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The Offerton Hat Works and Stockport's Felt Hat Industry

Steve Tamburello

ABSTRACT
Stockport became one of the leading centres for the British felt hat industry in the 19th century. An archaeological survey of the Offerton Hat Works that was carried out between May 2019 and February 2020 in advance of redevelopment has provided a detailed record of one of the best surviving 19th-century hat works in the town. The Offerton Hat Works was hailed as a state-of-the-art 'model factory' when established in 1886 by William Battersby, who emerged as one of the leading manufacturers of felt hats. This article summarises the conclusions drawn from the archaeological survey of this important works, with reference to other surveys and excavations of earlier 19th-century hat factories elsewhere in Stockport and in the neighbouring towns of Oldham, Hyde and Denton that together chart the key stages in the transition of hat production in north-west England from a cottage craft to a specialised factory-based industry of international repute.

KEYWORDS
Stockport; Battersby; cottage industry; hat works; bow garret; felting

Introduction

The production of felt hats in north-west England dates back to at least the late 16th century, with several wills in the early 1700s noting various recognisable items of apparatus used in the felt hat-making process, although often alongside another trade. This early, small-scale hatting industry benefited from a buoyancy in the trade during the 18th century due to its protected position at home and its dominance of the export market in Europe and North America.[1] The production of felt hats in north-west England synchronised particularly well with farming, with most hatting taking place at the start of the winter season. There was also a plentiful supply of soft water that was well suited to working felt and setting dyes.

The manufacture of felt hats was essentially an artisan-based industry throughout the 18th century, with a master hatter employing his sons, usually two apprentices and also additional journeymen hatters.[2] This specialised industry became focused in several towns in the region during the early 19th century, with Stockport and Hyde in north-east Cheshire and Manchester, Denton, Oldham and Ashton-under-Lyne in Lancashire becoming particularly important centres by the mid-1820s.[3] The industry was largely restricted to domestic premises and small workshops scattered over a wide area and with little use of mechanical power, but it was nevertheless a specialist trade that gained the Stockport area international repute for felt hats.[4]

The industry suffered a severe depression that began in the late 1830s due to the rising price of beaver fur and a change in fashion in favour of the silk hat.[5] The depression brought a hiatus to the local felt hat industry until the 1860s when there was a resurgence based on the introduction of machinery and power-driven hat factories.[6] The strong growth of the industry during the later 19th century is reflected in trade directories for 1902, with almost three-quarters of the 88 felt hat manufacturers listed in the whole of Great Britain being based around Stockport, Denton and Hyde (Figure 1).

The nucleus of hat-making activity in the North West attracted several London-based hat companies, who established factories in the area to take advantage of cheaper labour and the facilities for industrial production provided in the growing manufacturing towns.[7] One of the most well known, the Christy family, took control of Worsley & Co., a hat manufacturer on Hillgate in Stockport, as early as 1826 and had extended the factory such that by 1843 Christy & Co. was the largest hat and cap manufacturer in the world, with 3000 people employed at their Hillgate works alone. The company also built their own specialised factory in Droylsden in 1835 that represented the peak of hand felt hat production.[8] The main factory buildings contained the bowing, planking and dyeing processes with an extensive warehouse range and 50 cottages to house domestic workers undertaking the trimming and finishing of the hats. This pioneering attempt to concentrate all the production processes on a large scale on one site was unsuccessful and William Christy converted the buildings for making towels in 1837, a failure that has been attributed in part to the reluctance of the local handloom weavers to take up hatting in the wake of a depression of the felt hat trade.[9]

Denton and to a lesser extent Hyde rose to dominate the national felt hat-making trade during the 1860s and 1870s as the district turned to increased mechanisation to recover from the trade depression.[10] The demise of the cottage-based industry in favour of powered works where all of the production processes could be carried out on a single site required a new type of specialised factory to be developed. The result typically comprised a range of single-storey buildings used for the 'wet-end' processes of preparation, forming, felting, proofing and dyeing, and multi-storey ranges for shaping, trimming, finishing and warehousing, together with buildings for the steam-power plant.[11]

Despite the former importance and extent of the industry, very few hat works survive intact in the Stockport area, although several redundant works have been investigated archaeologically (Figure 1). The earliest of these was the site of a hat works on Deansgate in Manchester that had been established before 1740 by the Bower family, the most prominent of Manchester's 18th-century master hatters.[12] An archaeological excavation in 2002 uncovered the foundations of two multi-storey buildings and a possible dyeing house that dated to the early 18th century, together with a brick-built circular structure with a diameter of *c.* 2.4m that had probably been used to heat a dye vat into which partially finished hats were dipped. The remains of a planking room that had been added to the works were also identified, representing an expansion in the later 18th century and an early step towards creating an integrated hat works.[13]

The site of an early 19th-century hat works that similarly comprised two multi-storey buildings and a workshop range was

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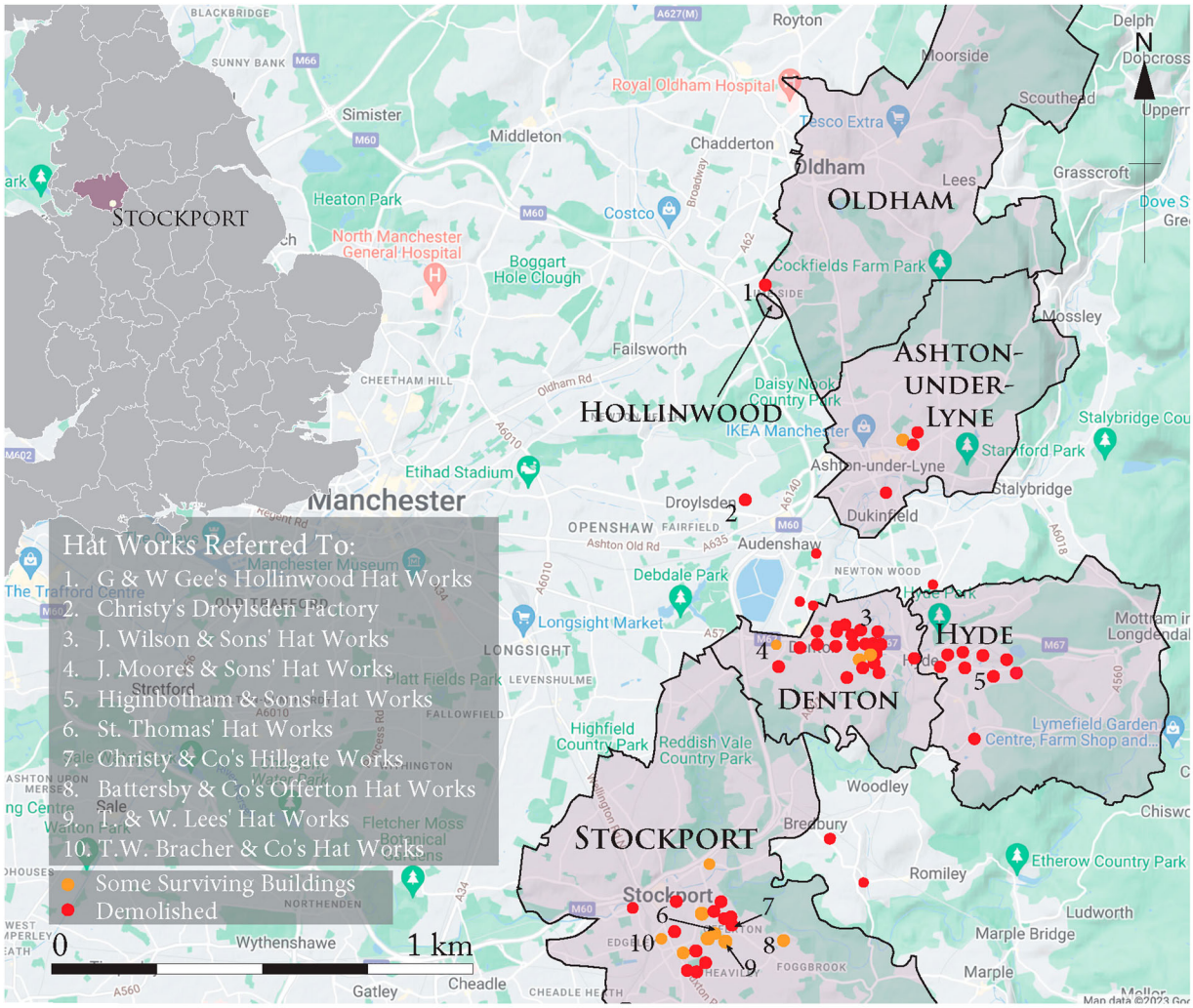

Figure 1. Location of Stockport and the sites of the principal 19th-century hat works in the area (© University of Salford).

targeted for research and excavation in 2020 ahead of a residential development in the Hollinwood area of Oldham. This yielded evidence that charted the development of the site from a cottage industry at the start of the 19th century to an integrated factory fitted with steam power in the early 1840s.[14] Several good examples of hat works that derived from the resurgence of the industry in the early 1870s have also been surveyed in advance of development schemes in Stockport, Denton and Hyde.[15] In 2019, planning consent was obtained from Stockport Council for the redevelopment of the redundant Offerton Hat Works. Dating to 1886 and considered at that time to be a state-of-the-art 'model factory', the Offerton Hat Works was recorded archaeologically prior to the onset of any development works, which allowed for the conversion of two of the most significant buildings but necessitated the demolition of a suite of the single-storey processing sheds to the rear. A three-dimensional survey of all the component buildings was carried out, coupled with monitoring during demolition and targeted excavation of key elements.[16] The detailed archaeological studies of these various sites chart the development and progress of hat manufacturing in the Stockport area and provide a microcosm of a hugely important historic industry.

Background to Felt Hat Making in Britain

The production and trade of felt hats in London and the ports of Chester and Bristol during the 17th century was controlled and dominated by the guild system.[17] These early centres of the felt hat trade relied on the ports for the importation of the raw materials such as furs and beaver pelts. Whilst beaver fur was naturally waterproof, it was possible to make coarser grades of felted hat from rabbit fur or wool that was commonly available. The production of these cheaper types of felted hat was well suited to more scattered centres of production in the late 17th and early 18th centuries, where the raw materials for making hats could be gathered from the surrounding agricultural land, and the domestic production used to supplement the income of the tenant farmers.[18] This type of cottage industry of seasonal farmer-cum-hat maker was common in north-west England, especially around Stockport.[19]

There was further development of regional production centres in the 1750s following the lifting of the ban on finishing London hats in the regions, and a loosening of restrictions on the training of journeymen hatters.[20] After this time much of the manufacture of the initial hat body moved to north-east Cheshire and Lancashire. As the hat-makers' guilds did not operate in these areas, a trained journeyman hatter having served his apprenticeship could set up a hatting shop and fix his own prices, which ultimately enabled the district to become the most important hat-manufacturing centre in the country.

The process of making a felt hat remained fundamentally the same from the 16th century through to mechanisation in the later 19th century. Fur was sought that would 'felt' together when heat and friction were applied to the fibres, making the scaly coating of the hairs mesh. Beaver fur felted particularly well but became prohibitively expensive and increasingly reserved for only the finest of hats, with rabbit or hare fur becoming the principal material used in the British hatting industry due to its availability and low cost.

The animal was first skinned and any coarse outer hair was removed by hand. The fur was then treated with mercuric nitrate that helped to break down the keratin and made the fibres felt more easily. The process was known as 'carroting' as it gave the fur a reddish-yellow tint and sometimes resulted in mercury poisoning amongst the workers, leading to symptoms including tremors, loss of memory, hallucinations and mental derangement, and was the basis of the saying 'as mad as a hatter'.[21] The fur was then carded with small wire brushes to separate the fibres and weighed into the individual parcels required for each hat.

The treated and sorted fur was next taken to a workshop, often a two-storey building known as a bow garret, where it was subject to 'bowing'. This required the fur to be spread out on a table of slatted wood known as a hurdle, placed beneath a bow suspended from the ceiling by a cord (Figure 2). The bow was typically around 1.8m to 2.1m long, with cat gut stretched between its ends. It was held horizontally over the fibres and plucked with a wooden bow-stick to scatter the fibres, allowing any dirt to fall through the gaps in the hurdle and, more importantly, allowing the fibres to settle in an even layer. Creating layers of fur in the correct proportions was a skilled process and required the extra daylight afforded by the upper-storey workshop. The layers were overlayed with a damp linen cloth and a dry, half-tanned horse hide and gently rubbed to interlace the fibres, creating a 'bat' of loose fur. Two bats were pressed and rolled together to form a conical body, which was then heated and compressed to prepare it for planking.[22]

Planking was the name given to the process of shrinking and hardening the conical bodies to form a 'hood'. This typically took place on the ground floor of the bow garret or dedicated planking shop where a large copper or iron cauldron known as a planking kettle was surrounded by sloped wooden planks (Figure 2). A solution of water, sulphuric acid and oatmeal in the kettle was heated to around boiling point. The conical bats were dipped repeatedly into the liquid and rolled with a wooden pin on the inclined planks to mat the fibres together and manipulate them to the desired size and thickness. Prolonged contact with the hot acidic liquid would naturally have a detrimental effect on the skin of the planker's hands, despite using leather or wooden palm guards. A bucket of cold water was often placed next to the each planker so they could cool their hands after they had plunged them into the boiling solution. The process of shrinking and hardening a hood to the appropriate size could take four or five hours of repeated dipping, realigning and rolling.[23]

The planked and settled hoods had the recognisable form of a hat and were ready for shaping. The hoods were stretched tightly over a cylindrical wooden block corresponding to the required style of hat, where they were pulled, pressed, cut and ironed in a process referred to as blocking. The finishing processes including burnishing to produce a polished exterior surface, dyeing to the desired colour and treating with a steam application of a proofing or stiffening agent that sealed the fabric and fixed the final shape of the hat. The final stage involved lining the inside of the hat and adding any external trimmings, according to the style and fashion of day. Not all of these processes necessarily occurred within a single works, reflecting the semi-domestic character of the industry with a master hatter distributing fur for bowing and planking to nearby domestic premises, which could then be returned for dyeing, stiffening and finishing.[24]

The various processes of felt hat making continued to be carried out largely by hand throughout the first half of the 19th century, although steam-powered blowers were being used to sort the fur and collect the finer strands as early as 1821. Felt-forming machines were developed in North America during the 1830s, but their uptake to replace the skilled process of bowing was slower in Britain, possibly due to doubts about the comparative quality of the hoods produced (Figure 3).[25]

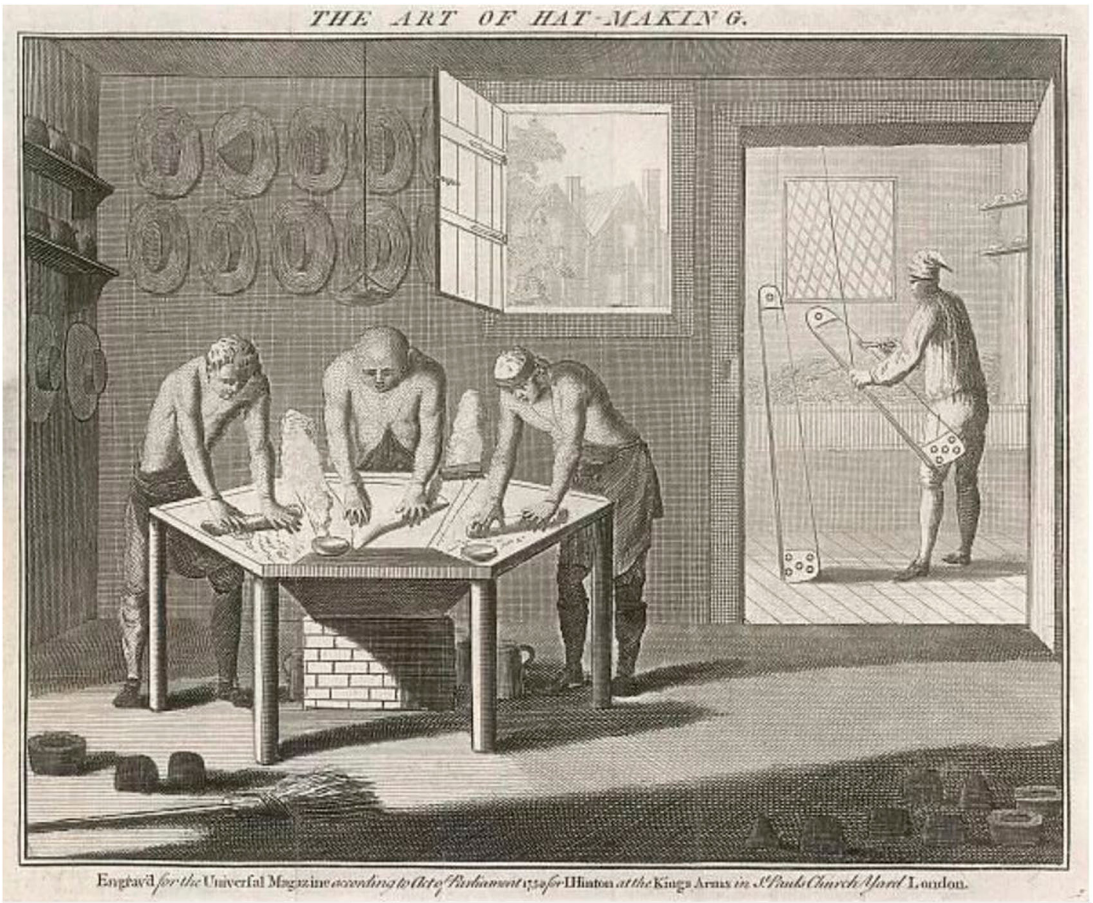

Figure 2. The planking process in the mid-18th century, showing the bow and hurdle to the rear (reproduced from the *Universal Magazine*).

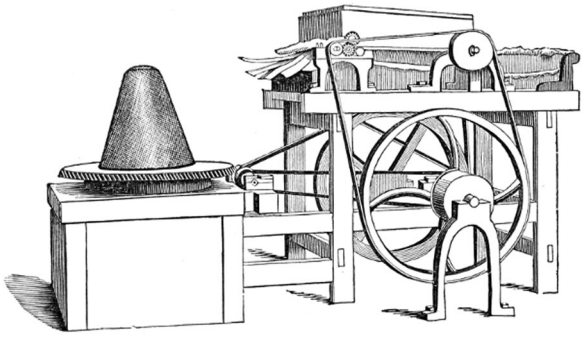

Figure 3. A steam-powered forming machine for fur hat bodies of a type patented in the 1860s (reproduced from Thomson 1868).

The labour-intensive planking process was also difficult to reproduce mechanically to the same standard. Christy & Co. pioneered the way in Britain by introducing the first rolling machines in 1856 in an attempt make the process more efficient at scale, but again the quality of hoods it produced was thought to be substandard. A multi-roller developed in Belgium in the 1860s was more successful in mimicking the planking process by introducing two sets of rollers that rotated and oscillated laterally at the same time. The rollers could also work in two directions, returning the hood to the front of the machine and therefore only needing one operator.[26] The proofing and dyeing stages also benefited from improvement in mechanisation and development of new chemicals during the later 19th century.

An array of belt-driven mechanical aids were introduced from the 1850s onwards to manipulate the hat body into the desired shape, including blocking machines, brim breakers, tip stretchers, hydraulic crown presses, hydraulic curling machines and flanging machines to give the hat the final shaping.[27] The final trimming stage could not be adequately replicated by a machine but the development of specialist sewing machines by companies such as Singer aided the skilled workers in producing high-quality hats ready for sale. These technological developments culminated in the replacement of the traditional bow garret with the mechanised factory that housed all the manufacturing processes on a single site. The scale of the late 19th-century industry also stimulated the growth of ancillary trades locally, including engineering works that specialised in hatting machinery and factories that produced hat boxes.

An Early 19th-Century Example: G. & W. Gee's Hat Works, Hollinwood

Hollinwood on the outskirts of Oldham became known in the early 19th century for the dyeing and finishing of hat bodies made elsewhere. This reputation was gained largely by James Gee, a hatter who had learnt his trade in his native Ashton-under-Lyne, moved to Hollinwood in 1806 and founded the firm of Gee, Mellor, Kershaw & Co., considered to be one of the 'principal specialised dyers and finishers of fancy coloured hats and bonnets in the country, with a particular expertise in the finishing of silk hats'.[28] The firm's works occupied a prime location in Hollinwood, adjacent to the main Manchester to Oldham road and the Hollinwood branch of the Manchester and Ashton-under-Lyne Canal. The partnership was dissolved following the death of James Gee in 1829 and the firm passed to his sons George and William Gee.

The Hollinwood works was advertised for let in June 1839 and was described as two narrow buildings of two and three storeys placed in the vicinity of 'a very excellent spring in the ground, which is celebrated for its properties in dyeing'. It was made clear that the premises were not fitted with a steam engine.[29] It is not known if the buildings were actually let but George and William Gee erected a larger factory immediately to the south of the original premises during the early 1840s, as shown on the Ordnance Survey map of 1848 (Figure 4). The map shows two parallel, narrow buildings that presumably represent the original works, together with the new factory to the south and a long linear

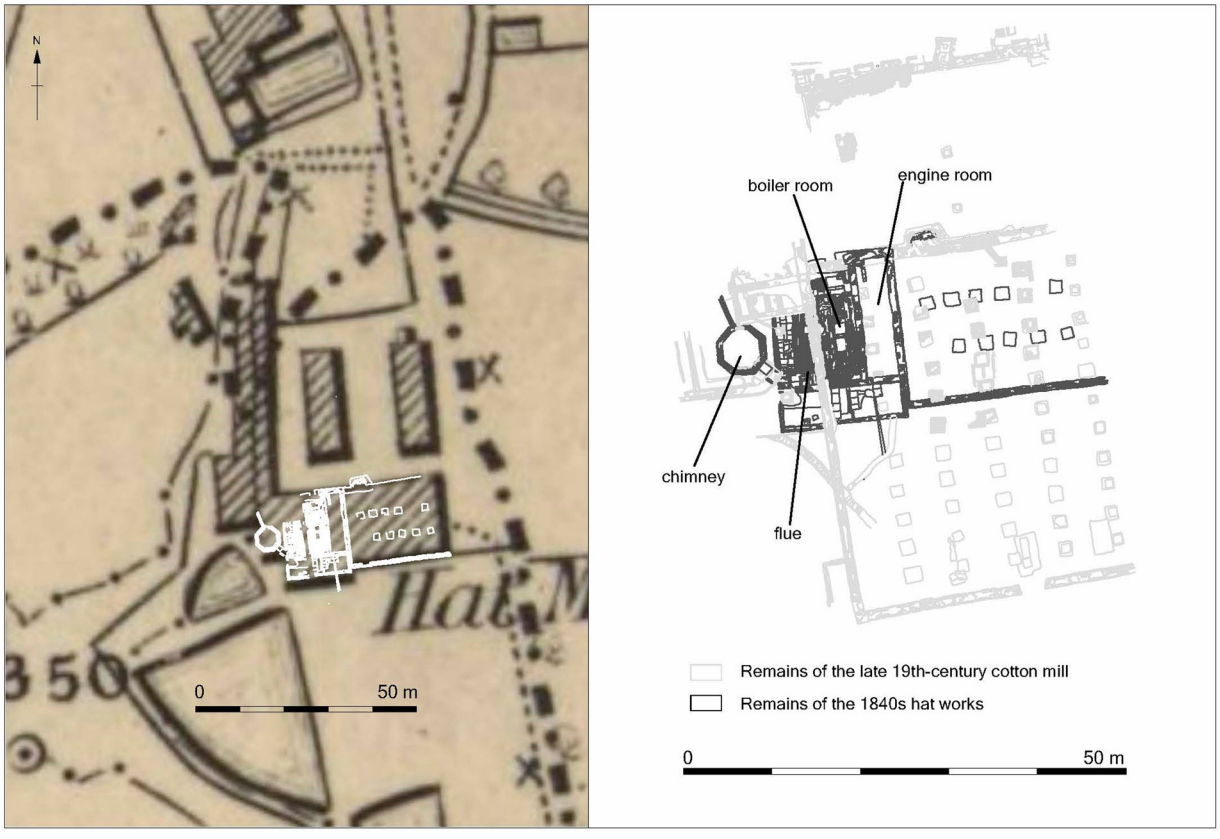

Figure 4. Plan of the excavated remains of George and William Gee's hat works in Hollinwood, with an extract from the Ordnance Survey 1st Edition 6" (inch): 1 mile map of 1848.

range forming the western side of the works that may have been Bents Farm that is recorded in this location on the Failsworth tithe map of 1845. Little is known about Bents Farm but the 1841 Census records that it was occupied by a family of silk weavers, with William Smithurst as the head. No documents have been found that demonstrate the Smithursts had been weaving silk for the Gees' hat business, but this certainly seems likely. It also seems likely from the archaeological evidence that the building was integrated into the Gees' new hat works in the 1840s. Significantly, the excavation demonstrated that the works had been fitted with steam-power plant, suggesting an early application of machinery to at least part of the hatting process.

The business continued until the 1870s when the Gees' extensive Hollinwood estate was put up for auction. This included a public house, numerous workers' cottages, Lime House and 'a mill or manufactory, formerly used as a hat works with a dwelling house at Hollinwood'.[30] Following the sale, the works was repurposed as a cotton mill known as Lime Mill, which operated until 1934 and was finally demolished in 2001.[31]

Archaeological Excavation

The site of the former hat works was excavated by Wardell Armstrong in 2020. The construction of Lime Mill in the late 19th century had evidently removed all physical trace of the two narrow buildings that probably housed the dyeing and finishing departments of the cottage-based phase of the hat works, but the remains of the 1840s factory were represented by the brick-built foundations of a broadly rectangular building. The eastern part was dominated by a large working floor that retained very few original features or fixtures to betray its intended use, although evidence for two rows of columns were identified, implying that the building had been at least two storeys high (Figure 4). A narrow room adjacent to the working area in the eastern part of the building measured 13.5m by 3.5m with the floor at a lower level than the adjacent rooms. Whilst no internal features survived other than the remains of a brick-built stairwell in the north-western corner, it seems likely that this room had been intended to house a steam engine that provided power to the working areas. The substantial build of the partition between this room and the working floor to the east suggested that it may have been intended as a gearing wall for the engine.

The remains of a boiler house were excavated adjacent to the engine house, and demonstrated that it had contained a single boiler than was charged at the northern end with a flue at the southern end (Figure 4). Yorkstone slabs had been used for the floor of the charging area, with small patches in hand-made brick representing *ad hoc* repairs. The setting for the boiler was 9m long, 4.1m wide and built largely of hand-made brick with shaped refractory blocks being used to support the boiler.

The 0.89m-wide flue at the southern end of the boiler room extended westwards to an octagonal chimney that had an internal diameter of 4.1m. The foundations of the chimney were of hand-made bricks with an internal lining of refractory bricks. Archaeological evidence suggested that this chimney had been retained when the site was redeveloped as Lime Mill in 1874.[32]

The Mechanised Factories of the 1870s

The felt hat industry began to embrace mechanised factory-based production in the 1860s and a new type of industrial building emerged in townscapes around Stockport. Several good examples of hat works that were established during this key period of the industry have been subject to archaeological survey in Stockport, Denton and Hyde, usually in advance of redevelopment, allowing their 19th-century form to be recorded.

Higinbotham & Sons Hat Works, Hyde

As production at the Gee brothers' hat works was drawing to a close in the early 1870s, James Higinbotham opened one of the first mechanised felt hat factories in Hyde, situated at the junction of Mount Street and Thomas Street. Higinbotham began his working life as an apprentice planker for Christy's in Stockport but had moved to Hyde with his family by 1844. The family established a successful grocery business that James inherited, placing him in a position to open his own hat factory in the early 1870s. The styles and fashions of felt hats were changeable and fast-moving, and James Higinbotham & Sons tried to stay ahead of the trends by employing new techniques and designs, including patenting their own design of hat tip in 1885. James Higinbotham was acknowledged as one of the leading hat manufacturers in Hyde by the time of his death in 1887, when the business passed to his sons.[33] At the beginning of the 20th century the firm opened premises in Luton, the main centre of the straw hat industry, diversifying into the production of straw hats alongside their established range of felt hats.[34] Access to these two markets helped Higinbotham & Sons to weather the downturn in demand for hats following the First World War, although they appear to have ceased trading by the 1940s.

The historic building survey undertaken prior to demolition in 2020 concluded that the sole remnant of the first phase of the factory was a three-storey block at the corner of Mount Street and Thomas Street (Figure 5). The remains of a chimney were enclosed in the east corner of the building and clearly demonstrated the provision of an internal power source from its initial construction. The lack of window and door apertures at the lower levels of the north-east gable wall implied that the steam engine and boiler had been placed against the wall. Bearing boxes were located in the centre of the two gable walls with a row of columns incorporating line shaft brackets aligned down the centre of the room, suggesting that power from a horizontal steam engine was transferred by a primary motion shaft via a belt-driven pulley wheel. There was no indication of a bevel gear mounting for an upright shaft, suggesting that power was only supplied to the ground floor where it may have driven machinery for the initial fur preparation, such as a blending drum or a blower to aid the initial sorting of the fur.

The original wet-end sheds were remodelled during an expansion of the works that followed the death of James Higinbotham in 1887. A larger boiler house was also created on the ground floor of a new two-storey extension to the south-east. The boiler house had space to contain two boilers, probably of the Lancashire type, and had a strong fireproof ceiling of brick arches allowing a floor to be safely included above. Infilled arches within the end wall implied that the boilers were charged from the courtyard to the west with flues to the rear linking to a new and taller cylindrical chimney to east of the main block. Apertures in the side wall of the boiler room were probably intended to house pipes carrying steam to some of the wet-end processes that occupied the long adjacent ground-floor room and required a supply of boiling water and steam. A bearing box identified immediately adjacent to the external west wall indicated that a powered line shaft had also extended into the room.

Several new structures were also built on the southern side of Thomas Street in the late 19th century, subsuming the eastern end of the street that formed a central courtyard to the enlarged works. Two of these buildings survived at the time of the survey in 2020, comprising the lower two floors of what had been a three-storey range along Mount Street and a single-storey shed to the east. The latter would have housed some of the wet-end preparatory processes, whilst the three-storey building had provided well-lit rooms for finishing processes, with no evidence for mechanical power having been employed.

Figure 5. Three-storey block dating to the early 1870s at Higinbotham & Sons Hat Works in Hyde (© University of Salford)

Other Examples

Other good examples of hat factories from this period include St Thomas' Hat Works in Stockport, established in 1872 and converted into residential apartments in 2007. An archaeological survey carried out by the University of Manchester Archaeological Unit prior to redevelopment recorded an arrangement of two three-storey buildings (plus basement to each) of brick construction that housed the hat trimming and finishing processes and were linked by a footbridge. A range of single-storey workshops to the rear once housed the wet-end processes, whilst a two-storey range forming the western side of the works was a warehouse. Evidence for a boiler house, engine house and associated chimney was also recorded.[35]

Joseph Wilson & Sons Hat Works in Denton, built in 1872, provides another good example of an early mechanised hat works that was extended and substantially enlarged during the late 19th and early 20th centuries to become one of the largest felt hat factories in the world.[36] It was also the last hat works in Denton to remain in production and its closure in 1980 signalled the end of the town's illustrious association with the felt hat industry that had spanned more than two centuries. A survey of the works in 2003 prior to its demolition recorded a suite of buildings including a three-storey, five-bay block that was erected in 1872 and represented the earliest surviving component of the hat works. It was brick built with open wooden floors supported by cast-iron columns and may have been used for hat trimming. Another three-storey block of seven by two bays had been built along Wilton Street by 1892, probably for hat finishing. This abutted the southern gable of the 1872 factory, and each floor was open, with the wooden floors being supported by cast-iron columns. A series of one- and two-storey workshops had also been added to the works by the early 1890s, including a probable engine and boiler house, presumably representing an increased capacity of the wet-end processes. The largest expansion of the hat works, however, was delivered in three related but separated phases between 1908 and 1922, which saw a long four-storey building erected along the Wilton Street frontage and a two-storey electric power house added to the north-eastern corner of the works.[37]

The Model Factory: Battersby's Offerton Hat Works

Like James Higinbotham before him, William Battersby (1839–1915) began his hatting career with Christy & Co. in Stockport. By the early 1860s William had established himself as a warehouseman of high repute at the company's Hillgate Works and had come to the attention of the owner, Edmund Christy. In recognition of his potential, he was seconded to Christy's factory in Bermondsey to study the manufacturing process and business set up. Whilst working there, William became engaged to Mary Oldham, who worked in the trimming department. It was the clash of their planned wedding date with a fact-finding trip to America with Edmund Christy that is said to have led to a falling out between the men, resulting in William leaving the firm.[38]

After a short time at Shelmerdine's, a rival Stockport hatting firm, Battersby entered a partnership to start his own hatting venture with an intention of making hats of the highest quality, which would return a greater profit margin than hats that furnished the lower end of the market. The new Stockport hatting company was styled F. Woodhams & Co., after the principal investor, though in actuality the business was entirely the endeavour of William and Mary Battersby. Their first premises was an old military barracks on Hall Street where they commenced work in 1864 with a staff of around two dozen. Amongst the early employees were skilled workers for each of the hat-making processes including proofers, blockers, dyers, pressers, finishers and trimmers, several of whom were related to William and his wife. There were no machines or facilities for planking in their first factory, which was done offsite by cottage-based contract workers.[39]

The business had outgrown the old barracks by 1868 and production was moved to a former cotton mill a short distance away on Hopes Carr in Stockport, where Battersby continued to gain a

reputation as a manufacturer of high-quality hats. When his business arrangement with Woodham came to an end in 1872 Battersby formed a new company named MacQueen, Battersby & Mead, wherein William Battersby continued to produce his high-quality hats, Mead managed the Stockport warehouse and James MacQueen took charge of marketing and selling the product in London and the south of England. The business prospered throughout the 1870s under this arrangement, winning medals for their hats at the Vienna International Exhibition in 1873 and the Paris Exhibition in 1878.[40] The success of the company enabled William and Mary Battersby to build a new house more fitting their social standing and growing family. The house was named Strathclyde and was located on Offerton Lane on the outskirts of Stockport, just to the west of farmland that would soon accommodate Battersby's new purpose-built hat factory under the name of Battersby & Co.

The Offerton Hat Works was completed in 1886 and heralded by the *Hatter's Gazette* of that year as 'a model factory … designed for the conduct of an extensive manufacture under the most convenient conditions'.[41] The vast red-brick site consisted of a long, three-storey range along Hempshaw Lane that housed the offices, finishing rooms and warehouse, concealing numerous single-storey sheds behind, which dealt with the wet-end processes. The works was powered by a horizontal steam engine that bore a nameplate reading 'Mary' in recognition of the founder's wife. A bank of boilers required to generate steam for the engine and the processes of forming felt can be seen in the central yard adjacent to the engine house on a stylised illustration for the works from 1897 (Figure 6). By that date, the works provided employment for around 1000 people.

A hat bearing a London label was always desirable for the international market and Battersby's had their own warehouse and a showroom in the capital by the close of the 19th century. The firm expanded operations to a factory in Conty in northern France in 1906, allowing much easier access to the continental market and the fashionable shops of Paris, just 96km away.[42] In the same year disaster struck the Offerton Hat Works when overnight on 22 May a fire spread rapidly through the finishing rooms from an office fireplace.[43] The fire caused £30,000 worth of damage, yet the building was repaired, albeit with the complete loss of the upper storey, and production was restarted within just four weeks. Another devastating fire broke out in a new packing warehouse range in 1912, causing damage that was estimated to be £10,000.[44] This led to the construction of a distinctive water tower over the main entrance that held 4000 gallons of water and was emblazoned with 'Battersby's Hats' and a large 'B'. This became a local landmark and is featured in an early 20th-century engraving of the works (Figure 7).

William Battersby died in 1915, 50 years after he had started making hats at the old barracks. As a magistrate and local councillor his obituary called him a 'Captain of Industry … who did much to extend throughout the world the name and fame of Stockport as a hat manufacturing centre'.[45] The business continued under the management of his eldest son Willian Norfolk Battersby, who ensured that each new generation of Battersby spent time during the inter-war years learning the family trade in the works.

The 1950s and 1960s were a challenging time for the hat industry. 'Hatlessness' was a generational phenomenon as clothing became less formal and hats were seen as being of the older generation. In 1965, 101 years after William Battersby founded the company, Battersby & Co. merged with several other surviving Stockport hat companies, including Christy & Co., J. Moores & Sons, Joseph Wilson and T. & W. Lees, to form Associated British Hat Manufacturers (ABHM). Despite the Offerton Works being larger and more modern, Christy's Hillgate Works was chosen as the site for the new company. The Offerton Works briefly housed the Stockport hat museum prior to its permanent move to Wellington Mill in 2000, and was then subdivided into industrial units. The works was assessed by English Heritage for designation in 2009 as part of a strategic project that focused on listing within Stockport, but it was concluded that the buildings did not provide special interest in a national context and was therefore not recommended for listing. In 2020 the site was partially cleared to facilitate housing, retaining the distinctive range along Hempshaw Lane and the iconic water tower. The Battersby family home, Strathclyde, was sold to Stockport Council in 1932, where it is still in use as social housing.

Archaeological Survey

The purpose-built hat works covered 2.9 hectares and comprised a network of over 30 adjoined buildings that made it one of the

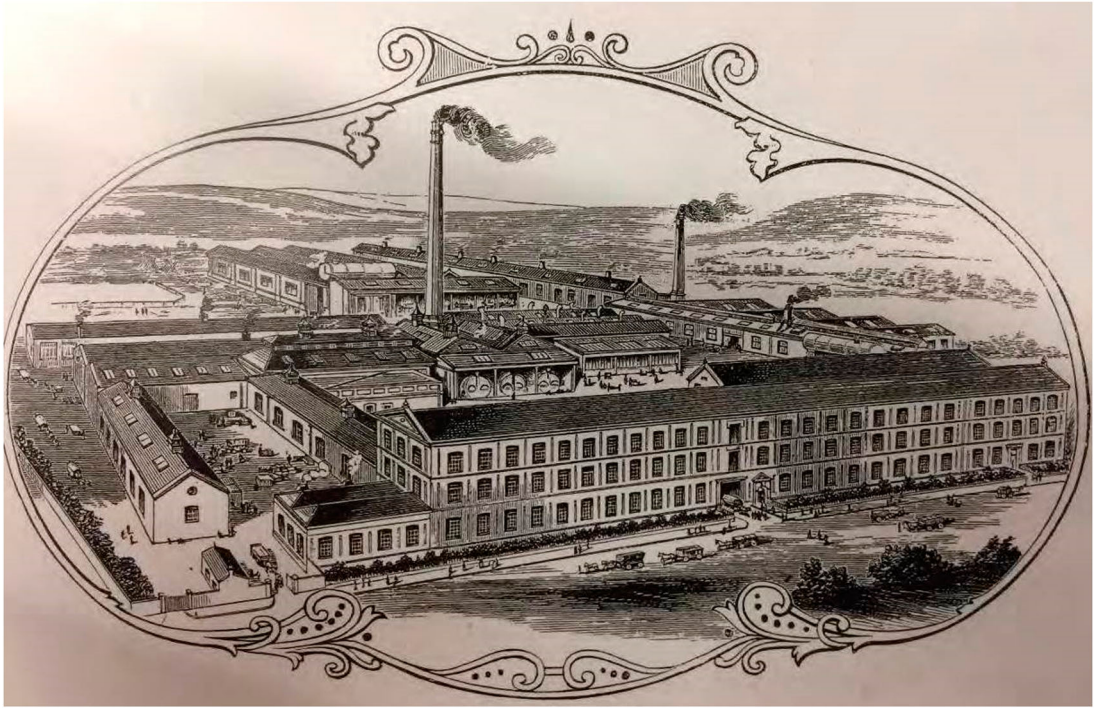

Figure 6. A stylised engraving of Battersby's Offerton Hat Works featured in an advertisement of 1897 (reproduced from McKnight, *Stockport Hatting*).

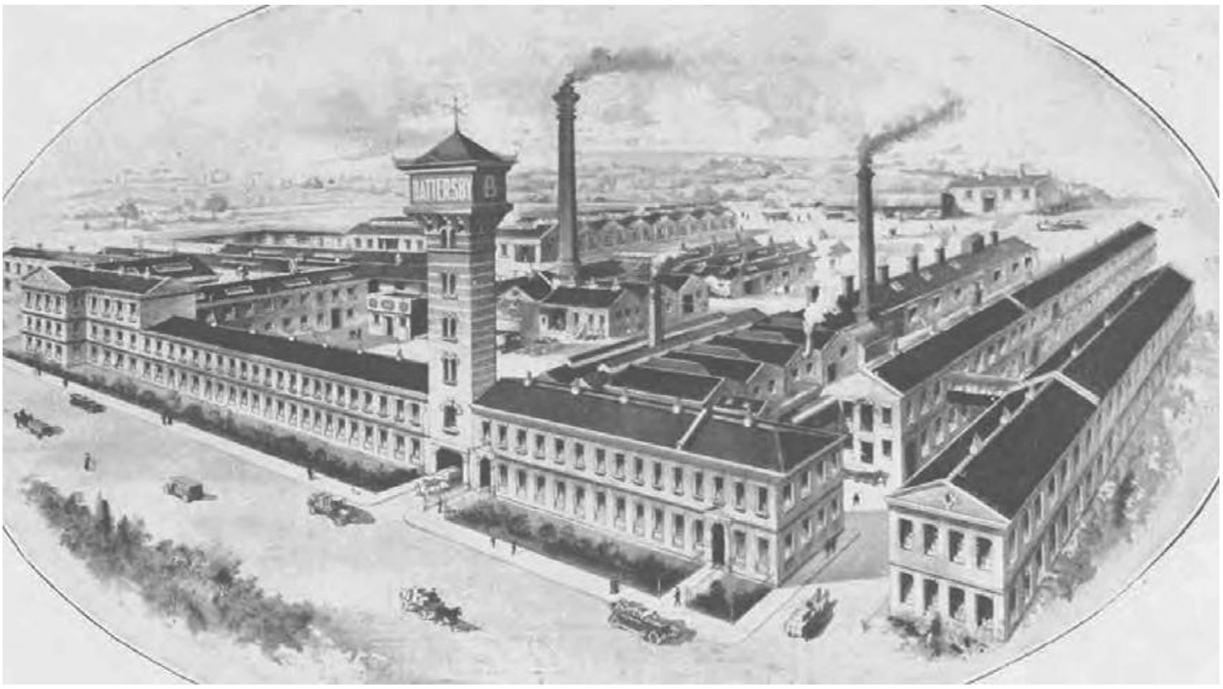

Figure 7. A stylised engraving Battersby's Offerton Hat Works from a letterhead of *c.* 1922 (private collection).

most complete mechanised hat works to survive in the district. The archaeological survey carried out between May 2019 and February 2020 enabled a comprehensive photographic and written record to be made of each building alongside a 3D laser scan of the entire complex to aid in the production of accurate drawings.

A sequence of developmental phases representing the evolution of the hat works from its initial completion in 1886 to its ultimate closure in the late 1960s were identified during the survey (Figure 8). The principal facade to the works comprised a two-storey, 21-bay range of red brick that spanned 60m along Hempshaw Lane. This housed the trimming and finishing departments and incorporated the main entrance at the centre (Figure 9). Each of the bays on the upper floor contained a nine-light window to maximise the daylight into the long internal rooms to facilitate the trimming and finishing processes. The building had been extended to west by 1906 and a new office added to

Figure 8. Plan showing the layout and chronological development of Battersby's Offerton Hat Works (© University of Salford).

the eastern end. A two-storey warehouse was also added to the eastern side of the works by the turn of the century to cope with the increased production.

The main trimming and finishing range was three storeys high when constructed in 1886, but damage sustained during the fire of 1906 resulted in the upper floor being removed and a new roof built at a lower level to expediate the return to production. Further alterations followed the warehouse fire of 1912 when the 20m-high water tower was added atop the entrance as a precaution against future fires (Figure 9).

Indications of the functions of individual buildings can be attained from a series of photographs taken during a tour of the works in 1910. One such photo depicts the 'stiff hat curling and trimming department' that can be identified as the upper floor of the finishing range to the west of the entrance, showing a new, lower timber roof that had been fitted following the fire of 1906. The historic image shows men stationed along the south wall working on the brims, whilst women are seated at tables against the north wall, trimming and stitching the almost finished hats (Figure 10). Self-closing safety doors noted during the survey between the rooms will have been installed as a precaution to stop the potential spread of fire between the departments. Similarly, the 'soft felt trimming room' can be located to the top floor of the west extension to the main finishing block. The historic image captures female workers adding the trimmings to the almost completed felt hats by hand, ready for them to be sent to the warehouse for packing by way of a service lift, which had been blocked by the time of the survey (Figure 11).

Although many of the finishing processes were still carried out manually by skilled hat makers throughout the life of the works, several of the latest time-saving machines were also known to be used. A photographic inventory of the machines ruined during the fire of 1906 and their replacements was compiled before they were fitted into the refurbished range and featured a fire-damaged crown finishing machine, a stimping machine, a tip-stitcher and a brim-making machine.

The steam-power plant for the hat works was located in the central courtyard, between the finishing ranges and the single-storey sheds that housed the wet-end processes. The engine house was converted to use as an electrical substation following the removal of the horizontal steam engine in 1936; the stone engine beds sealed beneath a concrete floor were excavated and recorded during the archaeological survey. The water required by the engine was drawn from a cast-iron tank situated atop the engine house, which survived *in situ* and displayed the date of 1886 and the name of the fabricators — Victoria Engineering Co. Limited, Stockport (Figure 12). The remnants of the boiler house and a bank of three Lancashire boilers shown facing the main works entrance on an engraving of the works from 1897 were represented by the stump of the original brick-built chimney. This comprised a square plinth constructed in a three-course English Garden Wall bond and a dentil cornice that was beneath a concave ashlar sandstone stringcourse (Figure 13).

All the wet-end processing was undertaken in the single-storey buildings to the rear of the finishing ranges, arranged around the central courtyard and close to the engine and boilers houses so the steam, hot water and power could be supplied directly to the workshops. Cast-iron columns with attached line shaft brackets were recorded during the archaeological survey in a building to the west of the engine and boiler houses. These corresponded closely to another photograph taken on the tour of the works in 1910, which shows scores of men gathered around planking kettles (Figure 14). The plankers often wore wooden clogs and are shown standing on raised wooden pallets to keep their feet out of any corrosive liquid spilt from the kettles. Mechanised multi-rollers are also visible, powered by belts attached to the various line shafts running beneath the ceiling and attached to the columns recorded during the archaeological survey.

A pressure-dyeing machine was designed and built at the factory in the 1920s by the works manager, Arthur Lee, which was said to have given Battersby 'a level of quality and consistency above and beyond the rest of the industry'.[46] A large quantity of

Figure 9. General view of the principal facade of Battersby's Offerton Hat Works (© University of Salford).

Figure 10. The stiff hat curling and trimming department in *c.* 1910 (© Stockport Local Heritage Library) superimposed on a view across the upper floor of trimming and finishing range in 2022 (© University of Salford).

Figure 11. The soft felt trimming room in *c.* 1910 (© Stockport Local Heritage Library) superimposed on a view across the upper floor at the western end of the finishing range in 2022 (© University of Salford).

Figure 12. The original cast-iron water tank atop the altered engine house (© University of Salford).

hoods were held open on a non-corrosive brass frame whilst the dye circulated evenly around them rather than them being agitated around a vat in a washing-machine motion. It is possible

Figure 13. The surviving stump of the chimney (© University of Salford).

that this innovation contributed to the expansion of the works in the form of a large open-plan building with a corrugated roof that was erected on the north side of the site in the 1920s. Additional two-storey warehouses were also added to the eastern periphery during this period, together with an additional wet-end processing shed that comprised a distinctive double-pitch north-light roof (Figure 15). The sharp decline of the industry, however, was reflected in there being only minor additions and alterations to the work from the 1950s until its eventual closure in 1967.

Discussion

The emergence of felt hat works in the 19th century as an industrial monument type can be broken down into three broad developmental stages. The manufacture of felt hats remained a cottage-based industry during the early 19th century, with the various processes often being carried out at different sites. Fur preparation and the forming of hat bodies was usually undertaken in a bow garret and then sent on to a separate planking shop to produce the rough hat body. The final processes of proofing, dyeing, shaping and trimming may have then gone to a central multi-storey finishing works, which incorporated a warehouse for the storage and distribution of the finished hats. The dyeing and finishing works of Gee, Mellor, Kershaw and Co., first established in the early 19th century, falls into this bracket. Although the excavation did not uncover any surviving physical remains of the early dyeing and finishing works, substantial remains from the later premises attested to the transition to steam power that facilitated the gradual adoption of mechanisation from the 1830s onwards. The presence of an engine house, boiler house and chimney within the early 1840s factory confirms that the Gees had incorporated some level of mechanisation into their new works. Pigot and Slater's trade directory for 1841 describes their firm as hat manufactures and dealers in hatters' furs and trimmings.[47] Fur-cutting machines that could rapidly and precisely cut the fur away from the pelt were in use at Christy's works in Bermondsey by the

Figure 14. The planking shop at Battersby's Offerton Hat Works in *c.* 1910 (© Stockport Local Heritage Library).

early 1840s.[48] The machines had a broad blade with a downwards cutting edged that chopped rapidly whilst allowing enough precision that the fur could be removed without cutting the skin. It is likely, however, that the majority of the preparatory stages of the hat-production process at the Gees' factory would have continued to be performed offsite by the skilled local workforce with the finishing largely carried out by hand in the factory up until its closure in 1874.

The introduction of mechanised forms of felt hat production led to a re-organisation of the production processes and provided an opportunity for the different stages to be concentrated on a single site. The first phase of these types of factories date to the period from 1860 to the early 1880s when small-scale two- or three-storey works encompassed parts, but not necessarily all, of the newly mechanised processes. James Higinbotham's works in Hyde, together with St Thomas' in Stockport and Wilson's in Denton, provide good examples of this emerging type of hat works, which utilised mechanised processes in sorting, planking and forming to streamline the full range of processes from fur to felt hat.

The culmination of the development of felt hat works coincided with the peak of the industry from the mid-1880s to the gradual decline in the early 20th century and was characterised by the emergence of large factory complexes with several multi-storey blocks for warehousing and finishing accompanied by an array single-storey workshops housing the wet-end processes. Offerton Hat Works was considered a model example of this advanced type of integrated factory when it was opened in 1886, superior even to Christy's Hillgate Works, where Battersby had started his career as a warehouseman.

After the merger of Battersby & Co. with the surviving Stockport hatting firms in 1964, the Offerton Hat Works was stripped of almost all indications as to its original function, apart from during its brief use as a hat museum. Examples of the machinery

Figure 15. Aerial view of the Offerton Hat Works, showing the processing buildings to the rear of the main trimming and finishing range (© University of Salford).

known to have been used throughout its life were transferred to their permanent home at Stockport's hat museum at Wellington Mill, including the belt-driven blending drums used to sort and clean the fur as it came into the works and the vacuum fur forming chambers that replaced traditional fur bowing techniques to form a hood.

Conclusion

Stockport and its surrounding district were at the epicentre of the British felt hat industry throughout the 19th century and into the 20th century, yet little outward sign of its past importance remains in the modern townscapes. The Ward Brothers' hat works on Wellington Road South survives as a Grade II listed building and currently houses the Stockport Hat Museum, but it was built as a cotton mill in the 1830s and adapted for the manufacture of hats subsequently. More typical 19th-century hat factories, including St Thomas' Works, T.W. Bracher & Co.'s works on Royal George Street and Battersby's Offerton works, are entered on Stockport Council's local list of heritage assets although all have lost some of their original component buildings, reflecting the challenges of repurposing the wet-end processing sheds for new uses. The historic hat works of J. Moores & Sons on Heaton Street in Denton and T. & W. Lees on Adcroft Street in Stockport survive to a greater extent, but neither benefit from any formal designation.

The archaeological surveys and excavations summarised in this article have provided a comprehensive record of a range of hat works spanning much of the 19th and 20th centuries, beginning with a dedicated dyeing and finishing works that relied on the workshops of the local skilled workers and continuing to early examples of mechanised hat works in Stockport, Denton and Hyde. Battersby & Co.'s Offerton Hat Works represents the culmination of the all the developments of the hat industry its peak at the end of the 19th century, as a state-of-the-art, mechanised works where all the processes from fur to felted hat were carried out on one site. Whilst Gees' Hollinwood works and Higinbotham's Hyde works have now gone, large portions of Battersby's grand vision have been repurposed and will continue to look over Offerton as an increasingly rare testament to an industry that was fundamental to the local economy and identity in the 19th and 20th centuries.

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No potential conflict of interest was reported by the author(s).

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