Cities & Technology

(From Babylon to Singapore)

Extended Essay

Wigan

Coal Cotton and Canals

Contents

1, Introduction

This essay will attempt to analyse the impacts that major transport systems, in the main, canals and railways, had on the local coal industry which would ultimately be instrumental providing the conditions for the development of a cotton industry that would become a major player in textiles until well into the 20th century. I will endeavour to show this was due to Wigan, having the willingness to adapt to technological change. The study will concentrate on Wigan during the first half of the 18th century, A period which would dramatically alter the towns form and fabric. The advent of steam power was a significant factor in the northern industrial towns as the industries became mechanised. The canal systems allowed raw materials easy access from ports to production centres, with finished products having easy access to markets.

As rail companies harnessed the power of steam, they soon began to compete with canals for heavy freight traffic. The early years of the 18th century saw cotton mills spreading to new areas, with mechanisation making mills much less dependant on fast flowing streams and able to locate to where the transport system and raw materials were readily accessible, foe example a steam powered mill in the Wallgate area of Wigan would get its raw cotton direct from Liverpool via the canal, the coal would come directly from the pit and the water requirement would be drawn directly from the canal.

The location of Wigan on the foothills of the Pennines overlooking the Lancashire plain always made Wigan of strategic value since Roman times. But the massive coal reserves under the town would make Wigan even more important as industry mechanised. The completion of the Leeds Liverpool canal closely followed by the Leigh arm joining it with the Bridgewater canal put the Wigan coalfield at the centre of the industrial transport network. The canals would soon be in competition with the developing railways as industrial output increased. The impact of increased industrial output and the extra labour required would cause major social problems as the population increased, such as poverty, poor housing, overcrowding, public health and sanitation. Coal in was mined in Wigan from medieval times, and as early as the 1680's Wigan's cannel coal was rated as the best in England and was in great demand. The abundance of coal was to spawn a significant iron working industry in Wigan but industry in general, did not take of until the early19th century and the advent of steam

2, Transport

A, Canals

Transport could be regarded as the catalyst for Wigan's industrial transformation, although the early planning of the canal companies left much to be desired. The Douglas navigation from the Wigan Wallgate terminus to the River Ribble was planned in 1720 and completed in 1742 allowing limited access to the sea for the coal of Wigan. The Leeds Liverpool canal company, who constructed a canal from Liverpool to Newburgh, where the canal intersected the Douglas thus gaining access to Wigan, subsequently bought the River Douglas navigation as part of their ongoing plan. The Wigan section was completed in 1780 giving the town direct access to both Preston and Liverpool. The canal was completed in 1816 with the final stage linking up Wigan with the Bridgewater canal and the markets of Manchester.

Fig 1, The No 1 Wigan Pier terminus warehouse (K Scally)

Note, many passenger vessels operated from this terminus, now known as No 1 Wigan pier with services to Liverpool and Manchester, along with industrial freight.

Wigan's cannel coal was in much demand in both the domestic markets and the Dublin trade the progressive linking of the town via the canal system to the various outlets meant an increase in output, new mining technologies employed and more workers required. Other industries also prospered such as iron works and foundries from the late 1780's with coal owners manufacturing coke, and the ability to bring in ores via the canal, local firms such as Park Webb and The Haigh foundry were founded, expanded and diversified making steam engines for mills and pits and other mill machinery as the technology became available.

Railways

As the coal production increased more efficient ways of transporting coal from the pithead to the canals were required, horse drawn rail wagons were developed in the latter part of the 17th century ferrying the coal and cannel directly to the barges. These colliery wagon ways were to be the forerunners of the rail network and Wigan became a criss-cross of branch lines as the collieries sought direct routes to the canals. It is also worth noting that the locomotive the Yorkshire Horse built by Robert Dalglish in 1812 at the Haigh foundry for hauling the coal wagons from Clarke's Orrell collieries to the canal (Ref Dark satanic mills Pg 38), was possibly the first steam railway locomotive in the county. Wigan was linked to the embryonic rail network in 1832 as the Parkside branch of the Liverpool and Manchester Railway was completed giving the town total access to the lucrative markets of both those cities, and soon the town would be linked by the North Union Railway with Preston and the midlands in 1834. The first station was in Dorning Street, this was replaced by Wigan Wallgate built by the Lancashire and Yorkshire Railway

Fig 2, Wigan Wallgate Station. The red brick fronted Victorian station complete with the original cast iron canopy still serving Bolton Manchester and Southport. (K Scally)

As in most towns there was much disruption as the canals, colliery branch lines and railways came into towns demolishing precious housing as the most direct route was taken. This disruption was considered necessary as the transport infrastructure was put into place that would help transform Wigan into one of the North West's industrial boom towns

With goods and passengers coming to and from the town, via canals and railways, horse drawn omnibuses, short haul wagons and carriages were required. Therefore, the new technology increased the need for traditional transport increasing the number of horses in the town. Related trades to horses were in abundance such as blacksmiths and farrier's, stabling and horse feed suppliers. This would exacerbate the already declining public health of the town, which will be discussed later.

3, The Wigan Coalfield

The history of mining coal in Wigan went back to the 14th Century, up to the latter part of the 18th century coal mining could be described as a cottage industry, with records of Wigan's inhabitants fined by magistrates for digging mines in their yards and undermining main roads. The Bradshaighs of Haigh Hall made some serious attempts at mining and undertook some innovative projects such as the great Haigh sough (a drain to take water away from the workings some 1200 yards long) in the 17th century, 1676 to be exact. The Bradshaighs also used some of the first winding gear in the mid18th century (ref Wigan Coal & Iron Pg 9). It was really the canals exposing the Wigan coalfield to other wider markets such as Liverpool and Dublin that gave the industry the impetus to expand to the levels it reached in the mid 19th century.

As more deep coal pits were sunk in the around Wigan, there was a demand for more labour in the area this precipitated a steady rise in the town's population during the coming decades. The diversification of local business into iron trades and engineering was stimulated by steam power, the abundance of coal and the transport infrastructure. The introduction of steam power into textile production would bring that industry to the town giving the coal industry of Wigan an avaricious domestic market which would increase in the 1830's as the railways came to the town opening other markets with themselves being a prime user.

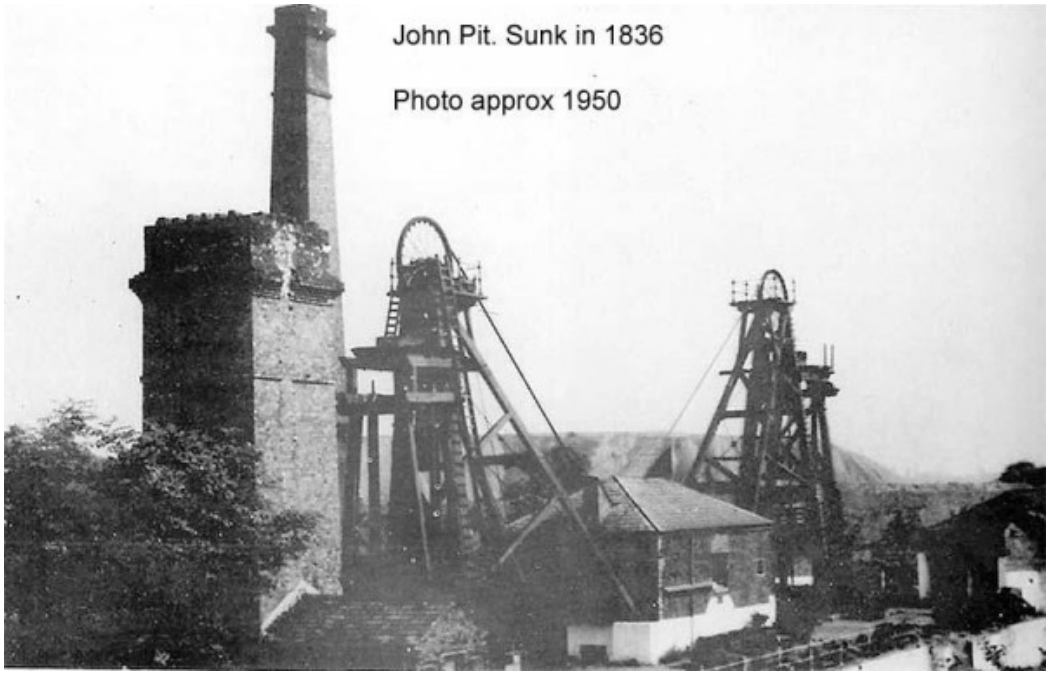

Fig 3, John Pit, Wigan lower road
Courtesy, Wigan History web site

The upsurge in mining caused a devastating impact on the landscape and ecology of the area polluting the water table, the air was filled fumes and particulates which caused health problems, trees and shrubs died because of the airborne pollution. Wigan was also involved in a social scandal reports published in 1842 cited that women, and children as young as five years old were working underground in appalling conditions. Although legislation was passed to bring women and children out of the mines and on to the surface, the practice continued in Wigan even with intervention from E W Binney of the Manchester Geological society on the governments behalf, the coal owners cited the hardships a reduction in wages would inflict on their workers families (Ref, Wigan Coal & Iron Pg 111). Later in the century children would be fully taken out of the mines and women confined to the pit brow.

Fig 4, Wigan Pit Brow Lassies Wigan history web site

The transport infrastructure of canal and then rail, although built primarily for coal gave a perfect logistical environment for another major industry to ascend in the town the cotton industry. The development of steam allowing manufacturers to build factories away from the traditional hills, building factories and manufacturing where the market was best suited for maximising profit.

4, The textile industry of Wigan, and the impacts on the towns form and fabric.

A, Cotton Production in Wigan

Geographically Wigan was on the western margin of the Lancashire cotton industry, but with Wigan becoming a rail junction in the 1830's complimenting the existing canal network, the geography of the town was no longer to the detriment of the development of a viable competitive textile industry, indeed the geography was a boost, with coal and transport having a symbiotic relationship on the local textile industry's development in the way of energy and logistics. It was said of Wigan "there coal, water and above all labour were cheaper than elsewhere in the county" low wages were a product of a low cost of living, low productivity, lack of trade union organisation and the strength of the master's associations, the tradition of family ownership remained strong (ref Cotton Mills in Greater Manchester Williams & Farnie Pg 35). The rise of Wigan's cotton industry on the back of the coal industry and canal technology could be classified as technological determinism, the available technologies and energy supplies determining the rate of progress.

As mentioned previously the textile manufacture was predominantly a cottage industry in the 18th century this was due to the lack of fast flowing streams required to drive the machinery such as the industrial 80 spindle Spinning Jenny's invented by Hargreaves and Arkwright's water frames which provided higher quality yarns. Another significant invention in spinning was the Mule invented by Samuel Crompton of Bolton. Crompton utilised ideas from both the water frame and the jenny, the mule combined the draw rollers of the water frame and the twist motion of the Spinning Jenny. Although possibly the most productive and efficient of the industrial spinning machines the mule could not be patented due to the similarities to Arkwright's machine but nevertheless was popular. Owing to the lack of waterpower most of Wigan's textile work was done in cellars below private houses, on eight spindle hand Jenny's and hand looms. With the advent of steam power spinning mills began to spread into the area by 1819 eight mills had been built in Wigan around the Wallgate area close to the Leeds Liverpool Canal an estimated 600 to 700 people worked in these mils and related trades. Some of these mills may have been weaving or spinning sheds with workers on hand powered Jenny's or hand looms working collectively for one employer but others were the forerunners of the giant multi story mills which would develop textile technologies such as ring spinning in the latter half of the 19th century that would take the cotton industry of Wigan well into the 20th century

Fig 5, Hand loom Ref Spinning the Web www.spinningtheweb.org

The Wallgate canal basin or Wigan pier, was traditionally used mainly for coal loading but as cotton production increased more warehouses were built, straddling the Wigan terminus. (Please see cover photo) These warehouses were to accommodate the raw cotton coming into the town supplying the mills, along with foodstuffs and supplies for other trades as the town's population started to steadily increase. This was mainly a causal effect of the steam power technology spreading into the cotton industry. The demand for coal increased with the building of more steam powered spinning mills in Wigan and the mill towns of Lancashire, many more mill operatives were required, adults for spinning and children for piecing (piecing together broken threads) and hurrying (scurrying to and fro with cotton and equipment for the spinners). This increased productivity in spinning provided more work for handloom weavers whether working from home or employed in weaving sheds. This had a causal effect on local road transport, as more short haul wagons were required to ferry goods to and from the canal warehouses. Power looms were introduced into the Lancashire cotton trade from the 1820's to the 1840's but this was not widespread and on a very gradual basis in Wigan as the profit and productivity made from the use of handloom weaving sheds and home weavers, was compared against the financial cost of reorganising, rebuilding, re-equipping the factory and retraining operatives. The two large areas of home cellar handloom weaving were Swinley wards Wigan lane, and the Hardybutts area of Scholes, the latter becoming predominantly an area of Irish immigrant workers. The mills of Wallgate after 1830 tended to be built following the pioneering designs of engineers such as William Strutt as the fireproofing innovations such as cast-iron columns and floor supports, brick arches with a minimal amount of timber were employed. (Ref Book 2 Chant & Goodman) These fireproof building techniques were even more necessary as the mills were equipped with massive coal fired boilers to drive the machinery. Restructuring and rebuilding was also required to accommodate power loom weaving sheds as reliance on handlooms was not considered cost effective from the late 1840's and 1850's. Large mills such as the imposing Trencherfield Mill, Victoria Mills and the Swan Meadow mills of the Eckersley family, were rebuilt more than once to keep up with the fire proofing technologies and automation as the industrial revolution entered its second phase from around 1870.

Table 1, Chronological Table

1819	8 mills in Wigan town boundary employing 619 operatives
1824	32 steam engines in use in Wigan
1835	55 steam engines in use average 325 Horsepower
1835	38 mills in Wigan town boundary around 6000 employed

Note,
Potential capacity of steam engine, six hands employed per1 horsepower

Table statistics Ref, Wigan's Textile Industry, M Townsend. Wigan History Shop Reference only.

As the table shows there was a steady increase in the capacity of the textile industry both in the number of factories, output and number of people employed in the industry. To gain a more comprehensive insight into population trends, the figures from the relevant census reports are a good source

Table 2, Overall Population Increases Wigan Borough

1831	**1841**	**1851**
20774	24981	31949

Table 3, Textile workers Wigan Borough Wards, census of 1841

Ward	**Total population**	**Engaged in textiles**
Scholes ward	9187	2160
St Georges ward	3118	472
Queen Street Ward	5569	1356
Swinley Ward	3557	668
All Saints Ward	3550	391
Town Population	24981	5047

Ref, Census reports 1841, 1851, Abstract of textile workers from the 1841 census.
The Wards of Scholes and Queen Street were predominantly working class with much of the worst housing in the borough.

As can be seen from the census figures there was a steady rise of around 5000 per each 10 years in the population of the town, this does not include the outlying villages and townships that were part of the Wigan parish who would have supplied some of the towns labour force and also had their own collieries and mills. A steady movement of immigrant workers came to the town many Irish who had their own unique community in the Scholes area, this was expanded to a point by the effects of the potato famine, the Irish community founded Saint Patrick's Church in 1847 as its focal point. The working conditions of these mill workers were very harsh with a 14hour day for both adults and children as young as eight, cotton dust and fibres floated around the mill making respiration difficult. Lung diseases were just as common in cotton mills as in the coalmines.

Fig 6, Trencherfield Mill Wallgate, rebuilt three times as textile technology and building methods improved. Has the largest working steam engine in the country now employed as a working Museum. (K Scally)

As the population increased the housing that was provided for these working-class areas was mainly back to back terraces (terraced houses with only one outside facing wall and only one entrance). Another type of housing quite widespread in Wigan especially in the town centre were the yards or courts. Situated behind streets. These yards contained a jumble of hovels constructed in a haphazard fashion. In many cases these yards were unpaved and without drainage with no sanitary provision whatsoever. Overcrowding was rife in these working-class areas. Wigan's form and fabric had undergone a massive transformation "for here mills and factories appeared in large numbers, and around them hundreds of dwellings had been thrown up to house their workforce. Many fine old buildings were gobbled up in the advancing tide, forcing their owners to move out to the suburbs leaving the old pre-industrial town, apart from its very core to become enmeshed in a multitude of courts terraces and back to backs. Cramming was inevitable and widespread" (Ref Those Dark Satanic Mills Page 62). "An 1849 report described 45 small two roomed cottages in Barracks Yard off Wallgate in Wigan. There were 257 inhabitants and thus an average of three people in each room with just 4 privies in total" (Ref Those Dark Satanic Mills Page 82).

B, Effects of Wigan's Cotton Industry on Public health

In Wigan, as in many overcrowded working-class areas during the industrial revolution, epidemics flared up on a regular basis. These were mostly waterborne diseases the worst being cholera. The 1830's and 1840's saw an increase in epidemics resulting in several reports recommending more attention to the provision of water supply and sewage. The Public Health Act of 1848 was broadly welcomed but in many cases the action taken was minimal with proposals blocked and by laws ignored due to business interests leaving people in working class areas dependant on streams springs and wells polluted by industrial activity or human waste. According to a report on Wigan in 1849 "sewage was left to accumulate in open cess pools or ditches, as less than 20% of Wigan was sewered and even those sewers discharged into ditches or directly into the River Douglas (ref Dark Satanic mills Pg34) The death rate for Wigan in 1851 37 per 1000, fever was prevalent, a Mr Ackerley clerk to the Board of Guardians wrote "a list of 27 localities in seven divisions of the Borough no less than 14 were in the Scholes ward". Another contributor to public health problems were horses, for as the volume of the cotton industry increased along with the population, and canals and rail increased their traffic, many short haul wagons were required. Added to the short haulage companies there were multitudes of other horse drawn vehicles from farmers carts, omnibuses, and hackneys to private carriages. Although no figures turned up for the 1840's, in the 1870's the numbers of horse related trades were

6 hay and straw dealers,
7 Saddle and Harness makers
15 Blacksmith/Farriers Ref Dark sat Pg34

The excrement of all these animals in a town with little sanitation would surely have been a contributor to the town's problems

C, Effects of the Cotton famine

In the 1860's when the American Civil War was raging over the Atlantic the Federal blockade of Confederate ports caused Lancashire's supply of raw cotton to cease. The mills fell idle collieries reduced output as the town went into a severe depression, workers suffered terribly in this period of history. Public works were undertaken to provide some form of employment to some of the desperate workers. These public works would be some of the only major public health works undertaken since the act of 1848, although piped water and an efficient sewage system for the majority of dwellings in Wigan would not be complete till the 1870's. The firm of Coop and Co was founded by Timothy Coop and James Marsden, they planned to set girls to work with sewing machines making clothes for men to provide much needed wages at this time and sound training for careers in textiles, although started as a relief organisation by the 1870's Coops was a large factory built in the spectacular industrial style of the great Manchester warehouses, continuously trading, manufacturing clothing and a major employer in the town until its closure in1993.The final phases of the building were finished in 1880's. The cream and red bricks

emphasise the buildings lines with ornate window arches making this building one of the towns finest examples of mid-Victorian industrial architecture.

Fig 7, Coops Factory Dorning Street Wigan, one of the towns few surviving examples of this industrial style, the building to the left was the original railway station (K Scally)

Many businesses did not survive the cotton famine but those that did went on to a new era in textiles. Wigan's dominance as a cotton town did not begin until the late 19th century and lasted until the mid-20th century, largely due to a willingness to adopt new technology, such as ring spinning, and new business structures such as the joint-stock company. Consequently, it has some very fine late mill complexes such as the Trencherfield Mill in Wallgate and Rylands Gidlow mill overlooking Mesnes Park and from 1889 until the outbreak of the first world Farrington and Eckersley's, Swan Meadow and Western mills were amongst the largest ring spinners in the country this phase could be linked to social constuctionism as maximising profit and cornering markets was the prime force behind the entrepreneurs of the joint stock companies.

Fig 8, Farrington, and Eckersley's Swan Meadow Mills from the Wallgate canal basin (K Scally)

5, Conclusion

Although the sections on transport, and coal dealt with initially the late 18th century, it was felt important to establish the fact that without the transport and energy infrastructures in place a viable cotton industry would not have been possible. This would also back up the assertion that the rise of the cotton industry in Wigan was due to technological determinism in what some class as the 1st industrial revolution. The rise steam power, energy reserves, depressed wages, abundant water, and transport logistics made Wigan an attractive proposition hence the expansion.

As Wigan entered the 1830's the advent of the railways, the steady rise in population, an almost 5-fold increase in the number of mills. The many markets that Wigan's industries were exposed to dramatically altered, the spatial form and fabric of the town as only the core of the town centre remained almost unchanged from the pre-industrial days. As the cotton industry grew larger some firms rebuilt mills and brought in new innovations in weaving redesigned more efficient power looms to attempt to corner markets and generate profit. This could be classed a social constructionism but in the main technological determinism seems to be the driving force.

As the towns, form and fabric altered there was much hardship and many public health problems, which despite legislation in 1848 would be only be resolved between 1862 and 1876 therefore our period from 1800 to 1860 encompasses some of the worst sanitation, housing and public health in the towns history,

Therefore, the rise of the cotton industry in Wigan from 1800 to 1860 was made possible by the first industrial revolution technologies of coal mining, canals and steam power, Wigan's location was now perfect for textiles, a location determined by technology

Resources and Bibliography

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Cover Photograph Wigan pier warehouses taken 30/06/04. K Scally