An Archaeological Resource Assessment of Modern Lincolnshire 1750-1960

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Note: For copyright reasons the figures are currently omitted from the web version of this paper. It is hoped to include them in future versions.

1. Introduction

This document provides a brief statement on the current state of knowledge about industrial archaeology in Lincolnshire at the end of the 20th century as a contribution to the East Midlands Regional Research Frameworks Project. As previous seminars in this Project have been on a period basis, this paper will also consider industry in its wider context in the county and will broadly take the period to extend from 1750 to the present day. It will include consideration of the development of industry, agriculture, transport systems, settlements and social organisation.

As in other parts of the country there has been work by amateurs since the 1960s but little interest by professional archaeologists until recent years. The Lincolnshire Local History Society (LLHS), now the Society for Lincolnshire History and Archaeology (SLHA), set up an Industrial Archaeology Committee in 1964 in response to an initiative from the Council for British Archaeology (CBA). Since then the SLHA has been involved in the research and recording of industrial archaeology in Lincolnshire and the Society's various publications include some with an industrial archaeology content.

In the 1960s members of the SLHA participated in an industrial archaeology survey conducted by the CBA and completed one or more cards for several hundred sites. A copy of each card was kept at the Museum of Lincolnshire Life. In more recent times the Association for Industrial Archaeology (AIA) initiated a new national survey, the Index Record of Industrial Sites (IRIS), which was intended to produce a standard index sheet of basic information about industrial sites for inclusion on computerised Sites and Monuments Records (SMRs). The SLHA was one local society which piloted the new forms and then used them for a few years. The IRIS survey was of limited success and only continued for a short time until central funds ran out. Use of the form varied from one county to another and Lincolnshire was one of the main contributors. The SLHA produced a few hundred forms, most of which were based on the previous CBA Survey cards so that the earlier information could be included in the county SMR and used in the planning process.

2. Sources

There are few sources that deal with the archaeology of Lincolnshire in the industrial period. The only town for which the former Royal Commission on Historical Monuments of England (RCHME) published a detailed Inventory is Stamford and that volume has few industrial references[1]. Only one volume of the Victoria County History of Lincolnshire has been published and that appeared in 1906 and contains little material relating to this period, apart from a history of sport as seen at the end of the Victorian period[2]. A short guide to the industrial archaeology of the county was published in 1983 in connection with the AIA Annual Conference held in Boston and Lincoln that year[3] and four volumes in the History of Lincolnshire series published by the SLHA relate to the county since 1700[4]. In 1993 *An Historical Atlas of Lincolnshire*[4a] was published.

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[1] Royal Commission on Historical Monuments, 1977, *The Town of Stamford – An Inventory of Historical Monuments.*

[2] Page, W, (ed), 1906, *The Victoria History of the County of Lincoln, II..*

[3] Wright, N R, 1983, *A guide to the Industrial Archaeology of Lincolnshire including South Humberside*, AIA and SLHA.

[4] Vol.VIII - Beastall, T W, 1978, *The Agricultural Revolution in Lincolnshire;* Vol.X – Olney, R J, 1979, *Rural Society and County Government in Nineteenth Century Lincolnshire;* Vol.XI – Wright, N

This contained a series of maps which covered all periods of the county's history, each map facing a page of text on the particular subject covered, and 38 of the 66 maps relate to thee period since 1500. Other books have dealt with particular subjects (county-wide or local) or looked at particular towns, and a selection of these are listed in the bibliography at the end of this report.

The Industrial Archaeology Committee of the LLHS produced a quarterly Newsletter from January 1966 to the end of 1973 and this contains a number of short site reports and other information. In 1974 the LLHS became part of the new SLHA and since then a section of "Industrial Archaeology Notes" has appeared in some numbers of the Society's annual publication *Lincolnshire History and Archaeology*[5] as well as individual articles on industrial archaeology subjects.

The County Sites and Monuments Records includes a number of reports based on the IRIS forms completed in recent years, many of which are copied from the CBA report cards written some thirty years earlier and include sites now demolished. The SMR also has some sites such as the Fossdyke Canal which are not date specific, the Fossdyke being allegedly built by the Romans and still continuing in use to this day!

The situation in Lincoln is better than elsewhere in the county following a recent Industrial Archaeology Survey (IAS) funded by Lincoln City Council and English Heritage[6]. Between 1993 and 1998 an Urban Archaeological Database (UAD) had been produced for the city encompassing the archaeological record to c.1700. The aim of the IAS was to enhance the UAD for the post-1700 period through a survey of the industrial archaeological remains and research into the industrial past of the city and record it on computer. The project work was carried out by the City of Lincoln Archaeology Unit (CLAU) from April 1998 to January 1999 and primarily covered the period 1700 to 1945. Because of the limited time and funding available, the survey recorded industrial and transport features shown on four historic maps of the city at particular dates in the 19th and 20th centuries and a photographic street survey to identify any other apparent industrial buildings still standing. Limited historical research was done to identify the occupiers of the properties found from the maps. At the end of the project a written report was submitted to the City Council and the more detailed information is recorded on computer.

The Lincoln Archaeological Trust which was formed in 1972, later absorbed into the Lincolnshire Archaeological Trust and then resurrected as the City of Lincoln Archaeological Unit, published a series of reports as Fascicules. Most of these dealt with earlier periods of the city's archaeology but one dealt with an aspect of industrial archaeology. This was *Clay Tobacco Pipes from Excavations in Lincoln 1970-74* by Jenny E. Mann, published in 1977, which included a brief history of the industry in the city as well as a record of finds[7].

In recent years the Lincoln Civic Trust has published a series of four booklets as the *The Survey of Ancient Houses in Lincoln* which deal with the city's medieval buildings, and the Trust have now commenced a project to look at later buildings in the city under the title of "The Survey of Lincoln". This will include all classes of building up to the present, though not all in the same architectural detail as in the previous surveys of the medieval properties. The first part of the city to be so surveyed is the Wigford area in the south-east quarter of the city, bounded by the river Witham on the north and west. The survey of Wigford has been going for a couple of years now and will continue for a while yet before it is decided how the results may be published.

3. Overview of Lincolnshire in the Industrial Period

R, 1982, *Lincolnshire Towns and Industry 1700-1914*; Vol.XII – Mills, D R, (ed), 1989, *Twentieth Century Lincolnshire*. (Note - Vol.IX not yet published).

[4a] Bennett, S, & Bennett, N, 1993, *An Historical Atlas of Lincolnshire*, University of Hull Press

[5] Industrial Archaeology Notes in *Lincolnshire History and Archaeology*, Vols 12 (1977), 13 to 18, 20, 21, 23, 25, 27, 32 and 33 (1998).

[6] City of Lincoln Archaeology Unit, 1999, *The Industrial Archaeology of Lincoln.* CLAU Report No.378.

[7] Jenny E. Mann, 1977, *Clay Tobacco Pipes from Excavations in Lincoln 1970-74*, Lincoln Archaeological Trust, Monograph Series Volume XV-1

A survey of the history of Lincolnshire in the industrial period was published in Wright, 1982, *Lincolnshire Towns and Industry 1700-1914* as continued by Mills, 1989, *Twentieth Century Lincolnshire*[8] so this report will include only a brief summary.

At the start of the 21st century large parts of Lincolnshire are still rural and agricultural, and some villages are still as small, or smaller, than they were in 1750. In the 18th century most people lived in villages, and most of the market towns were little larger than some villages and had a strong dependence on the surrounding rural area. Many market towns have grown in size over these two and a half centuries and have increased their dominance over the surrounding countryside, but in comparison with other parts of England they are still small and even the major urban areas of Lincoln and Grimsby/Cleethorpes are much smaller than a city such as Nottingham.

In considering Lincolnshire's situation in the East Midlands during the industrial period it is first necessary to note three major contrasts with the heart of the region, namely that Lincolnshire did not have any coal industry, nor any large-scale textile or boot or shoe industry. There were a few attempts to set up cotton mills, a lace factory, a bombazine factory or a carpet factory in the county in the 18th or 19th centuries but they were isolated, small-scale, mostly short-lived and unsuccessful.

A major change during the industrial period was the improvement in transport which somewhat reduced Lincolnshire's isolation from the rest of the country. The Great North Road through the county was turnpiked before 1750, and a network of other roads were turnpiked in the 1750s and '60s. The Trent, Witham and other rivers through the county had been navigable since the medieval period and these were restored during the 18th century. The old ports of Boston, Grimsby and Gainsborough enjoyed a revival and a new dock was also built at Immingham in the early 20th century. In the late 18th and early 19th centuries some short canals were created to link market towns such as Horncastle, Sleaford and Caistor to the navigable rivers. From 1848 to the late 20th century Lincolnshire had a network of railways that served many more places than the canals had done, but since 1970 only a few railway lines survive and private cars are the main means of personal transport.

During the 18th century Lincolnshire's main role in the industrial revolution was as a supplier of food and raw materials for London and the industrial districts lying to the west of the county, particularly the Midlands, south Yorkshire and Lancashire. Only in the 19th century did Lincolnshire establish an important role as engineering works in some towns grew large on the production of agricultural machinery which achieved world wide markets by 1914. In the rural areas were wind and water mills, brickyards, a few stone quarries and other premises processing local materials and producing goods for local consumption such as pottery in Old Bolingbroke. Lincolnshire produced wool and flax, and early in the 19th century attempts were made to establish textile factories in the county, including a cotton mill, but they were largely unsuccessful and have left little trace. The construction of new docks at Grimsby in the 1850s led to the town becoming the greatest fishing port in the world, and the food processing infrastructure established in the town continued to be used for other foods after the decline of the fishing industry.

Local administration in 1750 was based on the three administrative Parts of the county – Holland, Kesteven and Lindsey – the hundreds, six boroughs, two dozen market towns and 600 or so parishes in the county, and since then towns have increasingly become centres of administration and social organisations for the areas around them. The precedent was set by the Poor Law Unions established in 1834, followed by other local authorities including Rural District Councils and County Councils for the three Parts of Lincolnshire and finally the District Councils created in 1974 and two Unitary Councils in the north of the county in 1998. As towns grew and people's expectations rose towns became centres of services used by the communities around, from amenities such as theatres to services such as schools and hospitals. By the late 20th century many villages had long lost their local school and were also losing even the basic amenities of a shop, post office or church.

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[8] See footnote 4 above.

4. Communications

Lincolnshire is unique in the East Midlands in having a coastline, and over the centuries a number of ports have flourished and declined. The medieval ports of Boston and Grimsby on the coast and Gainsborough on the Trent had declined by the early modern period. Boston was then still the main port in the county but Grimsby had hardly any traffic and after the Louth Navigation was opened in the 1750s, with coasting vessels able to travel inland to Louth, that town took over as the main entrepot for north-east Lincolnshire. As the rest of the East Midlands industrialised in the 18th century the traffic along the Trent rose rapidly and Gainsborough experienced a revival as a port at the mouth of the river, where cargoes were transferred to sea-going vessels. During the 18th century small wooden vessels could be beached at almost any village on the flat Lincolnshire coast, such as Saltfleet or Skegness, as well as tying up in little rivers or creeks as at Wainfleet, Sutton Bridge or Fosdyke. After the enclosure of Holland Fen in the late 18th century the port of Boston experienced considerable growth, so that by 1851 the town was, briefly, the largest in Lincolnshire. Successful ports had many supplementary industries such as boat building and the making of sails, ropes and blocks.

The growth of the port of Boston stopped after the railway was opened in 1848 and stole the port's traffic in agricultural produce to London and inland centres. The port of Gainsborough also suffered as railways were opened through the East Midlands and took its traffic. The port of Boston revived, but not on the same scale, after a wet dock was opened in 1882-84. By that time Boston had been overtaken by Grimsby where the Manchester, Sheffield and Lincolnshire Railway built a series of large docks, partly commercial but mainly for the fishing industry. An attempt to build a Dock at Sutton Bridge in the 1880s was unsuccessfull, but in the early 20th century the Great Central Railway, wanting to add to its facilities at Grimsby, built a vast new Dock at Immingham near the mouth of the Humber. In 1987/89 a new river port facility was established at Sutton Bridge, close to the site of the failed Victorian dock of a century earlier.

Lincolnshire's role as a source of food and raw materials led to the improvement of its navigable rivers during the 18th century and to the creation of new tributary waterways. An important part in the design of many schemes for waterway and drainage improvements in Lincolnshire was played by the Spalding engineer John Grundy (1719-83), one of the pioneers of the civil engineering profession. Nationally famous engineers such as William Jessop and John Rennie were later active in the same area. The Stamford Canal had been created as early as 1664-73 and the Fossdyke Canal from Lincoln to the Trent was restored to traffic in 1744, but the major improvements were made in the 1760s with the opening of the Louth Navigation and the restoration of the river Witham. Shorter branch canals were opened in the 1790s and early 1800s to give access from Horncastle, Sleaford, Grantham and Caistor to the waterway network. Most of the new waterways were abandoned after the arrival of railways although efforts are being made to restore the Grantham Canal and the Sleaford Navigation.

Roads in the county were improved by turnpike trusts in the 18th and early 19th centuries, though because Lincolnshire was not criss-crossed by national routes, and much of its terrain was perhaps easier than in other counties, the proportion of miles of turnpike roads to other roads was not as high as in some other counties such as Derbyshire. The first turnpikes in Lincolnshire were the Great North Road through Stamford and Grantham, and a stretch of road extending eastwards from Lincoln towards the Wolds, but from the 1760s roads were turnpiked northwards and eastwards into the county, up to the Humber bank and the coast of Lindsey. Later toll bridges were erected at several river and estuarial crossings including Gainsborough, Dunham, Tattershall, Fosdyke and Sutton Bridge. One or two tollhouses still survive, as at Hallington, Stamford and Lincoln (Canwick Hill), there are still a few turnpike mile posts along some roads, and the Gainsborough Bridge remains, minus its original parapets but still with a toll house. Market towns at crucial points on the developing transport system benefited from their participation in national rather than local markets, and they served to bring manufactured products into the county and distribute them in their locality.

It was the arrival of railways in the 1840s and '50s that transformed the position of many Lincolnshire towns. Previously they had all been much of a muchness, with even the county town

of Lincoln only a little larger than most of the rest. But after the railways arrived some experienced considerable growth, some stagnated and others declined. The first two railway lines into Lincolnshire were short stretches opened by the Midland Railway Company in 1846, from Nottingham to Lincoln and from Leicester to Stamford, and within ten years a third of the eventual network in the county had been opened taking much long-distance traffic off the roads and waterways. The county was dominated by two railway companies, the Great Northern (GNR) and the Manchester, Sheffield and Lincolnshire (MSLR, renamed Great Central in 1897). The main line from Yorkshire and North-east England to London passed through the western edge of Lincolnshire but no main line passed through the centre of the county. Only in the late 19th century were two new cross-county routes built through Lincolnshire to join East Anglia to the midlands and to northern England respectively. Virtually all railways in the county were operated by the GNR and the MSLR either on their own or in partnership with other companies.

The effects of the railways varied from town to town. At Boston the GNR took over from the coastal shipping and the port stagnated for forty years, but at Grimsby the MSLR built vast new docks and brought massive expansion to what was the small remnant of a medieval borough. Lincoln was served by a multitude of railway companies and benefited from lines going in all directions to take advantage of the natural river valley break through the limestone edge, even though the city was not on a main line. Until the 1850s Grantham and Stamford were important coaching points on the Great North Road, but that business was lost when the railways were opened between London and the north. Grantham was on the main line to Yorkshire and had Hornsby's substantial engineering firm but Stamford was on a branch line and its local engineering firm, Blackstones, was smaller and took longer to develop.

Railways also led to the development of holiday resorts on the Lincolnshire coast in the late 19th century, including Skegness, Cleethorpes, Mablethorpe and Sutton on Sea. Skegness and Freiston Shore had existed as very small resorts even before the railways arrived, with just a couple of small hotels each.

Tramway systems were created in the two largest urban settlements, Lincoln and Grimsby/Cleethorpes, as well as rural tramways from Grimsby to Immingham and, for a short period before a railway was built, from Alford to Sutton on Sea.

5.Industry

5.1 Foundries and Engineering

The first notable engineering works in the county were established in Boston, by William Howden about 1803 and William Tuxford about 1826. Howden made the first steam engine to be built in Lincolnshire, but his business was small compared with those firms who came later. Tuxford pioneered the development of steam driven thrashing machines and sent those and many other products, including portable steam engines and traction engines, to many countries including Sweden, Austro-Hungary, Russia, Canada, South America, Australia and elsewhere. Tuxford engines are preserved in several countries around the world, including one which powered the Universal Agricultural Exposition in Paris in 1856 and is still on exhibition in a museum in Paris.

The arrival of the railways in Boston did not help Tuxford because their works were on the wrong side of town, and a long way from the main line, and eventually the firm declined and closed in the early 1880s. After 1840 it was engineering firms in towns on the western side of the county which rose to greatness. Hornsby in Grantham, Marshall in Gainsborough, and Clayton & Shuttleworth, Ruston, Foster and Robey in Lincoln. Lincolnshire firms grew to prosperity through the production of steam thrashing sets and portable or traction engines to power them, and exported them world-wide. Their markets included all the great grain growing areas of the world: South America, Russia and many parts of the British Empire as well as many European countries. Hornsbys later developed the heavy-oil engine or 'diesel' engine as it is now known. The Lincoln firms were not the first in the county but by the end of the 19th century the combined activity of all the Lincoln firms exceeded that of any other Lincolnshire town. During the First World War many of the works were involved in aircraft production and the several firms in Lincoln made the city the largest centre of such production in the world. As in other parts of the country the

engineering industry has down-sized since then but it is still of great importance to Lincoln and remains of its glorious past can still be seen in the Museum of Lincolnshire Life.

5.2 Brewing and Malting

The processing of barley for beer has always been an important industry in Lincolnshire and by 1856 there were 163 maltsters in the county, mostly located in the towns and in several villages in Kesteven and the northern and western parts of Lindsey, with very few on the Wolds or in the fens. In the 1750s breweries were often small undertakings, but during the 19th and early 20th centuries some firms grew larger and absorbed or displaced their competitors. In 1856 there were 166 brewers in Lincolnshire, nearly half of whom were also malsters, and they were located in all the main towns as well as in several villages.   As firms grew larger they tended to concentrate on either brewing or malting and by 1913 there were only six firms still involved in both activities. Apart from these six, there were only 32 brewers and 26 maltsters in the county in 1913.   The Lincolnshire brewers and maltsters faced competition not only from within the county but from firms outside.   Major national firms such as Bass of Burton on Trent took advantage of the new railway network and built their own maltings beside railway lines in the barley growing areas of Lincolnshire.   Truswells of Sheffield built some at Barnetby, there were others at Grantham, and in 1899-1905 Bass built a vast complex in Sleaford which closed in 1960 but still stands next to the line forty years later, a true monument of the industrial period.   Since the 1960s Melbourne's brewery in Stamford has become a museum but Bateman's of Wainfleet (founded 1874) still meets the need for liquid refreshment in many parts of Lincolnshire.

The rise of the temperance movement in the late 19th century led to the growth of mineral water manufacturers in Lincolnshire, as elsewhere, producing a variety of non-alcoholic drinks.   But their local industry has also declined and they have been replaced by national and international firms such as Coca Cola.

5.3 Brickworks[9]

Much of the surface of Lincolnshire is of clays and silts, easily exploited for brick and tile making, and the distribution of brick pits was related to the outcrop of suitable clays.   It was well used in the Roman period and pottery kilns abound; brick and tile kilns were probably equally numerous though only three have been found so far.   Bricks made their reappearance in the county from the 13th century, initially imported into Hull and no doubt Boston through North Sea trade links with Holland and Flanders.   Brick making became established in Hull by about 1300 and later in the century spread into north Lincolnshire.   The great age of brick came in the 15th century when it became fashionable in eastern England, with the great keep of Tattershall Castle (1432-48) as the finest example of this period.   During the 16th, 17th and 18th centuries its use continued to become ever more widespread.   Pantiles were imported from Holland in the second half of the 17th century and manufactured in Hull after 1700, expanding into north Lincolnshire after the mid-18th century. By the end of the century they were the almost universal roofing material in the county.   The fine Humber warp clay is ideal for making pantiles and in the latter part of the 19th century there were some two dozen tileworks on the south Humber bank from Barton to North Killingholme.

By the 1770s brick was being used for cottages as well as big houses and public buildings. Despite the introduction of the brick tax it remained a cheap option and its use became increasingly widespread in the county.   By the mid-1820s there were 35 brick and tile works, mainly along the Humber bank, but with a rapidly growing population the number had increased to 94 by 1849.   There was further expansion in the decade after the removal of the brick tax in 1850 to 130 brickyards, and in the second half of the 19th century almost every town and village had its brickpit.   As Lincoln and Grimsby/Cleethorpes grew, major brickworks were established with permanent Scotch kilns using coal for fuel brought in by rail and water.   Louth and Horncastle were largely built with bricks made in extensive pits within the town boundaries.   At Louth, Dale's brickyard off Brackenborough Road was opened to build the Town Hall (1854), and Louth architect James Fowler helped to make brick fashionable again in churches and parsonage houses. The number of brickmakers in the county rose to a peak of 187 in the early 1880s, but the next decade saw a decline to 126, and that included 30 on the Humber bank, some exporting fancy

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[9] Robinson, D N, 1999, *Lincolnshire Bricks – History and Gazetteer*, Heritage Lincolnshire

bricks and tiles, finials and chimney pots to London.   The cause of the decline was the ready availability through rail transport of cheap Fletton bricks which could be burned more easily because of the oil content of the clays.   By World War I the number of Lincolnshire brickworks had fallen to 80, and by 1920 this was halved although some survived to World War II. Brickmaking ceased at Barton in the 1960s, and by 1969 the number was 16.   Today there are just four – at Barton and Barrow/Goxhill (pantiles), Belton in the Isle of Axholme, and Stamford.

Apart from the universal evidence of local brick and the occasional remaining Scotch kiln as at Baumber (now restored), East Halton, Farlesthorpe, Gosberton, Stixwould and Sutton on Sea, the only traces of a once extensive industry are water filled pits now nature reserves or used for fishing, and names such as Brickfield, Brick Close and Brick Lane.   A Gazetteer of early brick buildings in Lincolnshire to 1760 was published by Heritage Lincolnshire in 1999.

A related 19th century industry was the production of decorative terra cotta for the exterior of buildings.   This was the work of Blashfield's factory in Stamford and examples can be seen in the town, including the Scotgate Inn.   Other examples can be seen on many Victorian monuments and grand buildings around the country.   The Stamford factory produced some designs from moulds that had previously belonged to the Coade Stone Factory earlier in the century.

5.4 Ironstone quarrying and smelting

The quarrying and smelting of ironstone in Lincolnshire started in the 1860s in a rural part of the county away from any town, but five small villages quickly grew into a town and one of them gave the place the name of Scunthorpe which is now one of the larger towns of Lincolnshire. Lincolnshire iron was apparently known and worked in Roman and medieval times but its value was forgotten until 1859 when Rowland Winn, a landowner then living at Appleby Hall, had some of the local ironstone on his estate analysed.   The results were favourable and Winn became the driving force behind the development of the iron industry on his family's estates in Appleby, Scunthorpe, Frodingham and Brumby.   Land was leased to the Dawes Brothers of Barnsley who began mining ironstone in 1860. The Trent Iron Works was built at Frodingham in 1862-64 and others followed so that by 1880 there were twenty-four furnaces, of which fifteen were in blast.   A branch railway was soon built through the area, and a Steel Works was opened in 1890.   After 1900 firms from outside the area started taking over the various works and in 1967 the industry was nationalised.   Since then, and the subsequent privatisation as part of British Steel, there have been extensive cut-backs but it still continues as one of the main industrial enterprises of Lincolnshire.

The developments at Scunthorpe generated interest in mineral working in other parts of the county. Open cast or underground mines were opened in the western area of Lindsey between Lincoln, Scunthorpe and the Wolds, at Appleby, Claxby, Nettleton and Greetwell near Lincoln, but they only operated for comparatively short periods.   The longest lived was the Greetwell underground mine which operated from 1873 until 1939.   Another area extended south-westwards from Lincoln into Leicestershire, with one mine at Coleby near the city and other workings in two areas north and west of Grantham.   The area north of Grantham was mined between the 1870s and 1946, and those to the west were in use until the 1930s and then re-opened in the 1970s.

The other extractive industries in Lincolnshire were the brickworks, described above, the 20th century cement works on the Humber bank, limestone quarries for Ancaster building stone west of Sleaford, gypsum (for flooring) in the Isle of Axholme, and chalk and gravel pits for road repairs in the 18th and 19th centuries.

5.5 Small Industries

Many long-established small scale industries continued in the countryside well into the 19th century, and some even into the 20th century.   One product of the vast unenclosed fens had been the feathers from the vast flocks of geese kept there.   After enclosure the feather industry continued with several large factories being built in Boston, one of which dated 1874 still stands, and the industry is continued by Fogarty & Co who still use some feathers although much of their production now uses man made fibres.   Other Victorian and 20th century industries included the production of water-filters and of cigars.   Others processed the agricultural produce of the county,

and included pea-sorting factories and 20th century canning factories. The frozen food factories of the Grimsby area were a development of the fishing industry but they later expanded to freeze other foods brought from anywhere in the UK, or even from overseas.

Not all of the county is flat, and water-powered mills in the west and on the Wolds fulled cloth and made paper as well as grinding corn, though few were as large as Newstead Mill at Uffington just outside Stamford.

Windmill technology reached its peak in the great 19th century brick tower mills such as Sibsey Trader, with their fantails and distinctive ogee caps, but inexorably steam took over during that century. There are still many windmill remains in the county and some have been preserved or restored and are open to the public. Windmills have received quite considerable attention over the years, a local artist Karl Woods painting as many as he could find in the 1930s, and the pioneer industrial archaeologist Rex Wailes, who served his apprenticeship in Lincoln, publishing material on them in the 1950s[10]. A more recent survey of windmill remains was published by the Lincolnshire County Council Museum Service in 1986[11].

During the 19th century the production of flour was taken over by steam mills such as Keyworth & Seely's in Lincoln and Marshall's huge Victoria Flour Mills in Grimsby. Other premises existed to serve the needs of agriculture or to use its products. Examples were the oil seed crushing mills in Gainsborough and Boston, and some fertiliser factories established in the later 19th century in Lincoln. After the First World War the government sponsored the construction of huge sugar beet factories, of which three were built in Lincolnshire at Spalding, Bardney and Brigg.

6. Public Utilities

The development of public utilities is largely a feature of the late 19th and 20th centuries. In 1750 Lincoln and Grantham each had water conduits to provide a limited water supply, but there as elsewhere individual householders looked to wells or cisterns to store rainwater from their roofs. River water was a possible source but was of doubtful value as the rivers were also polluted by the towns sewage. Improvement Commissioners were established in a number of towns to provide rudimentary street lighting and policing but it was the creation of Gas Light and Coke Companies from the 1820s which led to better street lighting. In late Victorian times several large enterprises, such as Boston Dock and Marshall & Sons of Gainsborough, built their own electricity generating plant and from 1899 local authorities and private companies started to produce public electricity supplies. Some of the first public supplies were used to power trams in Lincoln and Grimsby, but it was the 1950s before electricity reached the most remote parts of the county.

As the services have needed to modernise many of the original structures have been cleared away, often after a number of drastic alterations. The 1820s office block of Stamford gas works and the fine stone-faced front block of Sleaford gas works still remain, as does the 1890s office of Lincoln electricity works beside Brayford Pool, though the latter has been disused and bricked up for a number of years whilst awaiting a new use.

7. Agriculture

Throughout this period from 1750 to the present there were dramatic changes taking place in agriculture. The enclosure of parts of the open field system had started in the medieval period but between 1760 and 1820 virtually all remaining open fields and common land in Lincolnshire had disappeared as a result of parliamentary enclosure. Efforts to drain and enclose the fens of Lincolnshire and Cambridgeshire had been made for centuries, and in Cambridgeshire the Duke of Bedford was largely successful in the 17th century but it was the 18th and early 19th centuries before the deeper fens of Lincolnshire were subdued. Boston was surrounded by vast common fens shared with many adjoining parishes. There the process of enclosure needed expensive drainage works even before the fen could be divided between the parishes concerned, and each parish then had to undertake the enclosure of its own part of the fen. The 26,000 acre Holland Fen to the west

[10] Wailes, R, (reprint 1991), *Lincolnshire Windmills*, Friends of Heckington Mill (originally printed in transactions of the Newcomen Society, 1951, 1953).
[11] Dolman, P, 1986, *Lincolnshire Windmills a contemporary survey*, Lincolnshire County Council.

of the town was drained, divided and enclosed in the 1760s/70s, and the adjacent East, West and Wildmore Fens north of Boston, containing together 40,000 acres of common land, were only worth reclaiming in 1800-12 during the high food prices of the Napoleonic Wars. These fens had previously been used for grazing cattle, horses and geese, for fishing and wildfowling, and for the digging of turves, cutting of thatch, etc.

In the fen areas of the county there was a need for scoop wheels and, later, for pumps to raise the surface water from the drains into the main watercourses and rivers. These engines were at first driven by wind, but most were replaced by steam-engines in the early 19th century, then by oil-engines a century or so later and finally by electric power. There are still remains of some wind driven engines at Amber Hill, steam engines at Dogdyke and Pinchbeck, and diesel engines at Dogdyke and Gayton; electric engines are still in use. Drainage systems and engines are a distinctive feature of the Lincolnshire landscape and still remain as testimony to the skill of engineers such as John Grundy and John Rennie.

During the period of High Farming in the 19th century a few model farms were built, such as at Stainton le Vale where a number of buildings remain. Later in the century in the face of agricultural depression farms in the fens in particular began to specialise in higher value crops such as potatoes, bulbs and seeds, and this part of the county is still one of the most important agricultural producing areas in the East Midlands.

8. Settlement

For most of the period after 1750 Lincoln continued as the principal urban centre, of Lincolnshire, being a Cathedral City, the administrative centre of the second largest county, and a market town, but it was not the first industrial town in the county and its engineering works did not start until the 1840s. The first town to experience urban and commercial expansion, and have engineering works with an international market, was Boston. After the fens around Boston were drained and enclosed from the 1760s onwards, they were rapidly converted to the growing of arable crops, and this produce had to be sent out of the area by ship, in contrast to the previous main crops which had been herded on their own feet. This led to the great expansion of Boston's shipping trade in the late 18th and early 19th centuries, prosperity for its merchants who set up private banks (at its peak during the Napoleonic wars there were six such banks in Boston), a tripling of its population and increasing prosperity for its shopkeepers and craftsmen serving the expanding town. By 1851 the population of Boston had actually grown as large as that of Lincoln, but Boston's growth was then stopped by the railways which ended its profitable coastal shipping trade, just as Lincoln's modern expansion took off.

Grimsby started growing at the same time as Lincoln, and though it started from a smaller base by the end of the 19th century it had effectively combined with the adjacent resort of Cleethorpes and they had overtaken the county town as the largest urban area in Lincolnshire.

There were very few attempts to build planned settlements in Lincolnshire in the Industrial period. The earliest was New Bolingbroke built by John Parkinson in the 1820s in the middle of the fens north of Boston. That area of fen was so vast that when it was enclosed Parkinson felt a market was needed in the centre and he laid out a market place, built a short crescent of fine houses facing it, a bombazine (textile) factory and rows of smaller houses along the main road, but it never grew much beyond his original settlement and the market failed to become established. The original Lincolnshire terminus of the MSLR was at New Holland on the Humber bank, where a ferry went across to Hull. Before the railway arrived there were only one or two houses so the company built houses round three sides of a square, called Manchester Square, for their workers who staffed the companies facilities at the terminus, and a hotel for people coming by road to the ferry. When the Scunthorpe iron ore was first being exploited the major landowner was Rowland Winn and he hoped to make Frodingham parish the centre of the new settlement. He built a public hall and several streets of decent housing which still remain, but people setting up shop preferred to do so in Scunthorpe parish on land not owned by Winn so Scunthorpe became the centre of the new town. The most important attempt at a planned settlement was Swanpool Garden Suburb on the edge of Lincoln. This was a very ambitious scheme for a self-contained community on garden suburb principles proposed in 1919 by Colonel Ruston, one of the directors of Ruston and

Hornsby, but due to the financial difficulties of the city's engineering industry in the 1920s only 113 of the planned 2000 houses were built and the rest of the scheme was abandoned.

During the first half of the 19th century all communities in Lincolnshire were expanding to a greater or lesser degree, but later, particularly after the start of the agricultural depression in the 1870s, the situation was more varied. Some towns and villages continued to expand, but others started to decline and this divergence has continued to the present.

9. Administrative and Social Organisation

Over the last two centuries another significant change in towns has been a steady centralisation in administration. One of the first instances was the creation of the Poor Law Unions to replace individual parishes, with a Union Workhouse located at a central location. They were created in the 1830s, and a century or so later the workhouses were divided between health authorities and County Councils as welfare authorities. A number that became hospitals still survive in Lincolnshire, as at Louth, Caistor and Fleet, though most of those that went to Social Services have since been demolished. Other hospitals were built in the late 19th century and most of those have been demolished in recent years as the National Health Service has concentrated its resources in a small number of larger hospitals. New courthouses were built in the early 19th century and many of them still continued to be used for that purpose. Grimsby Town Hall and Boston Municipal Buildings are still used as local government offices by District Councils, and 18th and 19th century Town Halls in Stamford and Louth are used by successor Town Councils but most other Councils now operate from more modern premises. Lincoln City Council holds its meetings in the traditional chamber over the medieval Stonebow in the city centre, but its offices are in a 1960s office block.

Most factory owners relied on speculative builders to erect streets of housing and other amenities for their workers. The few public buildings to be erected by rich capitalists include a number of churches in Lincoln, a church in Spittlegate, Grantham and a church hall in Gainsborough. They also contributed towards the cost of wards in the County Hospital. Joseph Ruston built the Drill Hall in Lincoln and paid the interest on a loan for the construction of the church spire on the Congregational Church in the city.

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