Sykas

Volume I

ROUTLEDGE

PATHWAYS IN THE NINETEENTH-CENTURY BRITISH TEXTILE INDUSTRY

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VOLUME I: TIMELINE

1792	William Thompson set up a mill to spin waste silk yarns at Galgate near Lancaster
1801–1802	Patents of Thomas Parker, William Telfer and Alexander Affleck of Glasgow, for machinery to recover fibrous raw materials from manufactured textiles
1806	Conjectured date that Israel Davis adulterated Spanish wool with wool pulled from old blankets, and realised full prices in Yorkshire
1807	James Holdforth began spinning silk waste at Leeds
1809/1813	Conjectured date of first shoddy cloth by Benjamin Law and Benjamin Parr of Batley
1815	First rag pulling machine of sawtooth construction by Joseph Archer for Benjamin Law and Benjamin Parr
1818	Joseph Jubb and others construct woollen rag pulling machines
1820	George Hall began dealing in woollen rags for shoddy grinding at Clerk Green, Batley
c1820–1825	Rag pulling machine for woollen rags modified to use conical teeth and dubbed the 'devil'
1821	Marshall and Co. of Leeds begin carding and preparing of tow by machinery
1822	Hick Lane Mill established in Batley to weave shoddy cloth
1822	J. S. Alioth of Basle began spun silk production, moving to Arlesheim in 1824
1827	Marshall and Co. of Leeds began tow processing for fine work
1828	Output of rag trade estimated at 9,000 packs shoddy (*Wool Year Book*)
1830	Shoddy from Denmark exported to Britain by Marcus Gottlieb Galthen Bech
1834	Experiments with mungo production begun
1842	Busfeild Ferrand's denunciation of the shoddy trade as 'devil's dust'

1844	Abolition of import duties on foreign wool entering Britain, including rag wool
1844	London Sack Protection Society formed to recover empty sacks
1849	William Garnett Taylor of Manchester patented a hand-operated linting machine
1850	First hard waste opening machinery for worsted (Leather 1917)
1851	P. and C. Garnett, machine makers, founded
1851–1855	Experimental phase in the development of extract wool (wool extracted from blends with cotton)
1852	Lyon Playfair's lecture before the Society of Arts touching on recycling
1853	Crone, Fenton and Aldred patent for extracting wool from cotton and wool mixtures (no, 1891)
1855	First power-driven linting machine devised by William Robinson of Chesterfield, from experiments begun around July 1854
1856	Frédéric Quinson patented a waste silk combing machine in France that was put into practical use around 1870
1858	A process of recovering stearine from wash water was put in place at Kingholme Woollen Mills, Dumfries
1859	Lister and Warburton's first silk comb
1861–1865	Lancashire cotton famine stimulated interest in waste processing and mixture fabrics
1862	Joseph Rhodes of Morley gained knowledge of Mathias Stirn and Sons' improvement of the rag machine for mungo grinding, and patented it in Britain, hence known as Rhodes's cover
1865	Low woollen goods market opened at the Piece Hall, Halifax, Saturday, 7 January. Previously there was only a market at Rochdale
1865	The silkworm disease pebrine caused the French and Italian silk industries to collapse, making supplies scarce
1866	James Tomlinson patented his first machinery for hackling and opening hemp
1867	Celestin Martin of Verviers, Belgium, was commended at the Paris *Exposition Universelle* for the superior clearness of yarns made from burry wool by carbonisation
1868	Cottolene, a lard substitute from cottonseed oil, marketed in the United States
1868–1869	Samuel Cunliffe Lister patents velvet looms for weaving spun silk yarns
1869	Manchester Cotton Waste Dealers Exchange set up

1870	Jean Sebastien Bolette, Belgian engineer, introduces the steel tape for dividing carded fleece into strips for condensing
c1870	Carbonisation of wool/cotton blends came into general use after twenty years of secretive practice (Leather 1917)
1871	Lister and Reixach joint patent for face-to-face weaving velvet loom
1871	William Charles Jones established a cotton waste business in Manchester
1873	Archduke Rainer Ferdinand von Hapsburg invited displays concerning waste consumption for the Vienna exhibition
1875	*Textile Manufacturer* began publication, first monthly trade journal devoted to the interests of the textile industries
1877	Oakum picking removed from allowed types of hard labour punishment
1877	John Henry Leather patents a toothed wire for Garnett waste opening cylinders that allowed setting in double rows
1881–1884	Concerns over potential transmission of disease by rags led to investigations by Henry Franklin Parsons M.D. for the Local Government Board
1889	*Textile Mercury* began publication, the first textile trade weekly
1889	Cordite (using nitrocellulose in the form of guncotton) introduced as replacement for gunpowder
1911	Rag Flock Act banning sale of uncleansed rag flock
1912	Bradford Corporation extracted from their sewage over £30,000 worth of grease, the effluent of worsted manufacturers in the city
1912	*Waste Trade World* began publication, a weekly journal dedicated to waste and old material trades

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Research of this nature is hugely facilitated by the availability of digitised books and journals. The free websites of the Internet Archive, the Hathi Trust, Google Books, Grace's Guide and The Gazette were instrumental to efficient working. The Gallica site of the Bibliothèque Nationale de France and the Portail Persée of the Persée partnership were equally useful for French historical literature. My personal subscription to the British Newspaper Archive was immeasurably important in searches for publication dates, life stories of lesser-known people

and company histories. Institutional subscriptions to Proquest and Gale databases were also heavily tapped. Yet all these sources cannot satisfy the foraging requirements for an addict of textile trade literature. In 2020, I made a madcap purchase of an eighty-year run of the *Textile Manufacturer*, a quantity so large that customs officials were reluctant to believe this could be for my personal use. But during the pandemic lockdown, access to this journal proved its worth on multiple occasions.

The period during which this series came to fruition saw the death of three friends and colleagues who would have so much appreciated these works: the art librarian Harlan Sifford, the textile curator Linda Eaton, and the weaving and German language expert Ute Bargmann. I hope these volumes may be worthy of their memory.

NOTES ABOUT TRANSCRIPTION

The transcriptions in this series aim to be as accurate as possible a rendition of the author's words, and to preserve as much of the original format as may be meaningful. Original capitalisation and italicisation has been retained where possible. Historical and idiosyncratic spellings have also been retained. However, evident unintentional typographical errors have been silently corrected in the text in order to allow quotation without the need for the Latin adverb *sic*. Otherwise, corrections are made in the annotations, where, for example historical variations in spelling are adjusted, or proper names amended.

Original punctuation has been respected but, with reticence, a comma has occasionally been added or removed to aid reading or meaning. And single sentence paragraphs have occasionally been combined with previous or subsequent paragraphs when this has aided sense. Ditto marks in tables have sometimes been expanded for clarity. Where abbreviations have been expanded to aid the modern reader, this is signalled within the headnotes.

A warning about offensive text

In much British writing of the nineteenth century, casual racism, anti-Jewish and anti-Irish remarks surface. African ethnicities are often found characterised as less than civilised. Prejudice against Jewish people arises in remarks about uncleanliness, and negative attitudes to Irish people are conveyed by association with poverty. Names carrying a pejorative sense are used as a literary device with the intent of othering: *Mumbo Jumbo* for the African, *Ikey* for the Jewish man, and *Pat* for the Irishman. It has not been considered necessary to annotate each instance, but attention has been given where such prejudice is important to the context or meaning of the individual text. Some may question why I have reproduced such objectionable texts. The intention has been principally to retain historical integrity, but also to make available to scholars of race and racism examples that may be of use.

INTRODUCTION TO *PATHWAYS IN THE NINETEENTH-CENTURY BRITISH TEXTILE INDUSTRY*

> I do not think altogether the worse of a book for having survived the author a generation or two.
>
> Hazlitt, 'On Reading Old Books'

The works compiled in this series of volumes have little of the 'pure silent air of immortality' treasured by Hazlitt in his essay on old books, and indeed part of their value is that they preserve much of 'the dust and smoke and noise' of the time when they were current literature.[1] Written for a particular time and audience, many of these texts served their purpose and then passed quickly out of memory. This series looks at historical sources focused on three thematic areas: the waste textile trades, the commercial warehouse and the calico printing industry. These texts are revived here, not as period pieces, and not just because of their historical value in encapsulating social, business and technical knowledge, but also because of what they offer us today on strategies of innovation, global trade and sustainable manufacturing.

Often viable ideas and inventions do not take root because societal values mitigate against their growth. Nineteenth-century British society was enclosed in a frame of mind that was not only rigidly defined by class, but also one with an urge to classify. Hierarchies of value were applied widely, not only to textile fibres and fabrics but to discarded garments and rags. Ranks were ascribed to the location of urban buildings, and to the floor levels within these buildings, as well of course, to occupations and matters of aesthetic taste. Such concepts of higher and lower goods and purposes limited the freedom to apply all manner of useful ideas. Instead, they led to the promotion of less edifying systems, such as phrenology, or positively harmful beliefs in racial superiority. Revisiting historical texts offers not only a window on the past, but an opportunity to revive and reassess the innovations of the time in order to draw new connections with current projects.

The waste textile trades

Class and textiles were inextricably combined in the nineteenth-century mindset. This was at the heart of the great anxiety surrounding the rag and shoddy

trade, that 'the offcast of every class of the population, from the wealthy of the West-end to the tramp and vagrant of the East' were intermixed in the recycled product.[2] Even rags were expected to respect class, and the wounds of the gentry were bandaged with lint made from fine linen although ordinary linen would have served as well.[3] In the nineteenth century, recycling of textile waste ran up against cultural prejudices more strongly than technological barriers. Fear of contagion in an era of cholera, the associations of reconstituted substances with adulteration, and class-based bias against materials tainted by poverty – all these imparted a negative character to rags and regenerated textiles. Reinforcing these disincentives, the best-known example of textile reprocessing – converting old rope into oakum for caulking wooden ships – was used as a punishment, connecting it in the public consciousness to criminality and prisons.

The satisfactory quality of the end products of the textile waste industries – if the composition of products using recycled waste could have been revealed – might eventually have mitigated negative feelings, but these predominating cultural attitudes were powerful motivation for concealment rather than announcement. Less sullied by their origin were virgin fibres that were either by-products of manufacture, or gatherable through increasingly efficient processing of raw materials. But even these suffered the undignified names of droppings, fly, strippings and sweepings, hardly suited to public advertisement.

These cultural shortcomings were somewhat counterbalanced by the perceived good of eliminating waste. Domestic practices of *waste-not, want-not* prudence inculcated from childhood the values of a waste-free manner of living. It was to such homely virtues that the chemist Lyon Playfair first appealed in a public lecture of 1852, 'Chemistry, like a prudent housewife, economises every scrap',[4] going on to join feminine thrift to another cultural pillar, the model provided by nature, wherein every substance degrades and is re-utilised. Nevertheless, when it came to the insertion of waste-derived textile fibres into cloth, concealment became a stigma in itself. In 1862, the writer of the essay 'Social Wastes and Waste Lands' asserted:

> that quality and make of goods are now so delusive and disguised since machinery has been applied to the manufacture of cloths of every description, that none but [the manufacturers] themselves know of what it is made; and the public only learn by wear and tear that they are not what they bought them for.[5]

Despite the poor reputation of textiles incorporating waste fibres, quality was not necessarily compromised, and the main aim of textile production using waste fibre was lowering of cost, thereby enabling luxury-style fabrics to reach a wider market. Notwithstanding honest commercial intentions, the use of waste, no matter how economically or morally laudatory, was never able to become an open selling point in the nineteenth century. The lingering sense of abasement attached

to the waste textile trades in the past appears to have led to their neglect as a foundation for contemporary recycling studies. Even the term *waste* can be implicated in this problem. As soon as a practical use is found for refuse material, it is no longer waste – an anomaly that many writers on the topic have confronted. The heading of *waste* has been adopted here because it was widely promulgated and recognised in nineteenth-century literature.

What can we learn from the waste textiles of the past? Firstly, a lifetime of use could contribute valued properties to textile material; the medical use of lint was based upon softening through multiple alkaline washings, a character not possessed by fresh linen. Even quite radical treatments to recuperate fibres from intermediary or end products by tearing and shredding still left intact their unique *worn* character. For example, mungo – torn from felted broadcloth – was able to add qualities of smoothness and sheen to high-calibre woollen cloths that were not achievable with raw wool. So we find textile materials can gain desirable properties through use and reprocessing.

The British textile industries were segregated by fibre type, allocated to different geographical regions, with the waste textile industries following much the same pattern. With hindsight, this segregation can be seen to have slowed the spread of waste textile technology across the major types. We can now see that the development of waste textile machinery was to divide along processing lines rather than fibre type, aligning with either the carded or combed categories of spinning. Breakers, carders and condensers characterised short-staple processing, with gills and combs the tools of long-staple working. Bridging across fibre divisions gave new insights; Samuel Lister's experience with the wool comb provided him with a lead in the treatment of waste silk. Such cross-fertilisation was probably encouraged by the larger machine-making firms located in warehousing centres like Manchester or Leeds. Machine-makers were able to apply understandings gained in the sphere of wool to that of cotton or silk uninhibited by fibre-based regional separation. However, local crossover of technologies was also possible, demonstrated by divergent techniques for rag flock production, with Yorkshire following the shoddy devil model, Gloucestershire the paper beater model and Surrey the fulling stocks model. Innovation was nourished where textile technologies and mechanical technologies intersected.

A century earlier, William Lewis (c1708–1781) had drawn attention, in his *Commercium Philosophico-technicum*, to the interrelations between the arts that remained separated by the lack of mutual knowledge:

> The discoveries and improvements made in one art, and even its common processes, are generally little known to those who are employed in another, so that the workman can seldom avail himself of the advantages which he might receive from the correlative arts. . . . To enquire therefore by experiment into the different means of producing one effect, and trace it through all the arts . . . appeared to be the most rational and

> direct means . . . of procuring an useful intercourse and communication of knowledge . . . of enriching one art with the practices, materials, and sometimes even with the refuse-matters of another.[6]

While wool waste textiles were assorted to both combed and carded branches (the worsted and woollen divisions of the industry), long-fibred silk and linen paralleled the combed branch, and mixture fabrics the carded branch. Cotton waste, on the other hand, developed upon independent lines that gave rise to new textile structures and products. Possibilities for cotton re-use followed more closely upon staple length, with shorter fibres employed for filling and stuffing yarns wherein fibres are not subject to tensile stresses. Non-woven structures like batting, medical cotton wool, and engine-cleaning waste ensured that there was little fibre which could not be repurposed.

Victorian innovation in mixture fabrics, especially combining cotton with wool (vegetable with animal fibre), led to particularly intractable problems when reprocessing the waste of such mixtures. The solutions adopted involved destruction of the least valuable fibre, for example, carbonisation of cotton to extract wool. With contemporary mixtures of synthetic and natural fibres, the difficulties have increased, but technologies have also expanded in areas of materials separation such as ultrasonication. The long-standing challenge of fibre separation may ultimately act as a stimulus to design solutions that find replacements for blended-fibre fabrics.

The incessant Victorian impulse to classify was turned into a strength that contributed to the success of nineteenth-century rag recycling. The re-use of rags ultimately depended on the efficiency of systems of grading. Sorting of rags into a myriad of fibre, colour and quality categories by experienced and knowledgeable women made it possible to re-use materials with reduced processing, notably without dye-stripping, and with the least amount of re-dyeing.

Textile recycling often involves other forms of trade-off. Henry Franklin Parsons made the insightful statement that the hygienic advantage of washing wool rags, ‘is gained at the cost of a certain amount of river pollution; the streams carrying off the organic matter, which would otherwise find its way to the land as manure’. Already, the complex balance between competing forms of pollution was being highlighted. Parsons also noted that although washing ‘would in all probability remove any infectious matter adhering to the rags [it did not give], however, any protection to the work-people. On the contrary, the additional handling required in the early stages would tend in the opposite direction’.[7] More than a century has passed but the issues of textile recycling remain embedded in their materials, structures and processing, linking the present day with the past.

The commercial warehouse

Business historian Roland Smith saw the emergence of the warehousing system in Manchester as one of the most startling changes in its cotton industry: ‘In 1820,

126 officially termed warehouses were listed in the Township Rate Books and only nine years later the number had increased to nearly one thousand'.[8] These early warehouses were often converted dwellings or cellars but soon warehouses developed into a special class of architecture. Warehouse architecture had to resolve issues of constricted urban access, lighting, fire safety and ventilation. But even before this, the commercial warehouse came to represent a new practice of doing business.

Samuel Bamford suggests it was the Scottish brothers William Grant (1770–1842) and Daniel Grant (1784–1855) who introduced a stronger sociability to attracting warehouse custom. Their firm, William Grant and Brothers, had a warehouse at 1 Lower Cannon-street, Manchester, from 1804 when they entered the calico printing trade. Bamford recalled:

> They soon showed their English neighbours the way to do business; they were indefatigably on the alert for customers, and whilst other tradesmen stood at their doors bowing to country buyers – for it was never the custom then to stop them and ask them in – the Grants with quick eyes were on the look out, and seldom permitted a stranger to pass without offering him the inspection of their "stock of unequalled prints at the very lowest prices." Whilst others coldly looked on, they were often successful in making a sale; and thus, by means of an innovation on the old form of trading, they . . . soon established a good connection, and laid the foundation for their subsequent extraordinary and deserved prosperity.[9]

Some niceties of business were slow in arrival. In 1825, the Manchester Commissioners of Police recorded an expense for painting numbers upon doors: 'A Commissioner observed that the numbers on the doors in Back George-street were extremely irregular; the dwelling-houses were numbered in one way, and the warehouses in another; and this caused much trouble and inconvenience, and sometimes mistakes, in the delivery of parcels.'[10] Warehousing signboards appear as a later innovation, arising from the increasing array of specialist textiles available by 1840 that created a need for greater ease of identity. By good fortune, Benjamin Love's *Hand-Book of Manchester* preserves the babel of textile signage of the time.[11]

To cope with burgeoning variety and scale of business, the design of new warehouse buildings was modified to enable efficient receipt and stockpiling of goods, and to facilitate their display and sale to wholesale customers, while not neglecting discreet credit-checking and packing. A raised ground floor enabled a functional basement storey, and the lighting of five floors was supplemented by roof lights above a central well. Light was of the essence for sale of decorative cloth, with prints accorded the top floor, while grey goods could be consigned to the basement. With the invention of prismatic pavement lights, even the lower storey enjoyed reasonable natural illumination. Contemporary descriptions of the warehouse experience accord great pride to the systems of message communication

between floors. These enabled checking of credit while the customer was moving from floor to floor placing orders. Later innovations were conveniences such as customer lifts that made examining goods on upper floors a less strenuous undertaking.

At the start of the nineteenth century, goods made in the North were sent to London for warehousing and shipping. The growth of regional banking and insurance enabled provincial cities to become warehousing centres, with Manchester, Glasgow and Dublin in leading roles. Alongside their regional staples, the new commercial warehouses began to introduce luxury goods – ribbons, artificial flowers and lace – as well as haberdashery and hosiery, becoming rivals to the London houses. It was the expansion into these *fancy* trades that marked the full emergence of the commercial warehouse, able to satisfy all needs on one site. The transition was marked on the outside by the more decorative palazzo style making warehouses resemble Venetian palaces, and on the inside by grand staircases and extensive displays of goods.

At the heart of the warehouse system was the division into departments each headed by a buyer responsible for acquisition of stock and accountable to the business partners for its timely sale. Under each buyer was a team of senior and junior salesmen and apprentices. They were supported by entering clerks and counting house clerks who handled the paperwork and accounts. Specialising in a particular category of goods enabled salesmen to thoroughly know their stock and efficiently serve the wants of their wholesale customers. Everything sold was available to see and handle, and great orderliness was required to show, then repack and return goods to stock. Long hours were characteristic of warehouse work but the introduction of the Saturday half-holiday in 1843 was a hard-won concession. Leo Grindon described the prior situation:

> In winter it was quite a common thing to see every window in the principal warehouses illuminated up till nine, ten, even eleven pm., and the longest and sweetest of midsummer Saturday evenings often sank to sleep in the crimson west before ever a door was locked or a lad set free.[12]

To enable long hours, salesmen and apprentices often lived in tied premises adjoining, making warehousing a way of life. For a working-class lad, obtaining warehouse work was seen as satisfying most ambitions. Archibald Prentice derided the pretensions observed in the early Glasgow scene where ‘The assistant in a warehouse, who receives a salary of £50 a-year, dares not be seen in conversation with a weaver, for fear it might be supposed he kept *low* company’.[13] By mid-century, with the steady increase in sale of ready-made clothing items, workrooms were set up and women hired for making up such items on-site. John Roberton’s report of 1860 suggests at that time these workrooms were little better than sweatshops, but improvements were slowly introduced. We can see in the commercial warehouse the various innovative features that were adopted by retailers in the introduction of the department store.

From the 1830s, warehousing began to divide along the lines of the home trade serving the domestic market, and the shipping trade serving various export markets. In Manchester, the shipping trade grew largely in the hands of foreign merchants, many of whom became naturalised and added greatly not only to the wealth, but to the culture of the city. Manchester welcomed the foreigner in this context, but assimilation was not easy for the first generation. In the velveteen trademark dispute of 1880, for example, the naturalised Louis Behrens with his imperfect English was still seen as a foreigner. Export houses brought new marketing methods, with great attention paid to packing and labelling goods so that brands could be readily recognised abroad by sight. With the language barrier, and natural wariness of deception, purchasers abroad depended on visual cues to confirm quality, and insisted on consistency. Understanding the complexities of packing for different markets became a competitive advantage for British-based merchants over their new rivals at the start of the twentieth century. The commercial warehouse, in the form of the shipping house corresponding with agents stationed abroad, became the dominant model in the global textile trade of the nineteenth century. Methods of advertising, display, branding, grading of goods all had origins in the commercial warehouse and its international trading practices – revealed equally in the development of corresponding practices to deceive buyer and seller.

The calico printing industry

In calico printing, the nineteenth century experienced a nexus of the leading branches of innovative activity. George Dodd emphasised the tripartite contributions in design, mechanics and chemistry. All three manifested across the century, although with varied concentrations of intensity. The century opened with a burst of activity in transfer engraving and cylinder printing that saw the mastery of mechanised printing by the 1840s. This intersected with steady and regular advancements in colouration that showcased colour innovations as fashion trends up to the 1870s. The last part of the century witnessed a focus on export styles of printing that elicited developments in design alongside colouration, effects less well-known because they were seldom seen in European contexts.

Chemical technology became the prime symbol of advancement, and calico printing the representative industry taking advantage of new chemical knowledge. ‘Hence in every large print-work there is either a partner or a manager thoroughly versed in practical chemistry; and the drug or chemical department in such establishments shows the importance attached to this matter’.[14] Charles O’Neill, more than any other author, related the fits and starts of the developments in mordants, dyes and processes for calico printing. His accounts reveal how much the history of synthetic dyes has been written with hindsight, whereas at the time of their development, there was not a clear advantage to synthetic dyes as a general category. Economic factors were the crucial determinant of how innovation was received.

The fervour of attention to developments in colouration, and anxiety surrounding retaining competitive advantage from them, is brought out by John Mercer junior's account of his father's discoveries. His description contains numerous examples of the rapid diffusion of new chemical processes. After Mercer's introduction of the chlorination of wool in the early 1840s, his firm was 'able to print the most splendid Royal Blues and had a run of about a year before it became generally known'. Mercer gave the process to connected printworks in Sabden, but 'Sabden people let it slip in about a year after they got it; a man from a neighboring printworks pirated the secret from one of the workmen and set off through England, Scotland and France selling the process'.[15]

Mechanical innovation in calico printing developed more incrementally. Thomas Bell's oft-cited patent of 1783 for cylinder printing was not workable, but by the 1790s, a practicable single-colour printing machine was introduced. It was not until the 1820s that printing two colours in register became common, and three-colour printing was still in the experimental stage until 1830. Improvements in machine printing required advancement in adjunct areas, such as cylinder making, mandrels to hold and drive the cylinders, doctor blade materials, and construction of backing cloths. William Turnbull's article on the cylinder printing machine shows the level of sophistication reached after a century of incremental improvements.[16] Countering the Arts and Crafts movement's call for a return to craft-based production, Turnbull demonstrated how machinery extended the range of human skill.

It is a mistaken notion that innovation proceeded unidirectionally toward mechanised production. Hand-block printing competed with cylinder printing into the 1840s when, with the regulation of child labour, production became more costly. However, for printing expensive silk and wool materials or complex furnishing patterns, block printing retained its advantage into the next century.[17] It was a distinctive blend of artisan and machine production that characterised calico printing. Charles F. Sabel and Jonathan Zeitlin noted that calico printworks operated more as 'groupings of artisans' shops under one roof than factories organised on the assembly-line model'.[18] Flexibility, not speed, was a factor of crucial importance for the industry; old equipment was retained knowing that outmoded techniques could return to fashion.[19] Creation of new products and expanded assortments of goods were the means used by the British calico printer to outdo competition. From the boasts of *miles* of production in the first half of the century, outputs moved toward smaller-scale runs and sales based on pre-sampling in the second half. The combination of an artisanal with an industrial mindset appears to have motivated and sustained innovation.

In the early part of the century, designers were trained from young working-class men in the printworks who showed artistic promise. In the absence of academy-based presumptions about design, they produced work that prefigured later modern movements in the arts. The mid-century saw the dominance of "French" design, but we learn from William Mercer that the typical Paris studio was a multinational mixture of Alsatians, 'a few Frenchmen from different

provinces, a sprinkling of Germans, Dutch, Flemings, seldom more than one or two Parisians, and perhaps a solitary Englishman'.[20] In the last part of the century, British calico printing design was dominated by work for export markets. Designs were developed from advice given by agents stationed at destination ports, or adapted from models collected in the export regions – what would now be called cultural appropriation. The impetus of closely imitating hand work through mechanical means stimulated new printing techniques. From the 1880s, an appreciation of Japanese patterns, accessed through imports of worn-out *kat-agami* stencils, helped revitalise British design for both home and export markets. We can see that throughout the century, innovation in design largely emanated from cross-cultural fertilisation, but it was equally stimulated by new developments in colouration and mechanical technologies.

Reflections

Ultimately, it takes a free attitude of mind to take a different perspective. Farrar Fenton's Captain Corbett realised that if papermakers could separate cotton from wool by chemically destroying the wool, then the opposite must be possible – retaining the wool and eliminating the cotton.[21] Samuel Cunliffe Lister wrote,

> My very ignorance was the cause of my doing what I otherwise should not have done. A practical silk spinner would at once have said, "There is plenty of good waste; why bother with this rubbish?" . . . But not being a practical silk spinner and knowing little or nothing about silk or silk waste, I thought I would try and see what could be done with it.[22]

Closely occupied with the day-to-day running of their businesses, nineteenth-century manufacturers and merchants were largely exposed to alternative ideas through engagement in written communication channels: through journals of patents, trade journals, newspapers and reviews of national and international industrial exhibitions. These texts were increasingly accompanied by images and plans, visual stimuli likely to spawn ideas that could cross industrial divisions based on fibre types and localisation. The trade journals that arose in the last quarter of the century offered a chance to publish for the first time to many of the technical writers selected for this series. Often they were writing toward the end of a career in industry or education, summing up a lifetime's experience. Others adopted a more literary standpoint in the form of reminiscences, bringing to vivid detail working lives whose incident might otherwise have been lost in the even tenor of the everyday. The most varied group of authors contributed to literary magazines, showing an aspiration to reach outside a class-bound life. Occasionally young, like William Drennan, who wrote upon completion of his warehousing apprenticeship, they were more often seasoned men who had stumbled in the treacherous path to business success; Daniel Puseley altered his name and mythologised his past to obscure his bankruptcy history and pursue a literary career. But the important

point is that they wrote from experience. In this selection, a significant number of authors have been identified for the first time, and their biographies sketched out. The modern reader will note that there are few women's voices, but the noteworthy roles women played in the industrial world are nevertheless brought to attention. Likewise, the part of immigrants to Britain in the textile field is brought into view, if not in their own voices. Nevertheless, diverse and divergent voices have been sought, providing an elliptical view rather than an artificially sharpened focus.

Tasked with describing the year's advances in textile manufactures for 1883, Alan Summerly Cole, authority on the textile arts, raised the question, 'Would it be an advance if design and method of manufacture were improved, but the quality of material had deteriorated?' Cole outlined the positions of two camps, the *perfectibilian* that insisted on progress, and the *deteriorationist* that saw only corruption. Taking the side of advancement in manufactures which he saw characterised by vivacity in design, he nevertheless regretted 'a sort of hard effect in form. . ., a result of accustoming designers to the sight of mechanical designs. A similar character is even present in the appearance of hand-made works'.[23] More than a century later, Cole's reflection remains relevant, and to it we must add whether an innovation can be considered an advancement if it does not further environmental sustainability and social equity. The class system and imperial mentality impaired visions of social equality in the nineteenth century. However, in the narrow confines of textile commerce, there grew in Britain an appreciation of the foreigner at home and the tastes of the consumer abroad. More widely, the rational interests of nineteenth-century business began to align with environmental interests.[24] In 1873, Archduke Rainer Ferdinand went so far as to propose that the extent to which the waste materials of industry were utilised be considered 'a measure of the degree of industrial development and capability'.[25] A fresh look at nineteenth-century achievements in the textile industries can be both surprising and humbling.

Notes

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INTRODUCTION TO VOLUME I

The Waste Textile Industries

> Instead of a disgrace to our manufacturing industry, the employment of mungo and shoddy is a credit to the age, for waste is a sin against the present and future generations.
>
> Bevan, G. Phillips (ed.). *British Manufacturing Industries*, vol. 5 (London: Edward Stanford, 1876), p. 50

In introducing the art of fish-scale embroidery, *Cassell's Household Guide* advises, 'A knowledge of how to utilise trifles which would otherwise be valueless, will often enable the housewife to render her home attractive without expending that money which might be required for other purposes'.[1] Reclaiming waste was so thoroughly ingrained in female education and domestic economy that it usually passed without regard. However, in moving to the masculine sphere and the scale of industrial economy, the utilisation of waste materials came to take on an important visibility in the nineteenth century. Many nineteenth-century writers drew attention to the contradiction of applying the term *waste* to substances that had been found of valuable use. However, *waste* was conveniently applicable to both by-products and re-used goods – new and old materials. The term *waste* in this context also served to associate with industry moral values of prudence and thrift. The utilisation and re-utilisation of fibre residues was not new to the nineteenth century, but the mechanisation of processes leading to large-scale production and an increased range of products was the wonder of the age. Waste from each of the major textile fibres followed its own path toward mechanisation, had its own geographical centres, and its own markets. Looking first at writers on the general subject of waste, the subsequent chapters will treat individual fibre-based industries: bast fibre, wool, cotton, silk; then the development of the rag processing, ending with a chapter on repurposed textiles.

Part 1 'A credit to the age': the utilisation of waste

The utilisation of waste was a symbol of modernity. This was often made evident by citing the transformative power of chemistry. Peter Lund Simmonds indicated

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that 'modern chemistry has taught us how, out of the most vile and apparently the most worthless rubbish, the most useful and frequently the most beautiful things may be elaborated'. The Victorian mind delighted in the paradox of the low made high with its Biblical echoes. Simmonds continued:

> Rags are the common emblem of poverty, and to say that a man is in a ragged condition is the worst thing that can be said of him; but rags are, in fact, a great source of wealth, and one of the staples of our commerce.[2]

It is appropriate that Simmonds's papers head this volume as his writings on waste were amongst the first to treat the subject across the industrial and imperial landscape, and they held considerable influence, both reflecting and shaping the popular understanding of waste.

The philosophy first espoused by Simmonds was the imitation of nature: 'we perceive in nature how nothing is wasted, but that every substance is reconverted, and again made to do duty in a changed and beautified form'. Yet the insightful industrialist was one who 'rescued from the manure-heap' products that could serve wealth creation before re-entering nature's cycle. This value-adding economic argument was eventually extended, supported by the providential belief in nature as an infinite resource for humankind. Simmonds shifted in his thinking about waste, leaving behind the moral imperative to reduce pollution, and moving toward the exploitation of 'undeveloped' colonial raw materials. An underlying driver was the rag shortage of the 1850s – rags needed for papermaking upon which the expanding publishing industry depended. The search for papermaking substitutes in colonial fibre plants was seen as a means of maintaining Britain's competitiveness amongst its European neighbours. But the association of waste with unutilised natural resources became a means of legitimising interference in colonial ecologies for the purpose of capitalist profit.[3]

Speaking in 1917, Charles Walter Leather, proprietor of the iconic Garnett company and authority on machinery for processing reclaimed wool, reflected upon progress in the textile waste trade over the course of a century. He returned to a definition of waste as the residues or by-products of industry, and was an early proponent of zero waste, claiming that 'The acme of industrial economy is the profitable employment of every atom of material'. Britain maintained an impressive range of reprocessed fibre and products made from it, from the lowest saddle-stuffings to fine costume cloths, selling both fibre and end products, so that few opportunities for re-use were missed. However, while praising the organisation of the rag trade centred in the West Riding of Yorkshire, Leather chided the English manufacturer for putting short-term profit above improvement of the trade. Citing the Belgian expertise at purifying fine wool mixed with cotton, the French proficiency in removing burrs from wool, and German improvements in rag processing machinery, Leather saw Continental firms making greater advancement than their British counterparts. He returned to Lyon Playfair's 1852 metaphor of the prudent housewife's economising in order to describe the direction of future progress,

progress that would allow every scrap to be recycled as in the chemistry of nature. Cottonseed was the shining example: it was 'garbage in 1860, a fertiliser in 1870, a cattle food in 1880, and a table food and many other things in 1890'.

Part 2 Hard labour: oakum and tow

> From six in a bed in those mansions of woe,
> Where nothing but beard, nails, and vermin do grow,
> And from picking of Oakum in cellars below,
> Good Lord, deliver us!
>
> *The Poor Man's Litany* (c1811)

The unravelling of tarry old rope into its component fibre, making oakum, was associated with the prison and poorhouse long before the nineteenth century. Perhaps considered as a preventive measure to unfit a criminal's hands for the delicate work of pickpocketing, the original intent of oakum picking as punishment more likely lay in an enforced meditation on 'the rope' as means of execution, and the work necessary to undo a twisted lifetime. It was to become more simply a form of repellent labour designed to prevent inmates finding any comfort in their environment. Already, in 1817, Samuel Hill pointed out the unsound economic basis of such work:

> One hundred and fifty persons capable of labour, in St. Giles's Poorhouse (as appears from the books), earned by picking oakum, in the years ending at Lady-day 1817, *72l. 4s. 6d*. which, after deducting the percentage of the Master of the Poor-house, and the wages of the Overlooker, would not amount to one halfpenny per day for each person.[4]

But Henry Mayhew's account of the *Criminal Prisons of London* (1862) shows that the practice of textile working as punishment continued; his writing brings to life through skilful simile the dusty atmosphere and peculiar smell that characterised the work. Oakum was used, along with pitch, mainly for caulking ships, although the finer grades also found medical use for wound dressing – the tar acting as an antiseptic.[5]

In 1871, the Surveyor-General of Prisons showed that other forms of prison work (matmaking, shoemaking, tailoring) were valued ten to twenty times more than oakum picking, but still maintained the necessity of penal labour, such as cranking or pumping.[6] Prison reforms of 1877 finally dropped oakum picking as hard labour, and in the post-punishment era, oakum largely fell out of public consciousness. A 1926 article in the trade journal the *Textile Manufacturer* reminded readers that oakum was 'still picked' – now efficiently by machine, and it presented business opportunities. This article serves to reintegrate the story of oakum with the Victorian shipyard and the maintenance of vessels. However, it

is unlikely that late Victorian sailors any longer relished oakum as an alternative to tobacco as did Melville's seamen, finding an epicurean 'nutty delight' in the aromatic heart of the rope.[7]

The production of fine textile yarns always necessitates the rejection of a quantity of fibre shorter in length, tangled or irregular in texture that would otherwise prevent a smooth, even yarn. Tow is the flax fibre rejected in the process of combing (hackling) during the production of linen. Utilisation of such refuse material necessitated economical means of processing in keeping with its lesser value, so mechanical methods were sought. A notebook kept by John Marshall of Leeds records experiments made in the 1820s to card and prepare tow by machinery. These notes provide evidence of the difficulties of engineering complex processes involving multiple factors, and the extended periods of time that such experimental endeavours entailed. Marshall and Co. was a bold innovator in adjunct fields as well, being a pioneer of the green roof. The newest of the firm's mills was described in 1843 as being arranged on a single storey with a roof area of nearly two acres covered with grass, 'To "take a walk in the fields" on the top of a factory . . . is the impression likely to be made at first glance'.[8]

Moving to Peter Sharp's account of tow carding and preparing written in 1882, it is interesting to note how much of Marshall's experimental work had become codified in the intervening decades. Although machinery and settings had grown in sophistication, the same basic mechanisms and parameters of adjustment remained. Refinement had come in understanding precisely which settings to use for a given quality of tow to achieve a particular end quality of yarn.

Part 3 The 'low wools': shoddy and mungo

Sir George Head provides our first picture of the shoddy industry when it was still a novel business. Head had to dismiss the less reputable origins of shoddy – 'from the scarecrow or the gibbet' – reflecting the prejudices faced by the trade in 1835. Nonetheless, it had been taken up by the fashionable London tailor, George Stultz, for constructing the swelling collars of the dandy. By contrast, children working the rag machine suffocated under a cloud of foul-smelling dust that rendered them 'in appearance like so many brown moths'. Walter White takes up the story when shoddy had risen to a 'national institution' in the 1850s with the addition of mungo. Mungo was a radical phenomenon because the cheaper fibre brought broadcloth in reach of the masses, overturning a long-held sartorial distinction. But while these low wools were democratising, they were not revolutionary; they perpetuated the existing hierarchy, wherein the paletot of the gentleman was easily distinguished from the pilot coat of the practical man. White was fascinated by the low origins of shoddy, and in his account there remains genuine surprise that rags can give rise to prosperity. He ends by bolstering extant social norms through an image of uncultured shoddy operatives in awe of *true* West Country broadcloth.

Once the reclaimed wool industry had gained commercial success and a measure of respectability, the origins of shoddy became a topic of interest, and also of heated dispute from rival claimants to the honour of 'discovery'. Samuel Jubb wrote the first extensive history in 1860, which has become widely known.[9] Less familiar is Farrar Fenton's rival history published in parts in the *Textile Manufacturer* in 1881, but never released in book format. Fenton, unlike the Yorkshire trade historians, looked beyond the county and raised some novel material from oral sources that deserves consideration. Making Fenton's account available here enables the debate over the origins of shoddy to be revisited, and adds his unique viewpoint to the uncontested later history of the trade.

Professor Roberts Beaumont wrote for students and practitioners in the wool industry. Extracted here are his texts of 1888 and 1922, his first and last word on what he termed 'substitute' wools, in order to avoid deprecating associations. His definitions and descriptions of the varieties of waste and their characteristics form a secure groundwork, and make the point that reclaimed wool is not deficient in the normal properties of the fibre. Rags made from excellent fulling wool will produce mungo of good felting properties, enabling the use of reclaimed wool to produce textiles of high quality. Essential to this goal is the initial task of rag sorting, usually performed by women skilled in the physical judgements of handle required to allocate the different sorts. Subsequent machine processing was aimed at forming an evenly blended and uniform product.

The history of the *waste* wool industry can be read in the scale of the partnerships and companies that processed material, alongside the network of adjunct firms that serviced those companies, not least the machine-makers. Company histories provide an insight into the human level of entrepreneurial activity: entry into business followed by expansion, success or failure. Most businesses began as family firms and small partnerships, some being incorporated as limited companies, especially late in the century. With the great expansion of industry, commercial directories became lucrative ventures, and provide a means to view firms within their geographical concentrations. The 1893 directory of the London Printing and Engraving Company was one such venture that innovated with its attempt at short business biographies. At this time, we can see that telephone numbers joined telegraphic addresses as an item of prestige as well as contact.

Shoddy's tainted reputation entered the English language as a synonym for shabbiness and pretence. The staying-power of this image problem probably owes much to shoddy's rich affordances as a metaphor for debasement and deceit, in keeping with class-based anxieties over the advancement of the 'lower orders'. Real evidence for widespread sale of cloth lacking in quality or durability is absent, and it is likely the purchaser of shoddy received value for money. Where deceit occurred, it was mainly at the retail level, not in manufacturing. Curiously, the prejudice against shoddy offered opportunities for further deceits as entertainingly recounted by Alexander Cook in *Old Time Traders*.

Howard Priestman's 1913 article on 'pulled wool' provides a perspective on the shoddy industry at the height of specialisation. He emphasised the sorting process, which if performed well avoided the necessity of re-dyeing, as well as the need for skilful blending requiring astute judgement. Of immense value to the historian, Priestman provides contemporary and localised meanings of wool terminology.

Part 4 The waste of one is the raw material of the next: cotton waste

Cotton waste within textile production, as opposed to its use in papermaking, was concerned with fully exploiting the raw material rather than reprocessing rags into cotton fibre. In preparing cotton for spinning fine yarns, much of the fibre was rejected but could be taken up and spun for other purposes. Cotton fabrics evolved to make full use of residue material, with fine cottons having a symbiotic relationship with fabrics that utilised the refuse created in their making. Also, during the nineteenth century, greater efficiency was achieved in extracting more of the fibre from the cotton boll and seed, driven especially by the precarity of cotton supply. Our first article, from the premier issue of the trade journal *Waste Trade World* in 1912, introduces the subject by drawing attention to the numerous everyday products in which cotton waste was a component. A companion article, from the same journal, focuses on reclaiming the ultimate residues of cotton processing – the dirt. When working on an industrial scale, all residues can quickly become practical problems. If the only end use was agricultural, the seasonal nature of consumption meant that the processor either had to create adequate storage, or pay for removal during the off-season. This article also clarifies a terminological point – that cotton waste was referred to as *shoddy* by those in this branch of the trade.

Only a limited amount of cotton waste was re-used on-site by spinners; most was sold on to dealers. A pair of articles from 1868–1869 on the Cotton Waste Dealers' Exchange of Manchester mark the transition of such dealing from marginal to respectable. A new generation coming of age in the middle of the century sought to disassociate itself from the intemperate and sharp business practices of the past, while viewing with pride their ability to transform waste material into a valued commodity. The growth of the trade during the subsequent decade is witnessed by Eli Sowerbutt's 1882 *Cotton Waste Dealers' Directory* containing over 700 entries covering a spread of twenty waste trade specialities. Geographically, Manchester and Oldham had the largest concentrations of waste cotton dealers, with significant numbers at Bolton, Bury, Heywood, Rochdale and Stockport. Notable are five female dealers suggesting that entry to the field was more open than other mercantile trades. Included is Ann Stanyer née Wooleston (c1823–1891) who came from a family of rag merchants, and whose daughter Sarah Townend Stanyer (1851–1913) followed her mother into the business. Edwards and Bercry's 1888 trade directory of Manchester provides brief sketches of six firms involved in the waste cotton trade, highlighting the development from

engine-cleaning waste to sponge cloths and packing cloths – as well as the growth of cotton wadding and cotton wool as items of consumption.

The processing of waste cotton entailed modifications of the ordinary mechanical spinning process to deal with three additional difficulties: (1) the need to tear apart 'hard' (previously spun) waste or deal with dirty 'soft' waste, (2) the resulting wide variation in fibre length that necessitated additional blending for uniformity, and (3) the fragility of the carded roving that required consolidating by *condensing* (crosswise rubbing) to make it strong enough to be handled by machinery. The still-tender roving required insertion of twist to maintain strength while stretching during the spinning process. Joseph Nasmith, writing in 1892, does an admirable job of making such complexities intelligible, and if we find the text somewhat technical, it is instructive that it introduces the subject at the level of the student aiming to become a mill manager. There follows a description of a complete cotton waste plant from 1889 highlighting the adaptations of machinery introduced to make possible the spinning of cotton waste.

Thomas Thornley, in 1901, directing his attention to students for the cotton spinning examinations, located the sources of waste cotton in spinning mill processes, defining their particular characters and quantities. He adds to the general material introduced by Nasmith, refining the specialist vocabulary. In Thornley's definitive 1912 text on cotton waste, he describes in detail the composition of the main fabrics using cotton waste.

The remaining articles on cotton waste, from the end of our period, bring out particular features of British industrial practice, in sales or production. In 1913, Henry Brougham Heylin described business practice in the cotton waste line whereby mills contracted sale of their waste on an annual basis. It appears that the cotton waste dealer suffered from low esteem on the part of the mills who took little care with bagging or maintaining bagged waste in good condition. Frank Nasmith's lecture of 1916 indicates the divergent directions of British and Continental practice. While British manufacturers used short-fibred soft cotton waste mainly in a secondary role for stuffing and backing yarns, Continental manufacturers, especially in Germany, developed soft cotton waste as a material in its own right to make woven and knitted fabrics that imitated wool. The interruption of trade by the war necessitated a change in direction in Britain, but it is significant that war had not diminished admiration for the achievements of German industry, nor the close following of German developments through exhibition of samples by the Board of Trade. Sam Wakefield's 1917 treatment of waste is concerned with its monetary value. Accurate accounting methods reveal the losses waste could incur; a small fraction of a penny per pound generated a large figure over the course of a week. He admonishes that the average workperson – even the foreman – is oblivious to waste and requires educating in waste reduction.

The American Bureau of Foreign and Domestic Commerce kept a close eye on British textile practice. A report of 1918 identified a double profit in the form of cleaning cloths made from waste cotton: the cloths were easily washed and the oil with which they were saturated was recovered. One firm sold them with a

contract to wash and mend for a specified period, thereby recovering many tons of oil. Finally, in 1920, W. C. Jones Ltd. dealt with the perpetual image problem of the waste industry by a sophisticated promotional campaign. Waste was to be seen as a precious material in its own right 'for there are some effects which can only be got from waste − effects which cotton, no matter how expensive, cannot give'.

Part 5 An 'uninviting aggregation of rubbish': spun silk

We begin this section with a piece of juvenile literature by William Claxton from 1913 that captures facts, myths, social values and anxieties bound up in the subject of waste silk. Silk, the highest class of textile fibre, also generated the greatest waste. Extolling industry and invention, Claxton followed the well-trodden story that such waste was sold as rubbish until Samuel Cunliffe Lister's innovations in silk combing that enabled waste silk to resemble *true* silk. But successful conversion to a substitute silk brought fears of adulteration and false selling. Claxton resolves this unease with the assertion that waste yarns could imitate silk for a time, but their origins would soon be revealed by wear. As in social life, birth determined class, and mobility was not appreciated, even in textile fabrics.

James Burnley's contribution on Lister to the popular 'Fortunes Made in Business' series in 1881 presented the accepted view of Lister's contribution to waste silk spinning, but emphasised the end products enabled by the new industrial scale production and the extended range of waste convertible to attractive yarns. The development of face-to-face velvet weaving and plush silks is highlighted alongside a range of non-elite products: 'silk cleaning-cloths for machinery, bath-towels, floor-cloths, dish-cloths, and so forth'. Samuel Cunliffe Lister was not content with Burnley's account with regard to the credit given to Isaac Holden for the wool comb. In 1905, he penned his version of events which it seems fair to juxtapose with Burnley's. As regards invention of the comb for waste silk, James Warburton, Lister's joint patentee, enjoys sympathetic treatment here, even though the two men separated soon after this collaboration.

In 1905, Joseph Boden provided a welcome corrective to the Lister mythology. Silk manufacturers evidently knew that the outer layers of silk cocoons had long been converted to floss silk yarns, and the inner layers into wadding, but Boden cites specific examples predating Lister, and names the early firms. Boden provides a commercial view of the waste silk manufacture, an industry beset by rapidly fluctuating prices of raw material, and keen European competition.

Finally, Hollins Rayner's article of 1901 provides a dealer's perspective, introducing the range of silk wastes on offer in Eastern and European markets, and the merchanting practices followed in examining and buying. The prowess of the Chinese dealer in taking advantage of the lax inspection processes of the British buyer is recounted disparagingly – with an imperialist view. However, the source of the proliferation of quality terms, such as 'extra extra extra selected' is

explained with a touch of humour and admiration for his Chinese counterparts, with the knowledge that such grade inflation arose at home as well as abroad.

Part 6 'Complete metamorphosis of the rag': rag flock

Dr Henry Franklin Parsons's report on rag flock, written for the Local Government Board in 1884, reviews with great clarity how rag flock was produced, variations in different geographical centres, and the different classes of rag used. He then enters on an assessment from the perspective of human health, and in doing so, reveals a great amount of detail about working conditions and practices. Parsons's account is slanted in favour of the manufacturer, but maintains a convincing argument that there was little actual evidence for disease transmission through wool textiles in the context of rag processing.

Peter Fyfe's 1904 lecture 'What the People Sleep Upon' was the rallying cry that eventually led to the Rag Flock Act of 1911. Deciding from the start that wool flock was an evil, instead of the balanced approach of Parsons, Fyfe struck upon the idea of comparing the rinse water from rag flock to raw sewage. Finding less quantity of bacteria in the sewage, Fyfe made the appalling suggestion that 'it would be safer to sleep on a bed filled with sewage'. In case this did not convince his audience, Fyfe also employed the class argument, that the lady purchasing an economical bed for her servant 'takes into her otherwise well-appointed home a centre of disease potentiality', disease that could transfer from servant to family.

Paul Hasluck, describing materials for upholstery in 1904, gives an insight into how flocks fit within the range of available stuffing materials at this time. The upholsterer, required to produce for a full gamut of furnishings, budgets and climates, was at the forefront of testing new materials, both raw and recycled.

The escalating agitation over the issue of unwashed wool flock took to the pages of the medical journal *The Lancet* from 1906 to 1907 in a sequence of correspondence and notes assembled around the scornful title 'Loathsome Bed Stuffing'. It was implied that the horse in its fresh straw enjoyed a cleaner bed than the average city dweller. Blame is laid at the door of competition for cheapness, thereby signalling a shift from long-accepted free trade economic doctrine to a desire for a more regulatory regime.

This section ends with the section on rag flock from an extensive series of articles on the 'Inside of a Mattress' published in *The Cabinet Maker* between 1924 and 1928. This marks the rehabilitation of rag flock to a praiseworthy commodity, seen to emerge from the rag processing machinery 'cleansed, purified and carded – standard rag flock – an entirely new product' – a 'complete metamorphosis'. Images aid our understanding of the range of types available. Rag flock had expanded to include mixtures of wool with cotton, and even jute, using 'only such rags . . . as are quite useless for any re-manufacturing process or blending with wool for the making of cheap cloths'. In this way, rag flock played a major role in eliminating textile waste.

Part 7 Dolly shops and 'things done with'

This section moves on to textiles that are repurposed, rather than converted back into fibre for re-use. Cleansing and reshaping could erase the material's ancestry and enable its *translation* into a new article. One site of exchange of materials for such re-use was the dolly shop: 'the name popularly given in London to a shop where rags and other kinds of old articles are bought, and over the door of which a black doll is usually suspended'.[10] Adalbert Hoppe detailed this as a black wooden doll in white clothing.[11] The white garments are explained when it is known that the black doll was formerly a shop sign denoting the sale of India muslins.[12] However, the route of its descent from elite fabrics to rags is not clear. Nor was its original meaning widely remembered, as evidenced by Thomas Hood's cartoon of an indignant African in London, appalled by the seeming execution of a black child.[13]

The first article in this section, written by Charles Manby Smith in 1855 during the Crimean War period, concerns sheet lint for medical use in dressing wounds. Linen softened and purified by years of use and washing was the preferred source material for such dressings. Jewish entrepreneurs contracted with institutional users of linen (hospitals, prisons, schools, etc.) for larger and more consistent provision of such rags than could be provided by the dolly shops. Jewish populations were often closely linked to the rag and second-hand clothing trade, and nineteenth-century accounts are seldom clear of antisemitic innuendos of unfair dealing, even while admitting the tight margins and the difficulties of making a profit in such trades. The appeal of Smith's article, however, is its focus on the female lint-maker, pursuing her skilled but monotonous and wearisome trade in the dingy attics of London's back streets.

In another essay treating the lowly hemp or jute sack, Smith tackles, in 1854, a problem astonishingly modern in nature – the practicalities of returnable containers, and how to encourage their return. Because flour and grain sacks were provided for free, consumers did not respect the rights of the owner over this property. Private enforcement and legal remedies being costly, and failing to resolve the problem, owners dreamed of a throwaway single-use item that would counteract the sheer tempting utility of sacks, a utility that invited re-use as containers or conversion to floor, wall or roof coverings, amongst other possibilities. Again, Smith highlights an overlooked cadre of female workers making a meagre living, here facing a new threat of competition from the sewing machine.

In 1864, Andrew Wynter responded to the question of what becomes of old clothes with surprising revelations about their transformations and travels. Black cloth garments were cut up to make caps in France. The red tunics of the British infantry were destined for waistcoats of working-class Dutchmen, while scarlet officers' coats became facings for civil uniforms of Russian officials. Black velvet waistcoats from country towns were the source of material for Jewish skullcaps in Germany or Poland.

We conclude with Clara Matéaux's 1881 account of the rag and bone trade, appropriately titled 'Things That Are Done With'. As with many works for juvenile readers, this article strongly conveys core cultural narratives. First there is the awesome capacity of modern industry to transform materials – here conducting things that are 'done with' to a pristine new start. Admiration is bestowed on those with the insight to envisage creating value from such discarded things. But there is also a more disturbing class narrative. While sorters in the factory are represented as skilled in performance of a difficult task, even if *crouching* at low stools or barefoot, outdoor workers are portrayed as a different race: the 'hill people'. Likened first to ants and then to crows, the women hidden by sacking aprons and straw hats, hold on to their humanity only by virtue of their ability to sing and be useful. While mechanical equipment is able to purify waste, the human operative is enmired by close contact with disagreeable materials rather than dignified by the work.

The nineteenth-century waste textile industries inhabited a territory redolent with anxieties about class. Movement of textiles from low to high triggered emotional discomfort, provoked by associations with foreigners, beggars, criminals and contagion. Only if the manufacturer was able to completely cleanse and renew the fibre, to effect not transmigration but metamorphosis, could the suspect fibre gain full acceptance. Paper, with its near-elemental transformation that imitated nature and left the rag in a state of visual purity, was first to win public esteem. Then the virgin waste fibres like tow, spun silk and cotton, with their evocation of good housewifery, and clever business practice producing value from refuse, gained favour. Shoddy and flock, of more dubious origins, lingered much longer on the edge of approbation, flock requiring legislation to enter respectability, and shoddy remaining the textile that dared not speak its name.

Notes

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3 Timothy Cooper has expounded upon waste as a driver for capitalist modernity in 'Peter Lund Simmonds and the Political Ecology of "Waste Utilisation" in Victorian Britain', *Technology and Culture*, 52:1 (Jan 2011), pp. 21–44.
4 Hill, Samuel. *A Plan for Reducing the Poor's-Rate, by giving permanent employment to the labouring classes: with some observations on the cultivation of flax and hemp* . . ., 2nd ed. (London: J. Harding, 1817), p. 16.
5 Elliott, Isabelle M. Z. (based on material collected by James Rawlings Elliott). *A Short History of Surgical Dressings* (London: The Pharmaceutical Press, 1964), pp. 51–52.
6 Du Cane, Capt. E. F. 'On the Utilisation of Prison Labour', *Journal of the Society of Arts*, 19:965 (19 May 1871), pp 529–539.
7 Melville, Herman. *Redburn: his first voyage. Being the Sailor-boy Confessions and Reminiscences of the Son-of-a-Gentleman, in the Merchant Service* (New York: Harper & Brothers, 1850), pp. 340–342.

8 Dodd, George. 'A Day at a Leeds Flax-mill', *Penny Magazine of the Society for the Diffusion of Useful Knowledge*, 12:754 (Dec 1843), supplement, pp. 501–508, (on p. 504). Reprinted in *The Textile Manufactures of Great Britain by George Dodd* (London: Charles Knight and Co., 1844), p. 157. See also Combe, James. 'Description of a Flax Mill recently erected by Messrs. Marshall and Co. at Leeds', *Institution of Civil Engineers. Minutes of Proceedings, Session 1842*, 2 (1844), pp. 142–145.

9 Jubb, Samuel. *The History of the Shoddy Trade: Its Rise, Progress and Present* Position (London: Houlston and Wright, 1860).

10 *Chambers's Encyclopaedia: a Dictionary of Universal Knowledge for the People* (London: W. & R. Chambers, 1880), vol. 3.

11 Hoppe, Adalbert. *Englisch-Deutsches Supplement-Lexikon* (Berlin: G. Langenscheidt's Verlagsbuchhandlung, 1871), p. 124.

12 Brewer, Ebenezer Cobham. *Dictionary of Phrase and Fable* (London: Cassell, Petter and Galpin, 1870), p. 237.

13 Hood, Thomas (ed.). *The Comic Annual*, 1839. A story was elaborated from the *Comic Annual* cartoon by the *Exeter and Plymouth Gazette*, 23 Feb 1839, p. 4.

Part 1

‘A CREDIT TO THE AGE’

The utilisation of waste

Fig. 1 View of a blending or mixing room at Redmayne and Isherwood Ltd., Kirkham, manufacturers of cotton and engine waste.

Source: *Concerning Cotton: a brief account of the aims and achievements of the Amalgamated Cotton Mills Trust Limited and its component companies* (Manchester: ACMT Ltd, 1920), n.p. Manchester Metropolitan University Library.