

## **Manchester: Archetypal Industrial City**

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**Accepted text June 2017.**

**Published on line as part of 'The Oxford Handbook of Historical Archaeology', edited by James Symonds and Vesa-Pekka Herva**

### **Abstract**

This chapter provides an overview of one of the most significant nineteenth-century industrial cities: Manchester. It reviews the seventeenth- and early eighteenth-century background to the emergence of the nineteenth-century industrial city: weak local lordship and concentration of commercial power in a small group of entrepreneurial textile families. What emerged was a template for the industrial city: an urban-based textile manufacturing centre with dedicated workers' housing serviced by a detailed and efficient transport network. This model would be copied by cities in Europe and North America during the nineteenth and early twentieth centuries. The outline of the nineteenth-century industrial city is described through its archaeology, in the form of standing structures and excavated evidence. This includes the canal and railway infrastructure, the excavation of workers' housing and the recording of surviving workshop dwellings, and the survey and excavation of Manchester's most important manufacturing type-site: the steam-powered cotton spinning mill.

### **Keywords**

Manchester, industry, textiles, warehouse, canal, housing, poverty

## 1 Introduction

Manchester was the 'shock city' of the nineteenth century. Those who came to view it during the middle decades of the century were astounded or, like the social and political commentator Frederick Engels, more often horrified by the city's industrial face—the hundreds of cotton factories and chimneys, the narrow alleyways and overcrowded houses, most of which were packed into the present twenty-first-century city centre. The city was prominent in Victorian literature and was the inspiration for novels by among others Charles Dickens (*Hard Times*) and Elizabeth Gaskell (*Mary Barton*), books designed to raise awareness about the social injustices of industrialization and the factory system. The 'Manchester school of economics', a term coined by the Victorian prime minister and novelist Benjamin Disraeli, with at its heart the idea of Free Trade, had a significant impact on Victorian and Edwardian economic and political life, while 'Manchester goods', the products of the city's cotton mills, could be found all over the British Empire.

The city has a physical industrial heritage that is of equal importance, from the first industrial canal and steam-powered cotton mill to the first intercity railway terminus and suburban railway line. Its proto-industrial development as a commercial centre of the cotton industry is represented by the canals, merchant houses, waterfronts, and workshop-dwellings of the eighteenth-century town. Its later development as a mass-production centre, the world's first industrial city, is embodied

in the back-to-back terraces, canal arms, railways, textile mills, and warehouses of the nineteenth century.

However, Manchester was a modest place in the medieval period: in 1500, of thirty-four market centres in the North West, it was one of the smaller. It grew slowly in the Tudor and Stuart periods, doubling its population in the century between 1563 and 1664. Thereafter, it expanded rapidly; between 1664 and 1773 the population increased sevenfold to c. 23,000. Then it exploded, trebling in the space of a generation to reach 75,281 by 1801. In that year, there were thirty-three textile mills in the city, where there had been none in 1773, and by 1851 this number had risen to more than 100 and the city's population had reached 303,382 (Kidd 2002). The city and its region of c. 1.2 million people and more than 1000 textile mills had, in the space of just seventy-eight years (1773–1851), become one of the largest urban centres in Europe (McNeil 2006; Nevell 2008a, 2008b).

Such rapid industrialization has left a great variety of above- and below-ground remains in the city which, coupled with the detailed archaeological investigations of the first decade of the current century, provide a model for charting industrial urbanization in other mercantile cities.

## **2 Proto-Industrialization**

A central feature of the early industrial town was the lack of control on development. Manchester did not acquire corporate status until 1838. This made it technically not a town but rather, as Daniel Defoe described it in the 1720s, 'one of the greatest, if not

really the greatest, mere village in England'. As Joseph Ashton explained in 1804, the absence of borough regulation '[i]nduced strangers to add their stock of property, industry, and talent to the growing prosperity, [raising] the town and trade of Manchester to its present consequence on the national scale' (Ashton 1804, 55-6). Manchester, in short, was built on free trade, and a long period of proto-industrialization based around the manufacture and marketing of textiles.

From the latter part of the seventeenth century, the city was dominated by the cotton business, which was run by a handful of merchant families. At first, it was more a commercial than an industrial centre. Cotton merchants grew rich through the putting-out system, with spinners and weavers working in their own homes, many in the small towns and villages of the surrounding countryside (Nevell 2005). These textile goods were finished by the merchant families in Manchester and then marketed in London. The early wealth of the proto-industrial textile town is reflected in the surviving architecture of the early eighteenth century. Examples are St Ann's Church (built 1709–12), St Ann's Square (laid out in 1720), and King Street (second quarter of the eighteenth century), the latter two being high-class residential areas. By now, if not before, the textile merchants dominated the life of the town (Hartwell 2001).

The manufacturing side of this open town was represented by the workshop dwelling. In the city's Northern Quarter, to the north of Piccadilly Gardens, there survive a large number of this building type. These eighteenth-century workshop dwellings are distinctive. (Palmer 2004). Typically, they were three storeys high, had a cellar, and were one room deep. The uppermost storey was designed as a workshop, and at this level

there was a single wide window to allow in maximum light. The cellar was also commonly used as a workshop, with the two intermediate levels providing the family living accommodation. Examples on Kelvin Street (from c. 1773) and Tib Street (from 1783–94) demonstrate how these workshop dwellings functioned as proto-industrial units. These rows of three and four units had doorways in the cellars and attics providing access between the workshops and demonstrating that pairs or rows of such houses were built as a series of working units. These houses were the residences of skilled workers employed on hand-powered machinery—firstly looms, later spinning jennies—on the putting-out system; the Kelvin Street properties were built by a Mr and Mrs Manchester, fustian manufacturers. The earliest examples in the city date from the 1740s and hundreds were built on land sold by the successful merchant families of the previous century, such as the Byroms, Levers, and Mosleys (Nevell 2011).

No less important was the movement of both raw materials and finished goods to and from the city. Canals and warehouses were as important as merchant houses and workshop dwellings. The Rivers Mersey and Irwell were upgraded to make them navigable, and the city's first purpose-built waterfront was opened on the banks of the Irwell in 1736. The capital for the Mersey and Irwell Navigation Company was supplied by the Manchester textile merchants. Between 1759 and 1762 the city's first canal, indeed the first industrial canal in the world, the Bridgewater, was built along with the associated Castlefield Basin, around which six warehouses were erected between 1770 and 1840 (Nevell 2013). This marked the emergence of the first dedicated warehouse district in Manchester. Before 1770 warehouse facilities in the city were provided either

by the dozens of coaching inns in the city or by private warehouses attached to one of the mercantile families, such as the Byroms' timber-framed early seventeenth-century premises in the Shambles (now the Wellington Inn). The Duke's and the Grocer's Warehouses, the first two canal warehouses to be erected in the early 1770s, represented a revolutionary new design with five distinctive features. They combined multiple storeys, split-level loading, terracing into the riverside slopes, internal water-filled canal arms, and a hoist system run by water power. This meant that canal barges could be moved under the building and goods loaded or unloaded directly into and from it (Nevell 2003). This initial canal system was extended in the 1790s with the building of the Ashton and Rochdale Canals, each of which had a canal basin on the eastern side of the town, which were eventually linked to the Castlefield canal basin in 1804 by an extension of the Rochdale Canal (Maw et al. 2010).

The proto-industrialization phase of Manchester's growth thus had a number of distinctive elements. Firstly, a weak local government system provided few constraints on industrial and urban development. Secondly, a merchant oligarchy controlled the life of the town and acquired money to invest in new projects. Thirdly, the town developed a domestic-based manufacturing sector with skilled artisan workers. Finally, Manchester had developed a transport infrastructure that could move large amounts of raw materials and finished goods into and out of the town quickly.

### **3 Textile Manufacture—the Lead Industry**

In the last twenty years of the eighteenth century the city's industrialization took off with the construction of thirty-three water- and steam-powered textile mills. This mill building boom turned a regional manufacturing town into the first industrial city.

The first cotton mill was built in 1781–2 on Shude Hill by Richard Arkwright and his four business partners. It was 52 m long, 12 m wide, and five storeys high. The wooden floors were supported by a central row of cast-iron columns on each floor and there was an internal, centrally placed wheel pit. In order to provide water for the water wheel, a reservoir was built on the western side of the mill and it seems highly likely that it was fed by a leat drawn from nearby ponds known as the Shude Hill Pits on Swan Street, which in their turn were fed directly from the River Tib. This was a closed system, since the water was not lost but recycled. It was pumped from the lower reservoir to the west of the mill back uphill to a small square header reservoir north-east of the mill, using an atmospheric steam engine of the Savory type. There were also two atmospheric rotary steam engines supplied by Thomas Hunt of London, and the remains of one of these might be represented by an enigmatic brick-lined shaft, 2 m by 2.2 m across, at least 1.36 m deep, excavated adjacent to the wheel pit (Chaloner 1955: 90–1). Technically, Arkwright's Mill was the first in Manchester to use steam, although it seems unlikely that any of these steam engines successfully powered textile machinery.

The first proper steam-powered mill in Manchester, where the engine actually ran the cotton-spinning machinery, was, however, at another Arkwright-type mill owned by Peter Drinkwater. Drinkwater was one of the Manchester fustian putting-out merchants who made the transition to cotton mill owner. During the 1770s he was a

fustian manufacturer with commercial premises including a warehouse in King Street, a town house in Spring Gardens, and extensive overseas interests. In the late 1780s he began investing some of the capital he had accumulated in cotton-spinning mills, first in a water-powered mill in Northwich, Cheshire, and then in 1789 in Manchester with the construction of his four-storey, brick-built, Piccadilly Mill on Auburn Street, which by the early 1790s was employing around 500 people (Chaloner 1955: 85–93, 1962: 162–3; Miller and Gregory 2010). This was powered by an 8 hp Boulton and Watt rotary beam engine (the original drawings for which can still be seen in the company's archives at Birmingham), installed and working by 1 May 1790, and immediately increasing the output of his business thirtyfold (Chaloner 1955: 87–90).

Several of the first generation of steam-powered mills built in the 1790s have been investigated, including New Islington Mill and Salvin's Factory, which both used highbred steam and water power systems (Miller and Wild 2007: 34–49). The only eighteenth-century steam-powered cotton mill to survive is the Murrays' Mills site on the Rochdale Canal in Ancoats. This was a multi-block complex built in three phases between 1798 and 1806, eventually developing into one of the largest and most innovative mills in Manchester. The core of the complex was a quadrangle of blocks up to eight storeys high enclosing a canal basin linked by tunnel to the Rochdale Canal. The blocks had timber floors supported by cast-iron columns of cruciform cross-section, and the machines in the two largest blocks were powered by separate Boulton and Watt beam engines via centrally placed upright shafts. Murrays' Old Mill came to typify the Manchester cotton mill; it was a narrow, six-storey, brick-built structure, located on the

side of a canal and with, for the time, a large beam engine powering spinning mules. By 1815 the site employed 1215 mill hands, making it the largest single employer in the city (Miller and Wild 2007: 75).

One of the best preserved early nineteenth-century mills is Brownsfield Mill on the edge of Ancoats. Built in 1825–6, the mill lies on the western side of Great Ancoats Street overlooking a private canal arm and the Brownsfield lock on the Rochdale Canal (Maw et al. 2009: 30). It was a steam-powered cotton-spinning factory built as a room-and-power mill. The seven-storey southern wing was built around 1825 as a cotton-spinning mill and had an internal engine house at the western gable. The northern six-storey wing was built shortly afterwards, and by 1831 was in use as a warehouse and manufacturing block. It had a non-fireproof structure with wooden floors supported by heavy pine beams, many retaining their quality control marks showing they had been imported from the Baltic. Brownsfield Mill is notable for having the earliest surviving mill chimney-cum-stair house tower in Manchester and for a highly unusual internal canal arm at the northern end of the northern wing, and for its covered courtyard. The power system remains are quite well preserved with the engine house containing the original engine bed and evidence for two vertical drive shafts, one for each spinning block. The mill is of smaller proportions than some of the other surviving mills in the Ancoats area and at 6019 m<sup>2</sup>, with two wings of roughly 3000 m<sup>2</sup> each, may be more representative of the Manchester cotton mill of the first third of the nineteenth century in its scale, with its six and seven storeys, its timber-floored construction, and its canalside location.

Typical of the development of the power system in mills of the first half of the nineteenth century is the engine house at Pin Mill, on Pin Mill Brow (Nevell 2008a). Here, excavations illustrated the breakneck pace of technological innovation. Established in 1794 as a hand-powered or (less likely) water-powered textile factory, it was upgraded with the installation of successively more powerful steam engines. Evidence was found for three main phases. A brick plinth and some square-section iron bolts represented the earliest phase, characterized by a small Boulton and Watt rotary engine installed shortly after 1800. A larger beam engine of 1831 was evidenced by the site of a wagon boiler, a flue, and a square-sectioned chimney. Finally, around 1849, a yet larger beam engine, set on a tall stone and brick plinth, necessitated a new engine house, boiler house, and chimney; it had perhaps ten times the power of the first machine.

The last major mill building boom in Manchester occurred during the years 1848 to 1853 (Williams with Farnie 1992: 21). The 1849–50 Ordnance Survey 60 inch to one mile map of Manchester records 172 textile mills and ninety-one textile finishing sites in the city. Nearly all of the mills were cotton-spinning and weaving factories, although there was a silk-finishing mill on Hardman Street. Mills could be found all over the centre of Manchester, on Millgate in the heart of the old medieval town and on Bridge Street in the Georgian town by the Irwell, though most were distributed along the Ashton and Rochdale Canals, beside private canal arms, and along the Rivers Irk, Irwell, and Medlock. After 1850 new mills tended to be established in the suburbs around the city, although as early as 1825 mills were being built in Gorton and Newton on the

eastern side of the city and at Beswick in 1828 (Williams with Farnie 1992: 21). This represented the peak of the industry in terms of manufacturing sites, though output did not reach its zenith, like the rest of the Lancashire cotton-spinning industry, until 1913 at 3703 million working spindles (Williams with Farnie 1992: 46).

Of the late period mills in the city, three stand out, both metaphorically and literally. The tall chimney of Victoria Mill, in Miles Platting, can still be seen from Ancoats and remains a prominent landmark on the eastern side of the city. The mill was built in two phases in 1869 and 1873 as an architect-designed structure by George Woodhouse for the firm of William Holland (Hartwell et al. 2004: 382–3). It has a U-shaped plan formed by two large six-storey cotton-spinning blocks linked by an engine house and a tall circular chimney that has a stair tower wrapped around the lower part. The overall appearance is Italianate, a popular design of the period, with red brick dressings and corner pilasters. The central engine house was replaced in 1902 with an external engine house for a horizontal steam engine that ran a rope drive in a rope race, a system which was introduced into Lancashire mills from the 1870s. Paragon and Royal Mills, both of six storeys and nine bays, were built in 1912 as additional wings to the McConnel and Kennedy's Ancoats complex, and marked another major step in the development of the textile-spinning industry since both were built as electrically powered mills, powered from Manchester's municipal grid. They were built of steel framing with concrete floors, had flat roofs, drive-shaft towers for the electrically driven transmission system, and architectural ornamentation such as red brick with terracotta banding and Baroque detailing, typical of late-period cotton-spinning mills (Hartwell

2001: 280). However, they lack the monumentality of many Edwardian cotton-spinning mills in Lancashire due to the small size of the urban plots they were built on. Paragon Mill used a plot of former workers' housing while Royal Mill was built on the site of McConnel and Kennedy's first 1798 mill.

#### **4 Warehouse City**

The success of the manufacturing side of Manchester's textile economy was mirrored by the continuing growth of its commercial sector, and its dominance as a commercial and financial centre in the second half of the nineteenth century was dependent in part on its success as a textile manufacturing and marketing town. The physical expression of its commercial and financial role was the large number of warehouses. These were notable for two reasons: the way in which they came to dominate various parts of the city and the development of the goods handling and marketing process.

By 1850 a large textile warehouse district had developed on the southern side of the city along Princess Street and the Rochdale Canal, with further warehouse areas between Water Street and Liverpool Road Station, and between the Ashton and Rochdale canal basins and Piccadilly Station. Despite the importance, architecturally and archaeologically, of the canal and railway warehouse structures (McNeil 2004; Nevell 2003, 2013), it was the commercial warehouse that came to typify Manchester's role as a warehouse centre, and large parts of the city centre remain dominated by dozens of these buildings (Taylor et al. 2002). Typically, they serviced the textile industry, and emerged in large numbers from the 1840s, with examples being built as late as the

1920s, in an area running from Oxford Street in the west to London Road in the east. So emblematic did these commercial warehouses become of the city's commercial and industrial prowess, with their multiple roles as advertising symbol, statement of industrial power and prestige, and practical storage facility, that they became known simply as the Manchester Warehouse.

These warehouses, which could be as large as a cotton-spinning mill complex, were divided into three main types: home trade warehouses, overseas warehouses, and multiple occupancy warehouses. Home trade and overseas warehouses, which can be found all over the textile warehouse district, were the most elaborately decorated (Hartwell et al. 2004: 310–11, 326–8). Each floor was divided into departments that specialized in particular types of goods, overseen by a foreman who oversaw assistants and salesmen. The lightest goods were stored on the upper floors and the heavier goods on the lowest floors. These sales floors were used as sample and pattern rooms with benches for cloth examination, which required plenty of light and hence the many windows. In the basement of the warehouse was the packing floor with boilers, presses, later on hydraulic gear, and other services such as inspection and making-up; orders were lowered to the packing floor via hoists. Opposite the main entrance was a grand staircase that penetrated the full height of the building to impress prospective buyers, and led to the ground floor, where the company's offices were located along with entertainment rooms and showrooms for the clients (Taylor et al. 2002: 21). Amongst the many fine mid-nineteenth-century surviving examples in the city are 36 Charlotte Street, a palazzo-style warehouse designed by Edward Walters and built in 1855–60,

and S. & J. Watt's huge warehouse on Portland Street, now the Britannia hotel, built in 1855–8, which uses a different architectural style on each floor.

Multiple occupancy warehouses, a feature of Manchester's commercial quarter since the early nineteenth century, continued to be popular. Such structures were owned by a company that provided storage, display, office, and packing space which was rented to a number of smaller companies, rather on the lines of the room-and-power mills of the early nineteenth century. They were used by companies involved both in the home and overseas markets. One of the finest surviving examples is Canada House on Chepstow Street. Built in 1909, this is a six-storey, ten-bay structure with wide windows in a terracotta facade, while the rear elevation is a glazed screen with octagonal piers rising to the full height of the building. Inside, every floor had its own offices reached by a grand central staircase (Hartwell et al. 2004: 310–11).

The commercial side of the Manchester economy also depended on its role as the most important transport hub in the region and the network of transport links across the city. Many of the new mills of the nineteenth century had direct access to the canal system, which expanded to include not just the main routes of the Ashton, Bridgewater, and Rochdale Canals but also a series of private canal arms (Maw et al. 2010). By 1831 there were thirty-one examples (six branching from the Bridgewater, eight from the Ashton, and seventeen from the Rochdale), amounting to an additional 5.25 km of waterways that serviced the cotton mills, engineering works, warehouses, and the coal and timber yards of the southern side of the city (Nevell 2008a: 108;

Redhead 2011). They were a major factor in enabling the new industrial city to expand without choking its supply lines for raw materials.

The key to Manchester's manufacturing success in the late eighteenth century and the nineteenth century was the combination of steam-powered manufacturing and a large-scale urban-based labour force which were supplied with both raw materials and food by canal and road. This highly developed transport network was also one of the factors in the success of the city as a commercial centre.

## **5 Housing the Industrial Urban Workforce**

Industrial housing (workshop dwellings, blind-backs, back-to-backs, and through-houses) was a necessary counterpart to the urban, steam-powered factory. Factory owners needed to be able to guarantee a regular supply of labour, in return for standardized wages and hours, and a new landless tenantry, in purpose-built urban houses, emerged in Manchester to fulfil this need.

The rapid rise in Manchester's population required huge amounts of housing, and between 1773 and 1821 the number of dwellings in the city rose from 3446 to 17,257 (Kidd 2002: 38), and by 1851 had reached nearly 50,000 houses (Nevell 2011) .

Until the late twentieth century few physical remains of workers' housing from this period were recognized in the city. Survey work in the 1980s and 1990s rediscovered dozens of surviving eighteenth-century houses (Roberts 1993) and between 2001 and 2014 seventeen excavations revealed the remains of housing from the eighteenth and nineteenth centuries in the very heart of industrial Manchester

(Nevell 2014: 48–50). For the first time archaeology is able to augment the contemporary accounts of social commentators such as Aikin and Engels with physical evidence, some of which shows such reports to be exaggerated, while other finds demonstrate that these reports underestimated the worst aspects of contemporary industrial housing (Aikin 1795: 192–5; Kidd and Wyke 2010).

Frederick Engels's description of Manchester is the best known and most debated of the many visitors' sketches of the city. Writing in 1842–3, but published later in his book *The Condition of the Working Class in England*, his descriptions of housing and living conditions in the city have become infamous. Engels concluded that the '350,000 working people of Manchester and its environs live, almost all of them, in wretched, damp, filthy cottages, that the streets which surround them are usually in the most miserable and filthy condition, laid out without the slightest reference to ventilation, with reference solely to the profit secured by the contractor' (Engels 1845: 100). His comments came after more than sixty years of rapid urban and industrial expansion and at the end of a twenty-year period when Manchester doubled its population size, but not its physical area. He was thus writing at the most acute period in Manchester's housing provision and at the peak of the overcrowding of this new industrial city.

One of several themes to emerge from this archaeological evidence was the issue of housing quality and land ownership (Nevell 2005). There is a marked decline in the quality of workers' housing between the late eighteenth century and the 1820s and 1830s, the latter being particularly notable for the poor build quality and cramped

conditions. This coincided with the rise of small-scale landowners and renters who speculated in building housing on tiny plots.

A useful model of the way in which overcrowded, slum housing developed during this period is represented by the upstanding remains of 69–77 Lever Street in the Northern Quarter. These began as a speculative development of five four-storey workshop-dwellings built progressively over a decade by a plasterer, William Bradley (Taylor and Holder 2008: 24). The first phase spanned the period 1780–8 when a row of five houses was built. These had attic-floor workshops but the basements, ground, and first floors appear to have been divided for tenement housing in all but one case. Each house had its own rear yard with an outside privy. The second phase saw two-storey extensions, lit separately, built into the rear yard areas by around 1790, and a third phase by 1794 saw one-up-one-down cottages added to the rear of these in turn, facing Bradley Street. Later, in the early nineteenth century, by 1831 a five-bay, three-storey warehouse was built across two backyards. Access to the phase two and phase three housing was only from the Bradley Street side of the properties (Taylor and Holder 2008: 25). These properties encapsulate many of the features of later slum housing—small domestic unit size, poor lighting, restricted access through narrow alleyways, and a lack of sanitation (Nevell 2011).

The development of the industrial suburb of Ancoats demonstrates how even greenfield sites could become slum areas (Nevell 2014: 52–3). The starting point for the urban development of Ancoats is said to have been in 1775 when part of the Great Croft between Ancoats Lane and Newton Lane (the present Great Ancoats Street and Oldham

Road) was sold to Thomas Boond, a bricklayer, by George and Henry Cornwall Legh, members of the Cheshire gentry (Roberts 1993: 15). By the 1790s map evidence shows that a grid-iron of streets had been laid out between Great Ancoats Street and Oldham Road. Property not only lined those main thoroughfares but had also begun to be built in the streets behind. At this date development was densest in an area which lay closest to Great Ancoats Street and Oldham Road. Elsewhere building was more scattered, with some blocks of the grid-iron still vacant. By 1801 there were 11,039 people, a seventh of Manchester's population, living in the new industrial suburb.

During the early nineteenth century the industrialization of Ancoats continued unabated, with glassworks and engineering companies joining the textile mills, and this process attracted workers from both the rural hinterland of Lancashire and also from areas further afield, notably Ireland. By 1851 nearly every piece of land in Ancoats had been built upon and in that year its population numbered 55,983 (Nevell 2008a: 152). The 1849–50 large-scale Ordnance Survey map for Ancoats shows a large number of cellar dwellings, back-to-back houses, and court housing in amongst the mills of the area. For contemporary observers Ancoats' urbanization was dramatic even by Manchester's standards, as were the consequences in terms of living conditions. In the early 1840s Frederick Engels visited Ancoats as part of his investigation into the conditions of the working classes in Britain. During this visit he considered the construction of the workers' houses in the area around Jersey Street and commented that 'on closer examination, it becomes evident that the walls of these cottages are as

thin as it is possible to make them. The outer walls, those of the cellar, which bear the weight of the ground-floor and roof, are one whole brick thick at most' (Engels 1845).

This period of rapid population growth and increased pressure on housing quality from c. 1775 to 1851 was followed in the later nineteenth century by a slow improvement in housing quality through local by-laws that led to the addition of backyard privies, the closure of cellar dwellings, and the demolition or conversion of back-to-back houses (Nevell 2014: 49–52. This was the result of local government in Manchester assuming a series of powers designed to alleviate or remove the more insanitary conditions in the town's housing, which were the main factor in the cholera and typhoid epidemics of the 1830s and 1840s (Kidd and Wyke 2010: ix–xv). The Manchester Police Act of 1844 banned the building of new back-to-back houses, while new cellar dwellings were made illegal in 1853. Under legislation in 1867 individual back-to-backs were declared unfit for human habitation. To bring them up to the required standard, landlords might create a through-dwelling by knocking doors through the party wall between a pair of back-to-backs. Pairs of back-to-backs or individual one-up-one-downs in the court areas might be removed altogether to create the space for yards for the remaining properties (Kidd 2002; Roberts 1993: 22–3).

Improvements in the living conditions of the industrial suburb, however, could be slow. In 1889 Dr John Thresh presented a paper to the Manchester and Salford Sanitary Association, in which he examined the reasons for the continued high mortality in No. 1 District in Ancoats. This was a 36 acre area between Great Ancoats Street, Oldham Road, Union Street, and German Street, and included the present study area.

Thresh reported that the majority of houses in this district (over 800) had been built before 1830, some even before 1780; about sixty had been built between 1830 and 1850, but none after that last date. Most were two-storey, but there were also several three-storey houses, with a workshop in the garret. Back-to-backs accounted for about a third of the dwellings in the district. Many houses had cellars described as being used as workshops or for storage (Roberts 1993: 19). In 1904 T. R. Marr, in *Housing Conditions in Manchester and Salford*, reported the results of his own inspection of nearly 600 dwellings in 12.7 acres of No. 1 District. Almost half the dwellings were four-roomed (i.e. two-up-two-down), while a third were still two-roomed, although these were gradually disappearing under pressure from Manchester's Sanitary Committee (Nevell 2014: 52–3; Roberts 1993: 20). In 2011 the excavation of a set of eight back-to-back houses on the corner of Jersey Street and Pickford Street showed that running water to each house and individual privies per property were not installed until the early twentieth century, and there was no indication of any form of gas supply (Nevell 2014: 58–61).

## **6 Conclusion: Modelling Urban Industrialization**

The local historian and social commentator Thomas Aikin claimed in 1795 that Manchester 'has now in every respect assumed the style and manners of one of the commercial capitals of Europe' (Aikin 1795: 194). While his comment was somewhat premature, by the mid-nineteenth century Manchester had indeed achieved fame and importance as one of the great commercial cities of the world. The emergence of this industrial city was complete by about 1840, and although Manchester remained as a

potent symbol of this new type of urban site, it ceased to excite as much interest from contemporary commentators as the city matured into dealing with the problems inherent in newly industrialized societies: overcrowding, disease, social injustice, and a growing suburban hinterland (McNeil 2006: 158). Yet the Manchester model of the specialist industrial city (an urban-based textile manufacturing centre with dedicated workers' housing serviced by a detailed and efficient transport network) was exported around the globe in the nineteenth century. In Europe towns such as Barcelona, Ghent, and Rouen were all at some stage named as the 'Manchester of their region' (McNeil 2006: 160–4). The concept of an integrated industrial society (from capital, commerce, and transport to power systems, factory buildings, and housing), first expressed in the form of Manchester, achieved even wider influence and became the template for the industrial manufacturing cities of the late nineteenth and twentieth centuries.

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The second edition of The Oxford Handbook of Interdisciplinarity constitutes an update and revision of a topic of growing academic and societal importance. Interdisciplinarity continues to be prominent both within and outside academia. Academics, policy makers, and members of public and private sectors seek approaches to help organize and integrate the vast amounts of knowledge being produced today, both within research and at all levels of education. This compendium is distinguished by its breadth of coverage, with chapters written by experts from multiple networks and organizations, on topic Michael Nevell, Marilyn Palmer, Mike Nevell. This Handbook provides an informative and accessible guide to the industrial remains of the UK. It is essential reading for anyone with an interest in our industrial heritage, giving concise summaries of the history of different industries, together with descriptions of the structures and below-ground remains likely to be encountered. The book also considers the power which drove these industries, the transport network which delivered the products and the houses in which the workforce lived. It further reviews the legislation protecting industrial s