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BULLETIN OF INDUSTRIAL ARCHAEOLOGY IN CBA GROUP 9 CONFINED

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COUNTY INDUSTRIAL ARCHAEOLOGY REPRESENTATIVES

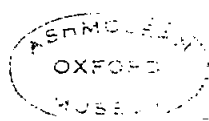
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If there are workers pursuing industrial archaeological studies in any of the five counties who are not yet in touch with that County's representative, it is hoped that contact will be established as soon as possible so that each representative will have a complete record of the industrial archaeology being undertaken in his County. This will help co-ordination of the work so that:-

- (a) Anyone will be able to see if a particular topic is being studied and if so, by whom.
- (b) Anyone coming across information or material remains which are relevant to another worker's studies will know to whom to pass the information.

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THE BULLETIN

Those concerned with Bulletins of this nature are usually faced with two types of problem:-

- (i) Those relating to the contents
- and (ii) Those involved with its production.

As far as the contents of this Bulletin are concerned, we have no problems regarding the amount of contributions. In fact, some of our five counties could fill the whole of each issue! The difficulties arise in trying to achieve a balance in the main articles across the whole field of industrial archaeology (for example, we do not want three major contributions on watermills in one issue) and in giving fair coverage of the activities in each of the individual counties in CBA 9.

It should be remembered that the stated aims of this Bulletin are:-

- (a) To report industrial archaeological activities in Group 9 so that through a greater awareness of what is already being done, more people may take an active part in industrial archaeology.
- (b) To show how the various aspects of Industrial Archaeology (e.g. documentary research, fieldwork, listing and preservation) are being undertaken, as a guide to others tackling similar projects.
- (c) To give industrial archaeologists in Group 9 an opportunity to report their work before submitting it for publication in their own Society's Journals, etc. or in the journal 'Industrial Archaeology'.

The first of these aims is met mainly by the Reports of Industrial Archaeology in the Individual Counties. It is here that there is the most noticeable difference between the five counties in what the Bulletin records as going on in each. We are anxious to rectify this and would be pleased to include reports (even if only one or two sentences: a few paragraphs are better!) of any studies being undertaken but news of items which have already disappeared or likely to do so in the near future, details of lectures, courses, exhibitions and publications are all of interest to our readers. Please remember to give exact location, dates, times and prices where applicable. This Bulletin should appear at the beginning of January, April, July and October: news can usually be included if it is sent to the Editor not later than two weeks before our intended date of publication.

The second of the aims of the Bulletin is satisfied in part by the reports given for the individual counties but it is hoped that the longer articles also indicate how a particular study was undertaken. The section COMMENT, introduced in Bulletin No.10, is intended for discussion of the various techniques and topics covered by readers of the Bulletin. Already this has tempted some fresh correspondents to write in and some of the new points of view should provoke thought - and perhaps others to write in reply, or justification of their own activities! All contributions gratefully received!!

The last aim concerns the longer articles and with these it is not so much a balance between the five counties as a balance between different aspects of industrial archaeology which is our intention for each issue. For example, in this Bulletin:-

- 'A Survey of Part of Victorian Northampton' deals with a large area in a town and concentrates on the buildings,
- 'Colliers Brickworks, Reading' is concerned with methods of working and the products,
- 'Tingewick Mill' shows what is involved in recording a watermill,
- 'Leighton Buzzard & Hitchin Light Railway' represents the documentary approach to a railway which was not actually built,
- 'Ironworks in Northamptonshire' is a review of the present knowledge of the history and physical remains of a particular type of industrial enterprise in one county.

From this it should be obvious that our interpretation of industrial archaeology is very wide. We do not wish to put up an artificial date barrier to the subject and would be pleased to have articles on industrial activities of Roman or earlier times in the area covered by CBA 9. So if your particular study has reached a stage where you can write something about it, how about trying it out in this Bulletin - and include appeals for extra information if necessary: a side issue of an interest of one of our other readers may provide one of the missing links in your own contribution to Industrial Archaeology.

There has been some criticism of the standard of production of Bulletin No.10 and the present issue has been produced in a different manner to show what is possible if we can achieve a reasonable balance between production costs and the income from sales of the Bulletin. A satisfactory balance could be obtained in two ways:-

- (i) By improving the income by a considerable increase in the circulation. So please, once again, try to get extra subscribers - 'ten shillings sent to J. Kenneth Major, 2 Eldon Road, Reading, RG1 4DH will bring them Bulletin No.10, this issue and the next two without having to do anything else.
- (ii) By reducing the production costs. The obvious but undesirable way of doing this is to cut back on the size and standard of production, so leading to an even smaller circulation. The other way of reducing costs is to get the Bulletin produced more economically. Surely there must be someone in the large area covered by CBA9 who is able to help? The Editor would be pleased to hear from anyone with suggestions on this.

G.H.S.

CONFERENCE ON THE FUTURE OF INDUSTRIAL ARCHAEOLOGY

This one-day Conference was arranged by the Council for British Archaeology to discuss the future requirements of Industrial Archaeology. The meeting was held in the Institute of Archaeology, Gordon Square, London on Saturday 11th October and was attended by over a hundred representatives from societies engaged in surveys of industrial monuments and other bodies interested in industrial archaeology. The five counties of CBA9 were well represented at the meeting.

The first part of the meeting consisted of an introduction "Industrial Archaeology: the first ten years" by the Chairman (Professor W.F. Grimes, Director of the Institute of Archaeology and Chairman, C.B.A. Industrial Archaeology Research Committee); a talk extra to the programme by Mr. Taylor, Inspectorate of Ancient Monuments, Ministry of Public Works and Buildings; "Industrial Archaeology: the next ten years" by Mr. L.T.C. Rolt (Chairman, Bath Conference Steering Committee on the Future of Industrial Archaeology) and "The future of the Journal of Industrial Archaeology" by its editor, Dr. John Butt of the University of Strathclyde.

The remainder of the time was spent in discussing a paper put before the meeting by the Bath Conference Steering Committee on the Future of Industrial Archaeology (on which CBA 9 Industrial Archaeologists are represented by two members). This paper was concerned with the need for co-ordinating Industrial Archaeology either by the formation of a national society or by the strengthening of the CBA organisation so that it could more adequately cater for Industrial Archaeology amongst its responsibilities. The three main points presented by the Steering Committee were as follows:-

1. National Organisation

The case for this rests upon the conviction that certain important functions are not being adequately performed at present by any agency. These functions are:

- (a) the provision of a regular information service and liaison for industrial archaeologists,
- (b) the encouragement of systematic excavation and other research projects, and
- (c) the promotion of a comprehensive national policy for the preservation of industrial monuments.

These functions imply the existence of an authoritative body which could represent industrial archaeologists nationally, make official approaches to government bodies, and generally act as a mouthpiece for the subject.

2. The Council for British Archaeology

The Committee is convinced that the CBA would be the best body to perform the functions mentioned, because:

- (a) it already co-ordinates other archaeological work, and it would be useful if industrial archaeology could be fully integrated with this.

- (b) it already has close links with government departments for listing and scheduling monuments, and receives a grant for the National Survey of Industrial Monuments.
- (c) through its Research Committee on I.A. it has acquired experience of the subject.
- (d) it would be difficult in practice to establish a new I.A. organisation alongside the existing CBA institutions. In particular, it would be difficult to raise adequate finance.

The Committee suggested strengthening the CBA institutions to perform the functions of a national I.A. organisation and this would involve:

- (i) making the Research Committee territorially representative.
- (ii) reorganising the Advisory Panel procedure to deal more promptly with recommendations for scheduling and listing.
- (iii) increasing the secretarial provision to deal with the greater volume of I.A. business

3. Other Forms of Organisation

Although the Committee felt strongly that the CBA would be the best body to perform the desired functions, it recognises that some other form of organisation will be necessary if the CBA refuses to accept the projected increase in its activities. If such a course of action becomes unavoidable, the CBA should be prepared to hand over its existing I.A. institutions and official contacts, and especially its "goodwill" with these contacts, in order to prevent the duplication of functions. The Committee considered that membership of an independent I.A. organisation should be on a representational or federal rather than an individual basis.

After lengthy discussion, at times heated (One gentleman from Cambridge, after a particularly angry exchange with the chairman dramatically announced he would leave the conference only to fall over chairs at the back of the hall and find he could not get out!), the proposals (i), (ii) and (iii) under 2. above, were agreed. It was felt that more frequent meetings of the Research Panel and Research Committee for Industrial Archaeology would help, together with a more democratic method of selection for service on the Panel.

Immediately after this agreement, Professor W.E.Minchinton (University of Exeter) proposed the formation of a national society for Industrial Archaeology. Following another prolonged and animated discussion, this proposal was rejected by approximately 50 against to 30 in favour.

GHS

BATH INDUSTRIAL ARCHAEOLOGY CONFERENCE

October 31 - November 2, 1969

The Bath Conference is now an established annual event to which more and more keen industrial archaeologists are going. Whilst in this conference the subject had little relevance to the Group Nine area - being lead mining - the discipline and discussion arising from it had. What is important is to meet other industrial archaeologists and to exchange ideas and views. To see our Buckinghamshire representative, Peter Jarvis, disappearing down condensing flues in a boiler suit complete with cameras, measuring equipment and a torch was an education in itself.

In view of the feelings of the meeting, that this was a lead mining conference and had no authority to discuss the future of industrial archaeology, no discussion took place on the results of the October 11th conference.

JKM

CBA GROUP NINE CONFERENCE - 1969

The annual conference of CBA Group 9 took place on November 8th, at Reading University under the broad heading of Recording Buildings. Dr. Pantin was the main speaker, dealing with "Recording Old Buildings". This was a lively talk on the problems associated with the hidden features which many of our 17th and 18th century buildings possess. It showed the features of these buildings which clearly give an indication of a medieval core and from it the keen student could obtain pointers to the methods of dating buildings.

The main speaker was followed by short talks on various aspects of archaeology in the area covered by CBA 9. The industrial archaeology contribution was provided by J. Kenneth Major, talking on Colliers Brickworks, Reading. An abstract of this is given on page of this Bulletin.

JKM

INDUSTRIAL ARCHAEOLOGY ON "CHRONICLE" - BBC-2 TELEVISION

On Saturday, March 14th, 1970, the BBC-2 series "Chronicle", which is concerned with Archaeology and History, will show a programme devoted to industrial archaeology. (The background to this was described on page 11 of No. 10 of this Bulletin).

In contrast to the usual 50 minute programme, this is being presented as a study of the activities of various industrial archaeologists. Some eight or nine projects will be presented during the programme and each of these will receive £25 worth of equipment whilst the winner will receive £250 worth. The programme promises to be a good one as it will present various aspects of industrial archaeology. Projects which have been examined and are known to have been short-listed out of nearly 100 entries are :-

Northern Mill Engines and their Preservation,
The work of the Sussex Industrial Archaeology Society,
Water raising by Animal Power, the study of horse engines
and donkey wheels,
The Redditch Needle Mill.

The aim of the programme is to extend knowledge of the subject of industrial archaeology and it is hoped that this will bring in more members to the societies in Group Nine.

JKM

EXHIBITION

The Northamptonshire Industrial Archaeology Group is arranging an Exhibition at the Central Museum, Guildhall Road, Northampton from Saturday 25 April until Saturday 9 May 1970.

There will be sections on the following:

Pottery	Breweries
Stone Quarries	Leather
Brickmaking	Boots and Shoes
Iron ore mines & quarries	Industrial Environment
Ironworks	Roads & Bridges
Farming	Rivers and Canals
Iron Founders	Railways
Engineering	Shopping
Windmills	Water Supply
Watermills	Gas Supply
Steam mills	Travelling Showmen

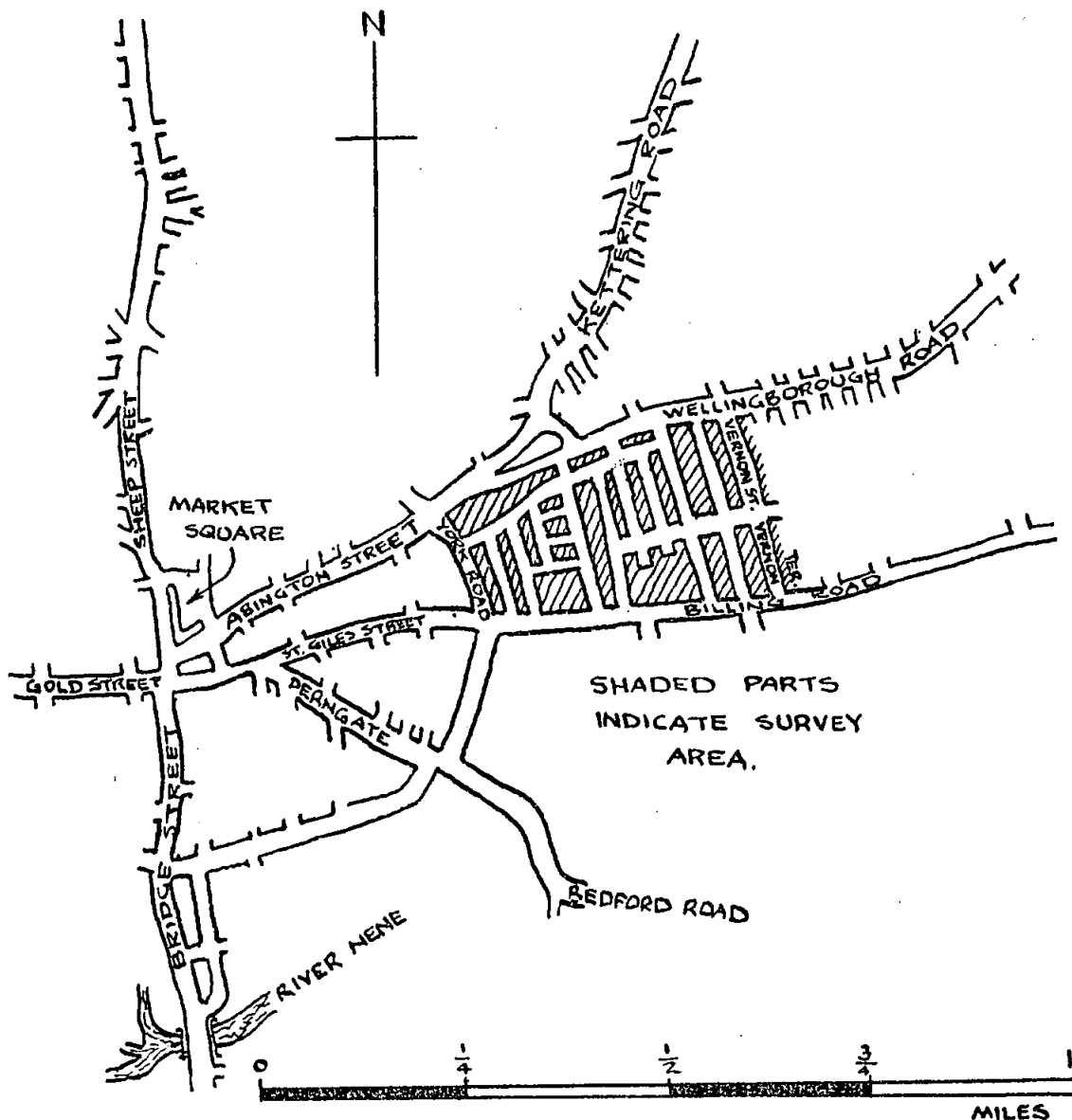
Guildhall Road is opposite the Town Hall, near the Centre of the Town.

A SURVEY OF PART OF VICTORIAN NORTHAMPTON

The Industrial Archaeology Study Group of the Archaeology Section of the Northamptonshire Natural History Society & Field Club decided to make a survey of all the industrial buildings in one part of Northampton. However, soon after starting the survey it was realised that, because the chosen area contained industrial and domestic buildings intermingled, the value of the survey would be greatly increased if all buildings in the area were included. Some notes on the methods of the survey were given in Bulletin No. 10, page 17. The following is an interim report by A.V. Goodfellow and G.H. Starmer, on the survey as at December, 1969.

General Description of the Survey Area.

The part of Northampton chosen for the survey was that bounded by Abington Square (South side), Wellingborough Road (South side), Vernon Street and Vernon Terrace (East side), Billing Road (North side) and York Road (East side), see map below. These roads enclose an area of approximately 47 acres. The survey area is adjoined on its east side by the New Town area which was built earlier. It is thought that most of the building in the survey area was done during the third quarter of the 19th century: several factories carry dates of the 1870's. The houses along the Billing Road were erected a little earlier than this.



For the survey, the buildings were considered under seven different categories of present use and the approximate numbers of buildings under each category were as follows:-

Factories and workshops	48
Domestic (Houses)	923
Religious	3
Shops - retailers	86
Public houses	5
Schools	1
Others (Offices, including houses used exclusively as offices, hairdressers, turf accountants, garages, warehouses, electricity sub-stations etc)	44

The survey is not yet complete but at this stage it is possible to make the following comments on buildings in the survey area.

Factories

Many of the industrial buildings in this area were originally built for boot and shoe manufacture. Bearing in mind that these were built mainly during the third quarter of the 19th century and machinery was introduced into the shoe industry during the 1860's accompanied by a move to work in factories, it is not surprising that there are comparatively few signs of workshops behind domestic dwellings. Although these were to be found in some parts of the town, for example, the rows of backyard workshops which, until a few years ago, were behind the north side of Hervey Street (SP 760 612), it has been suggested that this practice was not extensive in Northampton and that the 'outworkers' often worked in what is now the back bedroom. By the time the survey area was built, the trend to move work into a factory would have been very pronounced and the intermingling of factories with houses could be taken as evidence of the move away from domestic working. In 1875, the local newspaper referred to new shoe factories being built in areas where 'the homes of their workers would be for resting and not for work' (1). Amongst the few examples of the small workshop at a dwelling house are :-

(SP 760 607) Built on to a house at the west end of the north row of houses in Abington Place is a small two-storey extension with a lean-to roof. The upper storey has large windows and an exterior door at first floor level.

(SP 762 606) A house in Pytchley Street, at the west corner of the junction with Thenford Street, has a small (about 8 feet square) two storey addition, jutting out to face on to Thenford Street. At street level, double doors open out on to Thenford street whilst above is a 4½ feet wide by 6 feet high wood framed double casement window. These dimensions are somewhat greater than those of the windows of the house which the workshop joins. Also on the second storey, but facing east, parallel to Thenford Street, is a full-length external wooden door, glazed in its upper panels.

Whereas in Leicester, the introduction of closing machinery (i.e. for the manufacture of uppers) was part of the development of the boot and shoe factories, in Northampton the practice was for closing to be done by separate closing firms. Before the turn of the century, the trade sections of the local directories were listing whole columns of closers. Many of these would operate about 20 machines in a small building behind a row of houses, often in an extra storey built over the external wash-houses. In the survey area, there are some examples of buildings which may have been used for such work :-

(SP 761 607) There is a building of this type adjoining, and aprtly built into, the house at the SE corner of Abington Place. This 'factory' is of three storeys with exterior doors on the third and second storeys on the south side. Many of the windows have been altered but those on the upper storey are still large wooden-framed with 15 rectangular lights in each side.

There are a number of low two-storey workshops built onto houses on corner sites, the house fronting onto one street whilst the workshops are along the adjoining street. An example of this arrangement is :-

(SP 762 608) See figure 1 on page 9. On the west side of Victoria Road, between Wellingborough Road and St. Edmunds Road, is a 30 - 35 feet long two-storey building, 21 feet high to the ridge of its roof which is only at the level of the eaves of the house which it joins. At the north end, i.e. that furthest away from the house, there is a wing extending back for 30 feet from Victoria Road. The upper storey on that road has two large casement windows, each 8 feet long by 5 feet high, and also a wooden external door, originally glazed in its upper panels. On the left hand side of this door, a cast iron swinging jib, for an external hoist, is mounted on the wall. The design of the jib is particularly pleasing with a circular motif in the spandrel formed by the curved compression member of the jib. The hoist is no longer in use but externally is complete except for the actual hoist rope or chain.

Mr. John H. Thornton (Head of the Boot and Shoe Department, Northampton College of Technology and President of the Archaeology Section of the Northamptonshire Natural History Society) considers that later buildings for boot and shoe manufacture were influenced by the development of heavier machines for lasting and attaching (Uppers to soles) and eventually the very big heavy presses for the bottom stock. The arrangement of the boot and shoe factory was then :-

On the top floor	:	Clicking;	Closing
On the intermediate floor	:	Lasting;	Attaching
On the first floor	:	Finishing;	Shoe room
In rooms half above & half below ground level:	:	Bottom stock	

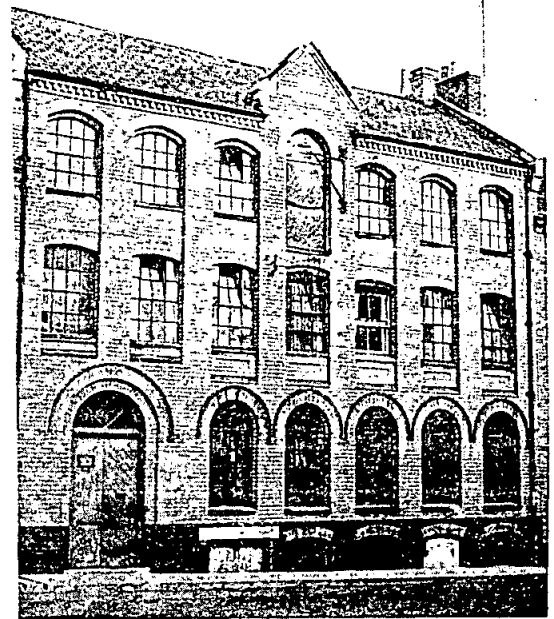
This would give a three storey building with an additional row of windows at pavement level for the sub-basement 'bottom stock' rooms. In the area surveyed, there are numerous examples of buildings with an external appearance indicating this internal arrangement, including the following :-

(SP 762 606) See figure 2 on page 9. On the east side of Victoria Road, almost opposite Harold Street, are the premises occupied until recently by the Kingswell Shoe Company. These have a frontage of 40 - 50 feet and stretch back approximately 80 feet from the road. The front of the building has three storeys, together with half windows at pavement level in Victoria Road. In the centre, rising about $6\frac{1}{2}$ feet above the eaves, is a stone capped pediment. Within this is a small rectangular date stone inscribed '1873'. Below this, at second storey level, is a full length wooden door, surmounted by a semicircular brick arch and with the swinging jib, of simple straight line design, for an external hoist, mounted on the wall at the right hand side. The only other doorway is at the left hand end opening onto the pavement. This doorway and the five ground floor windows all have semicircular brick arches. These windows, iron framed as are those on the other two storeys, have vertical glazing bars ending in spikes above the top horizontal bar, except for the centre vertical bar from which spring two diverging curved bars, forming two Gothic arches with the inwardly curving outside members of the frame. The windows on the upper storeys, and those at pavement level, are much simpler with only slightly curved brick arches.

(SP 762 607) See figure 3 on page 9. Also on the east side of Victoria Road but a short distance north of the Kingswell Shoe Company's factory, is a much smaller building at No. 32 & 34. This has a frontage of about 20 feet and extends back for something near 60 feet from the road. Although only two storeys high, this also has half windows at pavement level and external doors at its left hand end at both street and first floor level. The latter has a swinging jib, now lacking the hoist rope or chain, mounted on the wall on its left hand side. These premises are used by Hinde & Mason, Motor Factors, but the 1940 Kelly's Directory shows them as occupied by Geo. Dunkley, Leather Goods Manufacturer.



FIGURE 1. VICTORIA ROAD



PREMISES FORMERLY OCCUPIED
FIGURE 2. VICTORIA ROAD BY KINGSWELL SHOE COMPANY



FIGURE 3. 32/34 VICTORIA ROAD

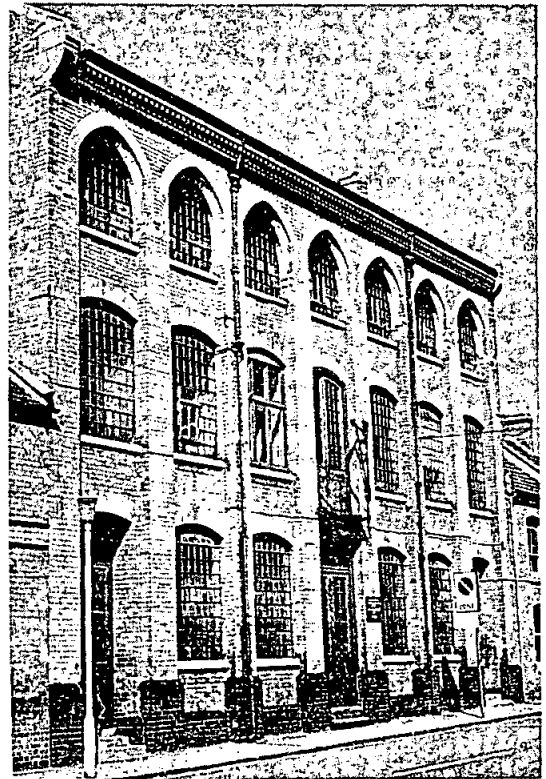


FIGURE 4. PALMERSTON ROAD

(SP 764 608). See figure 4 on page 9. The Northampton Legging, Gaiter and Spat Company Limited occupy a factory on the west side of Palmerston Road. This has a frontage of 50 feet, extending back for 55 feet although the main three storey block is only about 30 feet wide. The side of this block, facing the road, is in seven bays, with double doors in the centre bay of the second storey flanked by a swinging cast iron hoist jib mounted on the brick pier to the right of the door. There are three doors at street level, one in each of the end bays and one in the central bay. There are cast iron shoe scrapers let into the walls on the left of the door at the left end of the building and on both sides of the doorway at the other end. First and second storey windows are surmounted by slightly curved brick arches whereas the seven windows in the top storey have two-centred brick arches. There are no windows at pavement level. The appearance of the front of the building is enlivened by the use of yellow bricks at the windows and doorways and for the main vertical piers, contrasting with the red brick of the rest of the structure. The rear of the building is of plain red brick with six large windows on each floor together with staggered smaller windows at the south end, presumably at the staircase.

With the use of heavier machinery in the boot and shoe industry, there was a requirement for power additional to that from human muscles. In a reference (2) to a new manufactory rising near the Billing Road in 1875, it was stated that manufactories suitable for steam machinery must be built in order to apply it. Although steam engines may have been installed, there is now little evidence of the tall chimneys which would have been required for the flues of the boilers needed to raise steam for the engines.

It has been suggested that the gas engine was the main form of prime mover in the early days of application of power to the shoe industry. Lenoir produced the first commercially successful gas engine in 1859/60 but it was not until 1880 - 85 that this type of engine was developed sufficiently to become accepted as a more convenient form of power than the steam engine. However, the first stages of mechanisation of shoe manufacturing may not have required a great deal of power. If a shoe manufacturer was sufficiently enterprising to install the latest machinery, it is likely that he might try the new gas engines even though they were small. By 1874 Northampton had its first Otto & Langen gas engine, in a printing works in Newland (3). The printing firm's advertisements, headed "Printing by Gas ! Steam Superseded !" may have influenced the shoe manufacturers in their choice of a prime mover if their power requirements were small.

It is known that eventually many firms in the area, covered by this survey, employed gas engines including :-

Church's,	Shoe manufacturers,	Pytchley Street,
Greens,	Builders,	Palmerston Road
John Laycock & Sons,		St. Edmunds Road (4)
Henry Martin,	Joinery Works,	Thenford Street.

Even when gas engines, or the later oil engines, remain in situ, there is little external indication of this. Before the survey is completed it is hoped to go inside a few of the factories in the area and this, together with documentary research (sales notices etc.) and talking with old employees and maintenance firms, should give more information on the sources of power used before the widespread utilisation of the public electricity supply.

After 1900, the directories show a considerable decrease in the number of firms engaged in the boot and shoe industry in the town. This could be attributed to mergers and the smaller firms going out of business when they were no longer able to compete with the larger manufacturing enterprises. The smaller factories were then used by other industries and the survey has already shown that many buildings listed in older directories under the shoe industry, are now occupied by firms involved in activities such as clothing, heating and ventilating, packaging, picture framing, box-making and so on.

Houses

The houses in the survey area provide a cross-section of types and sizes built during the second half of the 19th century, ranging from small two-storey houses with 15 feet frontages to the large houses in the Billing Road, many built by the wealthier shoe manufacturers. Some of these large houses have towers surmounted by concave-sided pyramid roofs (Nos. 26, 30 and 40). Some still have coach houses at the rear and there is a fine example at (SP 765 606) in Palmerston Road at the rear of No.39 Billing Road. This coach house has elaborate ridge tiles and seems to have had stables on the east side but these have been demolished.

All of the houses are along streets except for twenty in Aington Place. These are arranged in two rows of ten, facing each other across a paved yard, which is the only means of access to York Road, running at right angles to the rows of houses. These twenty dwellings are virtually identical and the other streets on the west side of the survey area, for example, Alexandra Road, Denmark Road, have long terraces of houses all similar to each other. On the other hand, the streets on the east side of the area display great variety in the houses forming the terraces: Victoria Road has two and three storey houses, some plain, some with ornate pilasters and keystones above doorways and windows, whilst of the ten nearest Billing Road on the east side, each is significantly different from its neighbours. Palmerston Road and Vernon Street and Terrace also display pleasing variations in the houses and are worth a visit by anyone who thinks that 19th century terraced houses lack interest.

Although every house is not provided with shoe scrapers, there is a considerable number of cast iron scrapers of different designs. All of these are of the type let into the wall adjacent to the doorway: if there were examples of the free standing type these must have been removed some time ago due to the danger of pedestrians falling over them.

Shops

The high number of 86 shops is due to the survey area including one side of Abington Square and Wellingborough Road. Together these, forming one of the main shopping thoroughfares leading into the town, account for 55 shops (and 19 of those buildings listed under "Others" - see page 7). Apart from another 11 shops in York Road, close to the town's main shopping street, the other shops in the survey area are of the older variety with a number of true street corner shops with their single entrance angled at forty five degrees to each of the streets meeting at the corner. Several of the shops still retain their original fronts, some with the tops of their windows having interlaced Gothic arches sprung from elegantly shaped wooden vertical members.

Street Furniture

In addition to the buildings, it was hoped to discover older examples of street furniture - street lamps, pillar boxes and suchlike. All of the street lighting appears to be by electric lamps carried on modern tubular steel supports. Some items of earlier times survive including:-

(SP 764 607) A cast iron wall mounted GPO posting box, bearing the inscription "E VII R". This is on the Woodford Street side of a grocery shop at the north west corner of the junction with Palmerston Road.

(SP 760 607) Old-type cast iron bollards, positioned across Abington Place to prevent vehicle access to it from York Road.

(SP 761 607) A cobbled way for wagons still remains under one of the arched entrances from St. Edmunds Road to the rear of E. Poole's premises on Abington Square.

Conclusion

All of those engaged in this survey agree that they have been pleasantly surprised by the variety and interest of the buildings in a part of Northampton which is usually dismissed as having nothing of interest. The Group hope that the experience gained on this survey will enable more efficient surveys to be made of other parts of the town.

References

- (1) "The Shoe Trade in Northampton", Northampton Mercury, January 16, 1875, p.5
- (2) Ibid.
- (3) Advertisement by Central Machine Printing Works, 20 Newland, Northampton in Northampton Mercury, January 10, 1874, p.4
- (4) Auction notice for plant and equipment at John Laycock & Sons, St. Edmunds Road included "12 horse power Stockport Gas Engine". Northampton Independent, February 29, 1908, p.18

COLLIERS BRICKWORKS, READING

This is an abstract of the paper given by J.Kenneth Major at the CBA Group 9 Conference at Reading on November 8, 1969. Colliers Brickworks, at Grovelands, Reading, has now been totally obliterated and houses are being built over the site. This paper gives a summary of what the works made and how they were recorded when demolition was put in hand.

Colliers Brickworks moved to Grovelands in the 1870's from pits which are now covered by the houses in Berkely Avenue and Coley Park. The new works enabled the firm to open up claypits on the hills surrounding the old village centre of Tilehurst. The works covered a very large acreage at the end of its life but the pits were about one mile away and the clay was transported by overhead cable railway.

The bricks produced were typical of those made in Berkshire and were a good red multi with a sandy face. Sir Edwin Lutyens used them in his work in Hampstead Garden Suburb, in the Deanery at Sonning and in many other houses up and down the country. In use they are mellow and soft and when required for arches and splays they could be cut easily with a wire saw.

Most of the bricks were hand made and one range of the buildings had the brick-makers benches at every window of the four-storeyed building. Here the clay was dumped after it had been matured and mixed. The maker cut off a lump with a wire saw and slopped it into a mould. The brick was then turned out of the mould onto a wooden board to be put on the drying racks which stood across each floor between the benches. From these racks, the bricks were passed through tunnel kilns where the bricks were dried by hot air. From the tunnel kilns the bricks were taken to the large Hoffman, or Belgian, kiln occupying the next building. Special bricks, splayed bricks, sills, cornices etc. were made in the same way but these were burnt in downdraught kilns where the control was more uniform.

In another range of buildings standing between the Hoffman kiln and the road, tiles of every form, shape and size were made. The tiles were made by hand in the same way as bricks, they were then dried and stacked to await burning in the downdraught kilns. Here again, the high quality of these tiles was greatly sought after.

One little known aspect of Collier's work was the production of glazed earthenware-Silchester Ware. This was in production in the early part of this century and the designers used samples of Roman and Medieval pots from Reading, Silchester and York Museums as their patterns. This ware was glazed in rich blues, greens and browns. At the end of the life of the works, this pottery had ceased to be decorative and had reverted to straightforward red earthenware such as flower pots, garden pots and egg crocks.

When it was known the works were to close, every aspect was photographed so that the buildings were fully recorded. Several sheets of drawings were rescued which are now in the Royal Institute of British Architects' Library and these related to known buildings in Reading. Catalogues have been rescued from the bonfire pile. Perhaps more important was the recording of stock in the warehouse which clearly had not been opened up since the early 1920's. The items here were photographed, either singly or in groups, with a scale rod beside them. Unfortunately the stock has now been dispersed but it was full of finials, crosses, ventilators and the like which can be matched on existing buildings all around Berkshire.

TINGEWICK MILL, BUCKINGHAMSHIRE

This mill, on the River Ouse (SP 662 341), ceased grinding in 1966 and has since been extensively renovated by the new owner, as a dwelling. The fabric of the building remains essentially untouched although certain windows and doors have been replaced or added. Much of the machinery remains as is shown by the following report by Richard O'Rourke.

A mill on this site is recorded in the Domesday Survey as rendering 4/- and being possessed of 3000 roods of land. The part of the building now containing the machinery is at least older than 1720 (This and other dates derive from the mill day books, most of which survive) but the adjoining house, although of similar materials of construction to the mill, was rebuilt in 1836 according to a datestone on it. The last miller was Mr. Pym.

The mill race leaves the main stream immediately south of the Buckinghamshire Railway arch over the River Ouse (SP 663 345). The main stream is diverted east here, at a stone structure which may have originally been a sluice. The mill is situated 350 yards along here, and there is a tail race of 100 yards. The normal head of water available is $4\frac{1}{2}$ feet.

The building is constructed of uncoursed stone with brick inserts around the windows - this has not been done recently. There are two main storeys and a third floor in the roof. This is hipped but truncated at the end containing the waterwheel (i.e. the north end) and is tiled. There is no lucam but there is a dormer type window in the roof and two doors on the first and ground floors immediately below this. Presumably the hoist was housed here.

A new wooden wheel was fitted in 1733 and part of the solid shaft for this exists. This wheel was replaced in 1930 by a steel breast-wheel, using the newly made wooden shaft of 20 inches square section, of the previous wheel. The new wheel was built up using rolled steel channel section for the spokes, cut steel sheet for the rim and sheet steel paddles, bent to shape. The paddle-tip to paddle-tip diameter is 12' 4" with a total width of 60". The paddles themselves are of bucket shape but have no end plates. The main wooden shaft is of interest in being built up of four separate 10" x 10" sections bound at the ends, which are cut circular for the bearings, with steel bands, held by steel wedges driven in. This shaft was removed in 1966 (It still exists) and was replaced by a 3" steel shaft and welded in plates. The plain metal bearings were also removed and have been replaced by patent ones.

The pit wheel is a two piece iron gear, cast by the Kirkstall Forge of the Butterley Company and fitted in 1780. It has a square centre to accept the 20" wheel shaft, has 8 spokes, is 86" diameter, 10" thick at the centre and has 100 teeth. The main vertical shaft is 16" diameter and of wood, tapering to 12 $\frac{1}{2}$ " at its base. From this base projects a 2 $\frac{1}{4}$ " diameter iron rod resting in an adjustable 'penny' bearing. The cast iron wallower has 40 teeth, 8 spokes and is 36" diameter. The centre is octagonal and is fitted to the shaft using wooden wedges.

The main spur wheel, mounted just above the wallower, is cast iron with 120 wooden teeth. It also is eight-spoked and is 86" diameter, 10" deep at the centre and has a square section centre wedged to the shaft.

The above is the total extent of the machinery easily seen in situ: the crown wheel is in position but is situated in part of what has been converted to upstairs living accommodation to which access was not given. This machinery is to be used to drive a large generator to provide power for the house. The following description of the other machinery is based on the pile of smaller items which have been heaped into a barn rather than being broken up. Since there are no signs of flour dressing machinery, it is possible that the mill was grinding for grist and not for flour when it ceased work.

The stone nuts were originally cast iron, had 19 teeth, four spokes and a diameter of 15 $\frac{1}{2}$ ". The centre was octagonal and the method of engagement appears to have been to drop the stone nut onto an octagonal taper on the shaft running up to the runner stone. Two pairs of stones were used, one of millstone grit and the other a composite burr. These were 46" diameter.

The sack hoist was worked by belt from a horizontal shaft geared from the main shaft on the stone floor. It was worked by the common fast-and-loose pulley method but the pulley was sufficiently well counterbalanced so as to be worked by a one pound weight on the rope !

The present owner has built a new head race for a turbine-generator set obtained from Deddington Mill, Oxfordshire. This has a Turgo 8 horse power, 1640 rev/minute turbine driving by belts, a Gilbert Gilkes & Gordon (of Kendal) 250volt direct current generator. There is also an oil pressure operated Centrifugal governor which is no longer connected. This turbine-generator supplies power current for the house whilst a 1911 single cylinder Lister diesel (Works number 31) is used to drive a Morrison (Loughborough) $3\frac{1}{2}$ kilowatt Farm-Light generator for lighting current.

THE LEIGHTON BUZZARD AND HITCHIN LIGHT RAILWAY

By P.R.Arnold.

There appears to be little known about this railway which, like so many others, never came to fruition. Had the line been constructed, the later L.B.L.R. (For key to abbreviations, see end of article) of 2' gauge, opened in 1919, would certainly never have come into being.

In May 1899 an application was made to the Board of Trade for a Light Railway Order for a line between Leighton Buzzard and Hitchin. The public enquiry was held on November 9th at the Corn Exchange, Leighton Buzzard before the Earl of Jersey and Colonel Boughley - the Commissioners appointed to "inquire into the expediency of granting the application made by W.S.Cowper (Esquire of Toddington Manor), John Waugh (Surgeon of Toddington) and J.H. Green (Maltster of Leighton Buzzard) for an order to authorise the L.B.&H.L.R."

The L.R.O. was granted early the following year, allowing 3 years to take up the powers of compulsory purchase and 5 years for completion of works. The line, of standard gauge, single track, would be 19 miles 1 furlong and 5 chains in length, passing under the M.R. at Harlington by a brick arch bridge of suitable length to carry up to six tracks of that Company's line. Rails were to be of at least 56 lb/yard to allow an axle loading of 14 tons. Overall speed limit was to be 25 mph which would be reduced to 15 mph for tender locos running in reverse and to 10 mph at a distance of 300 yards from any level crossing and on curves of less than 9 chains radius which also would have to be provided with check rails. The maximum gradient would have been 1 in 50 for 1 $\frac{3}{4}$ miles, with the summit near the Toddington - Milton Bryant road, against trains from Hitchin.

The passenger fares would have been 3d/mile first class, with 1d less each for the two lower classes. The Board of Directors, each of whom had to hold at least £500 in shares, was to consist of between three and seven members. The capital provided was £110,000 in £1 shares and cost of the line was estimated at £98,631. The Company were to provide at least six stations, namely near Leighton Buzzard, Hockliffe, Toddington, Harlington, Barton in the Clay, Shillington together with Ickleford if required. The engineer for the line was A.C.Pain and Baxter and Co. of Westminster were the solicitors.

H.C.Richards, M.P., one of the two barristers appearing at the enquiry on behalf of the promoters said that there were a number of sand pits in the locality and it was naturally desired to connect them to the line so as to convey the valuable mineral either to the L.N.W.R. or to the M.R. Developments in the brick trade could also be expected due to the presence of both sand and clay in the pits.

Joseph Arnold, of Camden Town, who was engaged locally in the sand trade, expected that the line would save 1/- per ton cartage on his output of 50,000 tons per year. George Garside, another local sand pit owner, gave similar evidence. However, despite the fact that the L.R.O. was granted and plans and sections fully completed the promoters abandoned their proposal.

In May 1902 a new application was made by John Cumberland (a local auctioneer and valuer), John Waugh and J.H.Green with a slightly modified route and an intermediate junction with the M.R. at Harlington. This triangular junction was to have had a curve of 5 chains radius from east to west, of 1 furlong from north to east and a straight

line from west to north. The maximum gradient would have been 1 in 50 in each direction. Trains from Hitchin would have faced this for 5 furlongs from the Tebworth - Toddington road crossing and in the opposite direction for 1 mile 2 furlongs with the summit near the Toddington-Dunstable road. Solicitors for the line were Fowler & Company of Westminster with James Saunders and George F. Grover as surveyors and G.W. Usill the engineer who estimated the cost of the line at £100,857. Capital was to be £114,000 in £1 shares and directors were to hold a minimum of £250 in shares. The axle loading was to be 14 tons on rails of at least 60 lbs/yard although this could have been raised to 16 tons on rails of 70 lbs/yard. At least eight stations were to be provided, namely near Leighton Buzzards, Egginton, Hockliffe, Toddington, Hartington, Barton in the Clay, Shillington, Pirton together with Ickleford if required. In other respects details of the scheme were similar to the previous application.

Once again the local sand pit owners had a keen interest in this scheme and Joseph Arnold conceived a feeder line (probably standard gauge) from the various quarries to the L.B.&H.L.R. near Clipstone. Much correspondence passed between Messrs. Arnold, Usill and Saunders and Fowler and Company, some of which fortunately has survived to the present day. Having studied this correspondence, an idea of the trials and tribulations which befell the scheme can be gained.

On September 4, 1902 Usill wrote to Arnold arranging a visit to Leighton for the following Wednesday - September 10. However, he wrote again on the 9th cancelling his visit owing to a meeting of the line's promoters on the same day which he found imperative to attend due to the impending enquiry before the Light Railway Commissioners on September 24. Arnold replied suggesting 17th as a convenient date which Usill accepted by a letter dated September 10 adding that despite his severe ill-health a meeting on the ground was essential before the enquiry.

This meeting took place as arranged but the following day brought a sad letter from James Saunders reporting Usill's death soon after his return from the meeting. Saunders informed Arnold that Fowler & Co. wished to see him as soon as possible regarding his evidence for presentation at the enquiry. This had to be passed to Counsel by Fowler before Monday, September 22. Accordingly, Arnold visited Fowler and the following proof was agreed upon :-

"Proof of Mr. Joseph Arnold.

That he is engaged in the sand trade near Leighton and carries an extensive business therein.

That the building of the proposed line would tend to considerably increase the sand trade in the neighbourhood, especially if the suggested tramways were made to connect the pits with the railway.

Witness carts or loads in the aggregate about 50,000 tons of sand a year and with better facilities he could considerably increase this.

The construction of the proposed railway would save him 1/- per ton in cartage to Leighton and would also, by its connection with the Midland and Great Northern Railways open new markets.

Witness is very much in favour of the line."

The chairman of the enquiry, which was before the Earl of Jersey and Colonel Boughley once again, concluded his remarks by stating that he was pleased to hear that all objections had been met and that he was pleased to recommend the scheme to the government for the Bill to be adopted and get passed by Parliament. In fact, the Board of Trade gave its approval on April 6, 1903 but, as before, nothing resulted.

Notes left by Arnold indicate points which he raised at the enquiry which was held at the Corn Exchange. He wanted guarantees that a reduction be obtained in the through railway rates including wagon hire as then in force. He suggested a rate of 2/6d per ton to London terminal stations on each of the three companies who were concerned. He also wanted to settle any costs of connections of any quarry sidings to the L.B.&H.L.R. An added note gives the output of his quarries for the year ended June 1902 as 40,000 tons of building sand and 8,000 - 10,000 tons of silica and various sands from Miletree Quarry.

On October 2, Saunders sent Arnold a tracing from the 6th series Ordnance Survey showing the line of a proposed tramway to the quarries. They pointed out that neither they nor Usill (presumably the late Usill) could be bound to its course

until levels had been taken but saw no reason against the positioning of the line subject to any improvements suggested by Arnold. Apparently he replied asking if the line could be extended to serve other quarries for on October 4, Saunders wrote saying that, contours allowing, this was possible for the more traffic carried the better.

From this date the scheme died as far as any fresh applications to the Board of Trade were concerned but on June 10, 1904 Arnold received a letter from Cumberland requesting a meeting to discuss the reply to be made to Fowler regarding the line. Obviously someone was trying to revive the scheme again in some way. Accordingly, Arnold wrote to Fowler on June 17 saying that he could add nothing further to his evidence but added that trade was increasing after a slump and suggested that should better terms be offered an increased trade might result especially if sidings could be laid to the various pits. Similarly, George Garside wrote to Fowler saying that he too found nothing to add to his previous evidence except that trade was on the increase and would continue so. He also asked for better terms and facilities as the line would be nearer to the quarries than the L.N.W.R. thus being assured of the greater part of the sand carriage. As a result of these two letters Garside informed Arnold that Fowler would meet them both on July 14.

The precise outcome of this meeting is unknown but on September 13, Arnold wrote to Fowler asking news of any progress as his support of the scheme now depended upon certain circumstances which had arisen. Fowler replied on September 29 saying that details for a scheme for constructing sidings would shortly be available but that he had not yet received an estimate for Arnold's sand traffic revenue. To this, Arnold replied, on October 4, that he would be glad of the details as soon as they were available but he was considering the matter of estimated revenue and wondered if anyone else had yet done likewise.

The following day Fowler sent the draft agreement to Arnold. At the time, cartage to Leighton station from the quarries was 1/4 - 1/9d per ton. In the agreement it was proposed that the sand pit owners pay 3d per ton from Clipstone to Leighton plus 8d - 1/2d according to the distance over the siding from the quarry. Thus they would pay 11d against 1/4d for the nearest quarries and 1/5d against 1/9d for the farthest. The owners would be put to no other expense in the matter and with quicker transit all the owners should benefit. Other markets would be opened up by means of the M.R. and G.N.R. systems. Provided the matter of traffic was resolved, the financial people were ready. A copy of this draft was also sent to Garside by Fowler who suggested that the two owners discuss it between themselves.

Unfortunately this draft agreement has not survived but as can be seen from Arnold's reply he was far from satisfied with the terms. He wrote that he had no plans to which the agreement referred and he intended giving more thought to the details which he contended were not in line with what was first laid down. He disagreed that his output was so much greater than that of the other owners and that his quarries lay farther from the line thus entailing the carriage charge of 1/2d per ton. He further stated that he would lose sales of sand and could not compete against such charges. He failed to see any benefit to the sand owners and thus the agreement needed very material alteration before he would accept it. Later he visited Fowler, for a tracing was sent on October 11 following his visit the previous week. Fowler added that he had suggested to Garside that the two owners meet the financial people at his office without delay. On October 17, Cumberland wrote and suggested to Arnold that the two owners signed the agreement as soon as possible as the syndicate was prepared to find the money to build the line but that they would take up the offer of another scheme if the matter was not finalised quickly.

Some of Arnold's notes indicate those items with which he was in disagreement:-

- (a) Any fresh competitor should be bound by the same rates as the present owners, who should have prior claims to any fresh developments and sole use of the line within a 3 mile radius.
- (b) Most important that the line be brought near to Miletree Crossroads instead of through Clipstone so as to save a large proportion of the tramway as first proposed.
- (c) If any of the 3 Railway Companies purchase or work the line, the same rates should apply and the agreement be free from alteration in any way.
- (d) The late Mr. Usill stated that the rate of 2/6d should be agreed upon by the 3 Railway Companies into London from the point where the L.B.&H.L.R. connects with each of their lines.

IRONWORKS IN NORTHAMPTONSHIRE

by

Geoffrey H. Starmer

Early Ironworking

There are references to iron-working in Northamptonshire from early times. Iron weapons and slag were found at Hunsbury Hill (SP 738 584) near Northampton during iron-ore quarrying in the period 1882 - 84 (1), and trial excavations in 1952 have suggested an early Iron Age Settlement, c.600 BC, possibly established by a group working the local ironstone (2).

During the Roman Occupation, ore is said to have been worked at numerous places in the county including Corby, Gretton, Irchester, Kettering and Rockingham (3). Judd (4) states that at Oundle Wood, situated in a small lateral valley, west of the town of Oundle, there are ironstone beds which have been extensively quarried in ancient times. There are several large mounds in this wood, some composed of masses of ore as brought from the pit and others of the same broken into small fragments, together with heaps of calcined ore and slag. From the remains of pottery and coins found at this place, Judd surmised that these workings were carried on by the Romans. There are numerous records of slag dumps in association with Roman pottery (5). The considerable amounts of iron slag and charcoal are presumed to indicate the smelting of iron (6).

The Rockingham Forest area was worked extensively for iron during the Anglo-Saxon era and the Domesday survey refers to ferrariae (forges) operating at Corbei (Corby) and Gretone (Gretton) during the reign of Edward the Confessor. This period of ironworking came to a sudden end, probably due to much of the county suffering at the hands of Earl Morcar during the rebellion of 1065(7).

By the twelfth century the industry had revived and Rockingham Forest contained a number of furnaces (8). Those at Geddington worked from the time of Henry II to Henry III (9). At the time of his geological survey, Judd (10) stated that in the vicinity of Stoke Albany, Wilbarston and East Carlton, as at almost all points of the outcrop of the Lower Estuarine series, there was evidence, in heaps of old slag, of the extensive working of these beds in former times. He also referred to an area S.W. of Newton (near Kettering) and on the opposite side of the valley where could be found traces of old iron workings "with abundance of black slag of the usual character". Judd mentioned similar sites at Southwick and higher up the brook to the south of Bulwick.

In these earlier furnaces, the ores were reduced to iron by smelting with charcoal. This was obtained from the timber of Rockingham Forest but charcoal burning eventually made such inroads into the Forest that, during the reign of Elisabeth I, laws were passed forbidding the making of charcoal in this and certain other areas in the country. This brought an end to ironworking in Northamptonshire for three centuries whereas other districts, such as Derbyshire, Shropshire, Staffordshire and South Wales began to increase in importance as ironmaking centres. The existence of iron-ore in the county was forgotten and by 1712 a writer stated categorically that there was no iron-ore in the county and that the earlier furnaces had been supplied with ore from other districts (11).

The presence of iron ore in Northamptonshire was rediscovered about 1815 (12) although without immediately arousing any interest. Samples of iron ore from various parts of Britain were shown at the Great Exhibition of 1851 and amongst these were specimens from the Woodford (near Twywell) estate of Colonel Arbuthnot. The South Staffordshire ironmasters were already concerned about their diminishing reserves of Coal Measure iron ore and there was considerable excitement about this new source of iron ore (13). One ironmaster, near Dudley, began conveying away ore from workings at Wootton, at the rate of 2000 ton/week and started construction of a special railway siding at Northampton station (14). However, the ore was different from that previously used in the Staffordshire furnaces and the ironmasters were very disappointed with the results.

Due to the leanness of the ore and the need to use far more ore than fuel to produce a ton of pig iron, it seemed reasonable to smelt the ore locally despite the necessity of transporting fuel into the county. Mr. Thomas Butlin erected a small experimental furnace in Northampton and succeeded in smelting the ore in February 1852. Soon after he erected another small furnace at Wallingborough and managed to evolve new techniques for smelting the Northamptonshire ore. This was the start of the later period of ironworking in Northamptonshire but the county's iron-smelting industry grew very slowly.

By 1866, the annual output was only 19,000 tons with 6 furnaces in blast, by 1871 the pig iron produced in Northamptonshire was 60,512 tons out of a total production for the country of 4,379,370 tons of which Yorkshire, North Riding produced 1,029,885 tons and South Staffordshire 725,716 tons (15). By 1876 the county's output was 85,000 ton/annum (Just over one percent of the total British production) and by 1880, when the maximum number of furnaces ever to be in blast at one time in the county, namely 20, Northamptonshire produced just 2 percent of British pig iron. The county's contribution, in later years, to the country's steel production is also small: in 1937 the production of steel from Corby (the only steelworks in the county) was approximately 3 % of the national production (16) and during the 1939-44 period its average production was 5.5 % (17).

The various ironworks (the location of which are shown on the map opposite, page 19) are described in chronological order of starting dates in the following notes. The page number for the different works are shown in the list, in alphabetical order, below:-

Page 30	Corby
26	Cransley
21	Finedon
20	Heyford
25	Hunsbury
22	Irthlingborough
22	Islip
28	Kettering
20	Stowe
26	Towcester
29	Wellingborough
18	Wellingborough (East End)

Wellingborough, East End Ironworks (SP 895 682)

Following the discovery of a rich bed of ironstone in Wellingborough, Thomas Butlin (who had previously smelted local iron ore in an experimental furnace in Northampton) and company erected a small cold-blast furnace in 1852 at a site adjacent to what is now Cannon Street. The location of the East End works was probably influenced by the position of the iron ore workings which were situated in this area extending to the east and also north along Gold Street (the present B5386). This meant that when the works started, they were about $1\frac{1}{2}$ miles from the nearest railway, the Northampton-Peterborough line (opened 1845) and there must have been great difficulties in transporting fuel for the furnaces. The situation was only slightly improved when the Midland Railway's Hitchin extension through Wellingborough was opened in 1857, as there was still no rail connection between the East End works and the main-line railway, half a mile away. Butlin appears not to have shared the prevailing enthusiasm for simple tramways to serve ironworks. As late as 1871 there were advertisements that "Messrs. Thomas Butlin and Co., East End Iron Works, Wellingborough, are open to receive tenders for the raising and delivering of iron-stone by Horses and Carts to their works, and also into trucks of the Midland Railway. The contractor would have to provide at least Twenty Horses" (18).

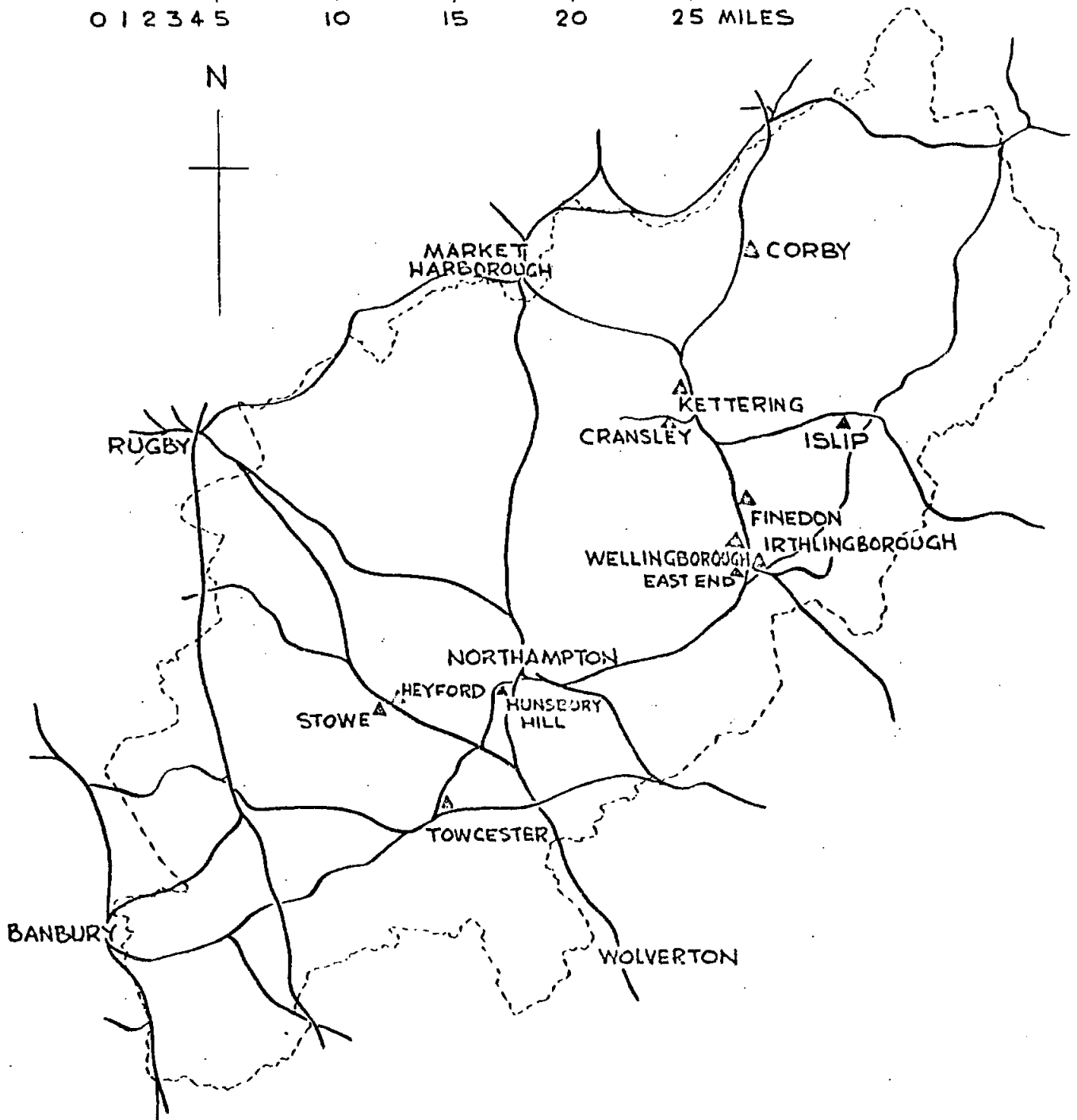
In 1863 another furnace was erected at the East End Works and the blast was provided by a 60 HP beam engine having a flywheel about 12 feet diameter. In 1874, the driver of this engine was killed when he was 'lifting the flywheel off its centre to start the engine when it started somewhat quicker than expected' threw him over and he was crushed between the flywheel and the wall. At the inquest it was stated that the driver was 'getting the engine in gear' and that it had been stopped for 25 minutes 'as customary . . when the casting was over' (19).

Iron ore was eventually obtained from a number of quarries around Wellingborough and an associated company Butlin, Bevan & Co. was formed to look after these quarries which included Irthlingborough (started 1863), Irchester (started 1863), Ringstead (opened 1871), Addington (started c.1877), Barton Seagrave (opened c. 1882) and Burton Latimer (started c. 1882).

With the working out of the ore deposits near to the East End works, the situation of the latter was a great disadvantage since there were no connections to a main-line railway and the best ore deposits seemed to be to the east of the River Ise. Butlin & Co. erected the Irthlingborough Ironworks to the south of Wellingborough (Midland) station and east of the River Ise. These works commenced operations in 1867 but the East End Works continued in production, although on a reduced scale, until 1876.

BLAST FURNACE SITES IN NORTHAMPTONSHIRE

0 1 2 3 4 5 10 15 20 25 MILES



△ BLAST FURNACE SITES

— MAIN-LINE RAILWAYS

Wellingborough East End Ironworks (continued)

The site was subsequently cleared and part of it later occupied by the generating station of the County of Northampton Electric Power and Traction Co. Ltd (later the Wellingborough Electric Supply Co.) and the rest of the site is now used as the Wellingborough U.D.C. depot. However, in the east corner of the area, near the junction of Thames Street and York Road, there is a group of single-storey buildings formerly used in connection with the ironworks, probably as workshops, stores and stables. The past activities of the area are remembered in the name 'Furnace Street', leading off Cannon Street opposite the north end of the ironworks site.

Heyford Furnaces (SP 654 578)

There is a reference to iron smelting at Heyford in 1855 (20) but this may have been in a small experimental furnace as the first pair of furnaces are recorded in 1857, owned by George Pell and Company. (21) These were located to the east of the LNWR London-Rugby railway, between this line and the Grand Junction Canal and to the south of the lane connecting Nether Heyford and the Watling Street (the present A5).

It is uncertain as to which quarries supplied ore to the Heyford Furnaces during the first few years of operations although it seems that the presence of ore at Heyford Hills, Pell's own estate, might have influenced the siting of the furnaces at Heyford. However, it is stated that these quarries were worked from 1863-8 (22) and of the other quarries worked by Pell and his associates, those at Gayton Wood were opened in 1858 (23) and another at Duston, near Northampton, in 1859 (24). The ore from both of these could have reached the Heyford Furnaces by the LNWR or by the Grand Junction Canal. In 1863, the Stowe Iron Company commenced operations about 2 miles south west of the furnaces and because of the hills in the line of the direct route, the ore was taken by narrow gauge tramway to a wharf on the canal for unloading into narrow boats for the $\frac{3}{8}$ mile journey south to the furnaces.

Unlike the nearby Stowe Furnaces, erected a few years later, the Heyford Ironworks worked more or less continuously for almost 40 years with only temporary shut-downs in 1859, 1863, 1866 and 1867. It has been suggested (25) that these shut-downs were due to the financial instability of the owners and there was a succession of these in the first half of the furnaces existence: S.Griffiths, connected with the well-known Guide to the Iron Trade of Great Britain, took over in 1861 but the following year the furnaces were again under the control of George Pell who, in 1865, formed the Heyford Co. Ltd. Charles Henry Plevins, a Derbyshire colliery owner, obtained control in 1870 and began to work all three furnaces (The third was erected in 1865) using ore from the 'celebrated Gayton and Duston mines' (26). The iron was well regarded in the Staffordshire market which was easily accessible to the furnaces by railway and the canal. The Heyford Iron Co. Ltd. was formed in March 1874 to run the furnaces and continued to do so until 1891. The plant then stood idle for a number of years and was eventually dismantled in 1898.

The site has been little disturbed since the turn of the century although some large blocks of slag, which had been local landmarks, were removed during the building of the M1 motorway, some miles away. The three hearths for the furnaces are still visible, approximately 6 feet diameter circles of brickwork and white slag, rising about 18 inches above ground level, set in line, almost at right angles to the main-line railway. There is a brick retaining wall on the north side of the railway embankment which is extra wide to have accommodated the sidings for the ironworks. Near to the furnaces, the embankment curves out to stop, end-on, at a brick faced vertical drop - presumably part of the arrangement for getting raw materials to the furnaces. There are two inclines leading from the main-line railway embankment down to the ground level of the ironworks. At the north west end of the site, close to the railway bridge over the Watling Street-Nether Heyford Lane, are houses said to be associated with the ironworks.

Stowe Furnaces (SP 652 578)

The Stowe Iron Ore Company started quarrying in Lodge Plantation (SP 628 563), in Stowe parish in 1863, as mentioned above. It is thought that initially the ore was taken by tramway and canal to the Heyford Furnaces described above but in 1866 the company erected Stowe Ironworks, in the parish of Nether Heyford, on the east of the LNWR London-Rugby line and to the north of the Watling Street-Nether Heyford lane. A single furnace was put in blast but only worked for a few months.

The following year, 1867, the working of the quarries was taken over by the Castle Dykes Iron Ore Co. Ltd. and the Stowe Furnace stood idle, the iron ore apparently going again to the Heyford Furnaces. By 1871 the proprietor of the Stowe Ironworks was William McClure who proposed the formation of the Castle Dykes Iron Co. Ltd. to operate as one concern the quarries of the Castle Dykes Iron Ore Co. Ltd. and the Stowe Ironworks. This came to nothing and McClure is said to have reconstructed the furnace by 1873.

Operations restarted at the Ironworks in 1875, the same year as the Nine Churches Iron Ore Co. was formed to work the quarries. The latter had no connection to the canal and their ore was brought on a standard gauge line, banked to the level of the INWR main-line but also at a convenient height to feed the furnaces alongside. There were two furnaces although only one was in blast during 1875 and 1876 when the works closed again. Limestone for the furnaces was also quarried by the Nine Churches Iron Ore Co. The furnaces were 50 ft high, 14 ft bos hes, 6 ft diameter across the hearth, with a capacity of 5400 cubic feet and a weekly output per furnace of 205 ton (27).

In 1889 the grand-sounding Steel & Iron Co. Ltd. took over the works and apparently took down one of the furnaces. The remaining furnace worked during 1890 and 1891 and then stood idle until 1894 when it, too, was demolished. The failure of the Stowe Furnaces is attributed to the lack of extensive ore deposits, as enjoyed by the other works in the district.

The site was acquired by Geo. King & Son (later the Blisworth & Stowe Brick & Tile Co. Ltd.) for brickmaking and this was in turn taken over by Henry Martin Ltd. of Northampton. The brickworks were closed in 1940. After wartime use for ammunition storage, the site lay derelict until modern industrial buildings were erected over the south east part.

There are still brick foundations to be seen amongst the undergrowth in the vicinity of the furnaces. The curved embankment, formerly used for bringing ore from the Stowe quarries to the furnaces, is still to be seen approaching the now electrified British Rail main-line from London - Rugby. On the south side of this is a wide verge: the site of the ironworks sidings, reaching almost to the Watling Street-Nether Heyford Lane overbridge. The trackbed for these former sidings, is still supported by brickwork with signs of earlier use for tipping materials for use in the furnaces.

Finedon Furnaces (SP 895 723)

The Glendon Iron Ore Co. started ironstone quarrying in 1863, about $2\frac{1}{2}$ miles north of Kettering Station, in the parish of Rushton on the west side of the Midland Railway's Kettering - Leicester line. The cutting of this latter line in 1853 (Opened 1857) revealed the presence of substantial ironstone beds, as can still be seen in the cutting where the Nottingham Direct line (via Manton) leaves the original Midland Railway line (SP 853 822). The company did not erect furnaces here but near Finedon, some $6\frac{1}{2}$ miles south of their quarries. It has been suggested that the reason for siting the furnaces away from the quarries was that at Glendon, the main-line railway is in a deep cutting but at Finedon the line runs at field level (28). It is likely that there was some other reason since there are other suitable sites, much nearer the Glendon quarries. For example, the site of the Kettering Iron & Coal Co's furnaces - this company did not start operations in that area until five years after the erection of the Glendon Co's furnaces.

Near Finedon, the furnaces were erected on the east of the Midland Railway line between Kettering and Wallingborough. The first furnace was put in blast in 1866, a second was in operation by 1868 and a third in 1869. In 1871, the company started sinking a colliery at Alfreton in Derbyshire, for supplying the Finedon furnaces.

In 1872 Checkland & Fisher became proprietors of the furnaces and quickly increased the size of the works. By 1876 two more furnaces had been erected but it was not until 1878 that all five were recorded as being in blast simultaneously. In 1882 a sixth furnace, 70 ft high, with 20 ft bos hes, was started and the works were the largest in the neighbourhood. With five furnaces in operation, the total output was 1100 - 1200 tons per week. There were four blast engines, two built by the Lilleshall Company having air cylinders exceeding 100 inches diameter (29).

Initially, all of the ore came from the Glendon quarries but by 1871 a line had been laid to quarries on the hillside to the east of the works (30).

In 1883 the name of the company changed to Glendon Iron Co. which became a limited company on June 23, 1886. From that time, there was a gradual decrease in ironmaking activity and by 1890 only two furnaces were in blast. The following year the final furnace ceased and the works closed.

The Islip Iron Co. took over in 1892 but nothing was done on the site until 1900 when three furnaces were dismantled and the ironstone quarries were handed over to Charles Barlow. The rest of the furnaces were not finally dismantled until 1908. Whilst the furnaces were operating, the slag was dumped at the rear of the works and after they were dismantled it was discovered that there was a large market for the slag as railway ballast. The slag was worked until 1924 when the site was taken over by Francis T. Wright Ltd., railway wagon repairers.

The works area is still discernible as rough and overgrown ground behind the present wagon works. On the west side of the Kettering - Wellingborough railway line are rows of terraced houses running east-west (SP 893 722). These were built for the workers at the furnaces and are still occupied although they have been considerably modernised during the past few years.

Irthlingborough Ironworks (SP 907 677)

The reasons for Thomas Butlin & Co's second works in the Wellingborough district have already been described - see page 18. The name seems something of a misnomer since the site of the works is within the present boundary of Wellingborough but when they were built, the Isebrook was the boundary between the parishes of Wellingborough and Irthlingborough and the works were on the latter side of the brook.

The first two furnaces, erected in 1867, were 55 ft high, 14 ft 9 inches boshes, 6 ft diameter hearth giving a capacity of 6300 cubic feet. The make averaged 192 ton per week per furnace. In 1882, two larger furnaces were erected, still 55 ft high but 18 ft in the boshes, 10½ ft throat and 7 ft diameter hearth, giving a capacity of 9025 cubic feet and an output of 700 ton per week. The waste gases were taken off at 16 ft above the hearth and 8652 cubic feet per minute of blast air were used. The two later furnaces were charged with a mixture of coal and coke, a typical charge per ton of pig iron produced, being :-

	Hard coal	36.2	cwt
	Hard coke	16.2	cwt
	Soft coke	21.2	cwt
	Limestone	14.32	cwt
	Raw Ironstone	50.01	cwt
	Calcined Ironstone	8.33	cwt

The slags were composed of .41% silicon, 9½% alumina, 37% lime and .34% iron (31).

On June 27, 1889 the firm became a limited liability company - T. Butlin & Co. Ltd., which took over the operations of the quarries from the former Butlin, Bevan Co. Many of these quarries closed in the next few years, 1891 or 1892 but the Irchester quarries continued to be worked by Butlin until 1906. From that time, T. Butlin & Co. Ltd. do not seem to have quarried iron ore and must have purchased it from other local quarry owners.

After the erection of the second pair of furnaces, there was rarely more than half of the capacity in use and for many years only one out of the four furnaces was in blast. In 1920, the works were acquired by the United Steel Company who, in 1925, finally shut down the blast furnaces and used the works as a foundry. Morris Motors took over the premises in 1947, which are still run as a foundry by the British Leyland Group.

Small quantities of slag have been found on the north side of the area but otherwise there is little to indicate the original use of the site. There are still plenty of small buildings on the site, dating from the time the furnaces were operating and the railway sidings for the Nuffield Foundry are still referred to as Butlins Sidings, half a century after that firm ceased trading.

Islip Ironworks (SP 969 782)

Quarrying operations in this area commenced in 1866, following the opening of the Midland Railway's line from Kettering to Huntingdon. In 1871, Charles Henry Plevins, a Derbyshire colliery owner, formed a company to work the iron ore deposits and build blast furnaces (32). The site chosen was approximately 1½ miles west south west of Islip, between the Midland Railway's line and the Kettering - Thrapston road.

The company was referred to as C.H.Plevins & Co. (Mineral Statistics) and also as the Islip Company (Mining Journal). Plevins had taken over the Heyford Ironworks in 1870 - see page 20 - but he had probably soon realised the limitations of that site and the Islip area offered greater possibilities with large reserves of good quality iron ore and served by the Midland Railway which gave a direct link for transporting fuel from his own collieries in Derbyshire.

Initially, two blast furnaces were erected, capable of producing 400 tons of pig iron weekly but the foundations and underground work were laid out for the addition of four more furnaces (33). The first furnaces were put in blast in 1873 but in 1874 it was reported (34) that a new company was reconstructing furnaces at Islip. From that time, two furnaces are recorded as both being in blast until 1879 when they were owned by the Islip Iron Company in which Plevins had controlling interests. In the same year, an additional two furnaces were erected although out of the total of four, only two at any one time were in blast until 1883 after which three are recorded in blast. This was the usual number until the 1920's when the number fell to two and this was usually the case until closure of the furnaces in 1942. During this latter period there were occasions when three furnaces were in blast together, due to one furnace being put into blast whilst another was under repair and being allowed to run on after the repaired furnace was returned to work.

About 1918, it is thought that the Plevins family sold out most of their interests in the company to N.W.Kidner and his brother. Eventually the Islip Iron Company was controlled by a holding company: Drayton Iron and Steel Company Limited who also owned the Bloxham and Whiston Ironstone Company Limited.

Ore and limestone for the furnaces were obtained from the surrounding quarries and brought to the ironworks by the extensive 3 ft gauge railway system operated by the company (35), (36). At the ironworks, the 3 ft gauge wagons discharged into loading bays, served by seven tracks laid over the top. The bays were divided into compartments by brick walls: from the west end, the first three compartments were used for calcining the ore, the fourth for raw ore ('redstone'), the fifth - much narrower than the others - for limestone, the next three for calcining, the ninth - again narrower - for limestone, the tenth for raw ore and the final three for calcining. Each track over the loading bays held about 48 of the narrow gauge wagons.

In the calcining process, about one ton of coal plus one ton of slack 'burnt' on average, just under 40 ton of ore and the loss of weight on calcining was just over 25%. The calcined ore was riddled by shovelling onto a large screen from which the lumps were forked into barrows for the furnaces. The dust left behind was shovelled into a two-wheeled square tub which was winched up a slope to tip into standard gauge rail wagons. These were taken up the bank at the east of the furnaces and tipped on the opposite side to where the slag was tipped.

In the 1930's, the furnaces were charged by hand, 90 times a day (37). Each charge consisted of :-

2 barrows of calcined ore	(Average weight : 1350 lb)
2 barrows of raw ore	(Average weight : 1100 lb)
2 barrows of limestone	(Average weight : 900 lb)
4 barrows of coke	

Eight men were employed in charging the furnaces. At the bottom, by the loading bays, 2 men loaded calcined ore (with a boy for running out the empty barrows from the bottom of the lifts), one man on 'redstone', one on limestone and two loading coke. At the top of the furnace, one man took the loaded barrows from the lifts and tipped their contents into the bell of the furnaces.

The barrows of materials were taken up in two vertical hoists - one between each outside pair of furnaces. One hoist, or lift, was operated by a horizontal steam engine with two cylinders, one on each side of the winding drum. The cables from the winding drum supported a cage capable of holding two barrows. The other hoist was a water-balanced lift. This had two cages, each of which could take four barrows, and had water tanks below the floor. Whilst the barrows from the cage at the top were tipped into the furnace, water from a tank at the top of the blast furnaces flowed into the tank in the cage. When this was full, its weight was sufficient to make the cage descend whilst at the same time raising the lower cage containing full barrows. As the descending cage reached the bottom, it knocked off a valve so allowing the water to flow out of the tank.

In 1930, there were 8 Cowpers hot blast stoves, heated by the waste gases from the top of the furnaces, to give a temperature of 1100 - 1300°F to the blast, which was at a pressure of 5 pounds per square inch. At one time there were four blowing engines, said to have been built by Stephenson's of Preston. The last one to be erected was a double vertical blowing engine which had been obtained second hand. This engine worked at 50 pounds per square inch, the steam being raised in Lancashire boilers heated by burning the blast furnace gas (65% went to the Cowpers stoves, the remainder to the boilers). At one time there were 17 boilers, most working at 50 pounds per square inch but two at 120 and another two at 150 pounds per square inch, the latter four having reducing valves to deliver at 50 pounds per square inch into the steam main.

Iron was run out at approximately 6 hour intervals from each furnace, giving a total output of 80 ton per day per furnace. Under the best conditions, each furnace should have given 600 tons per week "But this is seldom achieved" (37). The annual capacity of the Islip plant was given as approximately 80,000 tons per year in a report dated September 1932 concerning proposals by Stewarts & Lloyds for their Northamptonshire scheme (38). In front of each furnace were a keeper and three men, responsible for tapping slag and iron. The molten iron was run onto pig beds, open to the sky, and after the iron had solidified a gang of five 'pig lifters' were employed to break out the iron from the beds and load into railway wagons for despatch. The natural market for the foundry iron was the Midlands, particularly Staffordshire and the Birmingham area although some was sent to South Wales and about 10% of the total output went to Sweden, mainly via Kings Lynn.

Slag was tapped off from the furnaces into cast iron 'pots', arranged 8 in a hole close to the furnace. After allowing the slag to set, each iron pot was lifted off by a steam operated radial crane, one crane for each furnace. A set of claws was used on the crane to lift the solid block of slag onto special wagons, with a tipping base. These slag wagons were taken up the slag bank at the east end of the works, and then their bases would be tipped so that the slag lumps toppled down the bank. As they tumbled down the previously tipped lumps, the succession of impacts was hoped to break them into manageable size. However, there were usually quite a few big pieces which had to be hammered by men working at the bottom of the bank. The broken slag was hand loaded into 2 ft gauge steel V-tip wagons which were drawn by horses to the crushing plant. The original 'crackers' were replaced in 1912 by steel ones, driven by a steam engine, and lasted until the closure of the furnaces. Much of this slag was sold to Constable Hart but nearby councils also bought the slag for road-making and some was bought for railway ballast.

The determining factor in Stewarts & Lloyds Ltd. choice of Corby as the best location to concentrate their iron, steel and tube production was that the company, through Lloyds Ironstone Co. controlled large areas of iron ore. In the years immediately prior to the implementation of the Corby scheme, special efforts were made to increase the areas under lease and to this end, Stewarts & Lloyds acquired the Islip Iron Co. Ltd in 1930 (39). Besides the large areas of freehold and leasehold ironstone reserves directly connected to the Islip ironworks, the Islip company also had over 3500 acres at Harringworth, close to the areas already leased to Stewarts & Lloyds. It seems that the Harringworth reserves were the main reason for the acquisition of the Islip Co. since the furnaces there continued to produce foundry iron, using Islip ore, for a considerable time after the Stewarts & Lloyds take-over.

During this period, several improvements in plant and methods of working were implemented. One change was in the method of loading the furnace so that there were layers of ore, limestone and coke and this greatly improved the operation of the furnaces. Previously the ore etc. had been tipped in haphazardly and there was a tendency for the furnaces to 'hang' (40). At a meeting of the Stewarts & Lloyds Board on January 29, 1935 it was agreed that no major capital expenditure be undertaken at Islip "the plant to be allowed to become gradually inoperative, either through deterioration of the equipment or through inability to make profits" (41). However, about 1935 a turbo-blower was installed to provide the blast and some years later Babcock boilers were installed to replace the older Lancashire types. At the beginning of the Second World War, other turbo-blowers, previously used at Corby, were brought to Islip but were not installed.

After the acquisition of the Stanton Ironworks Co. Ltd. by Stewarts & Lloyds in 1939, there was a case for rationalising the production of foundry iron within the new group. Since the Stanton Company owned Wellingborough Ironworks, which had been modernised

in the 1930's, the decision was to close the Islip furnaces. These were blown out in 1942 and the employees transferred to Corby or Wellingborough. The Islip quarries continued to work until October 1952, a large part of the output going to the Irlam works of the Lancashire Steel Corporation, who had reached an agreement with Stewarts and Lloyds about the supply of iron-ore from Corby in 1930 (42).

Dismantling of the ironworks did not take place immediately after their closure and the 180 ft high chimney was not demolished until 1950 (43). Some of the smaller buildings still remain, including a row along the road to Thrapston and one of the locomotive sheds near the course of the old Midland Railway line. There have been a few new buildings erected recently in the ironworks area but not on the site of the furnaces where there are still remains of foundations. The calcine dust banks at the east end of the works were still being removed by contractors in October 1969 and the remains of these and the slag banks are being further eroded by motor cycle scrambles.

Hunsbury Hill Ironworks, near Northampton (SP 731 593)

Iron ore quarries at Hunsbury Hill were opened by the Northampton Coal, Iron and Wagon Company, Far Cotton, and these had become extensive by the early 1870's (44). The company decided to erect blast furnaces on the east side of the Blisworth - Northampton railway, about $1\frac{1}{2}$ miles from Bridge Street Station. Two furnaces were constructed by Howson of Middlesbrough (45) and the first was put in blast on October 23, 1874, followed by the second on November 20, 1874. The blast air seems to have been pre-heated from the beginning of operations since a 15 year old boy was reported to have been killed during the construction of stoves for the furnaces. These stoves were described as consisting of large iron pipes placed upright in groups (46).

Soon after the start of production, the Northampton Coal, Iron and Wagon Company were advertising that they were "prepared to receive offers for slag made at their furnaces, Hunsbury Hill, loaded into carts or wagons or delivered by rail to any neighbouring station." (47) By the end of January 1875, the Hardingstone Local Board made reference to getting slag for road repairs from the N.C.I.&W. Co. but had already received a complaint about the use of large lumps of slag in the road by a Mr. Butlin (Apparently no connection with the Wellingborough ironmaster) who had broken a spring on his brougham on the road (48).

In 1875 the Hunsbury Hill Coal & Iron Co. Ltd. was formed to operate the furnaces but these were not entirely satisfactory and were both out of work by 1877. The company invited Butlin, from Wellingborough, to advise on the furnaces and he recommended a reduction in size to 7400 cubic feet capacity. After this the furnaces worked better, producing approximately 260 tons of iron per furnace per week. Nevertheless, the company got into financial difficulties when the iron trade slumped and Pickering Phipps (well-known for his brewing activities in Northampton and Towcester, and a major shareholder in the company) bought out the other shareholders in 1888 to form the Hunsbury Hill Iron Co. He must have stock-piled the pig iron production because when the price rose he was able to sell some 80,000 tons for nearly £15,000 in 1889 (49).

In 1890 one of the furnaces was rebuilt and in the same year, after the death of Pickering Phipps, the furnaces were run by the executors of his estate.

Besides the quarries at Hunsbury Hill, the N.C.I.&W.Co. worked pits at Blisworth (about half a mile north west of Blisworth church and on the north side of the Gayton - Blisworth road) from about 1873. The ore was transported by narrow gauge tramway to a wharf by the canal where it was discharged into narrow boats fitted with removable tubs. In earlier days, the boats took the ore all the way to Hunsbury Hill, to unload on to rail wagons running on a narrow gauge track laid on the wharf, the track running on a sharp curve under the Blisworth - Northampton railway line and up to the furnace area. This procedure was still in use in 1908 since in that year the Grand Junction Canal Co. made a new "winding pool" for turning the boats at Hunsbury. To avoid the trouble of passing through the 15 locks between Blisworth and the ironworks, the narrow boats were later unloaded at a wharf just to the north of the railway bridge over the canal at the east end of Blisworth station. A crane lifted the tubs out of the boats and above railway wagons into which the ore was discharged for transport to the ironworks.

In the 1880's the Hunsbury workings were extended into the site of the Iron Age settlement - as mentioned on page 17. By the time of the First World War, the reserves of iron ore were nearly exhausted and with the call-up of men for the armed forces it is said that the company would have closed the works in 1917 except for the great war-time demand for iron (50). After the war there was a high demand for iron but the company could not survive the first recession in the iron trade and the furnaces were blown out on January 28, 1921 and the quarries closed. Although the works were idle, the name of the company changed to the Hunsbury Iron Co. in 1922. The works were acquired by Richard Thomas & Co. Ltd. in September 1935 and there was speculation that the site was to be developed to include steelworks and rolling mills, as had just been completed at Corby by Stewarts & Lloyds. However, the new owners soon dismantled the blast furnaces. During the Second World War the site was taken over by John Blackwood Hodge & Co. Ltd who continue in business there.

Amongst the buildings erected by the new owners, there are still one or two remaining from the ironworks. There is also the bridge carrying the lane (now called Euclid Avenue) from Rothersthorpe Road over the track of the railway connection into the works, a few yards before crossing the Blisworth - Northampton railway line.

Towcester Ironworks (SP 693 503)

The Towcester Iron Ore Company opened quarries at Easton Neston in 1873. Ironworks were erected on the east side of the Northampton - Banbury Junction Railway's line between Blisworth and Towcester, just over $\frac{1}{2}$ mile north of Towcester station.

Dr. C.W.Siemens, who by 1873 had developed the Open-Hearth method for the commercial production of steel from pig iron, was interested in the production of wrought iron or steel direct from the ores, without the intermediate stages of blast furnaces and pig iron. He experimented without success, using a rotary furnace at Landore works in 1869. In the 1870's he devised another form of rotating furnace and when he became a director of the Towcester Company, two (51) or three (52) of these were erected at the Towcester Ironworks and put in blast in 1875. Mr. Samuel Lloyd (one of the original partners of the firm Lloyd & Lloyd, tube makers of Birmingham which amalgamated with A. & J. Stewart and Menzies Ltd. to form Stewarts & Lloyds Ltd) was also a director of the Towcester Company and is attributed with suggesting several improvements to Dr. Siemens methods.

During trials over the next three years, some good results were obtained, the wrought iron considered to be equal to Swedish bars in toughness but generally the process was not a commercial proposition and Siemens abandoned his experiments at Towcester in 1878. The furnaces continued in use for producing a spongy iron for filtering purposes until 1882. In 1889 the ironworks and quarries were taken over by the Towcester Mineral & Brick Company who dismantled the furnaces and put in a connection to the Towcester - Ravenstone Junction line (Opened for goods on April 13, 1891) at Easton Neston, so enabling them to dispense with the earlier line between the quarries and the ironworks.

With the passing of over three quarters of a century, spreading grass has absorbed the ironworks site into the surrounding fields. Its position is shown by broken ground and a few brick foundations.

Cransley Ironworks (SP 849 776)

These works were built by the Cransley Iron Company, formed in 1875. The site, on the west of the Northampton - Kettering road (A43), was connected with the Midland Railway at Kettering by a private branch, opened on February 19, 1877 and purchased from the owners by the Midland Railway, by an Act dated June 28, 1877 (53). The furnaces were first put in blast the same year. In the early years, the iron ore for these furnaces was obtained from pits near Cransley and others to the north west of Broughton. There were originally two furnaces but by 1880 work was started on a third (54) and this was completed in 1882.

The works then comprised the original two furnaces, each 52 ft high, with 7 ft diameter hearths, boshes 16 ft, a capacity of 7200 cubic feet and having 14,784 cubic feet of blast air per minute. The new third furnace was 70 ft in height, with 20 ft boshes, 8 ft diameter hearth and a capacity of 13,200 cubic feet. The whole works were described as forming a well-arranged plant, with machinery of the best description (55). However, the quality of the iron ore from the Broughton and Cransley pits deteriorated and iron smelting had ceased by 1886, the company going into liquidation.

In 1890 a new company, the New Gransley Iron Company Limited took over the works and one of the remaining two furnaces was put into blast that year. The ore for this is assumed to have been obtained from quarries worked by the new company near White Hill Lodge (SP 833 776). Although these pits operated until 1897 (56), the new company joined with the Bestwood Coal and Iron Co. Ltd., the Sheepbridge Coal and Iron Co. and the Staveley Coal and Iron Co. Ltd. in promoting the Loddington Ironstone Co. Ltd to develop rich deposits of ore in the parish of Loddington, about $2\frac{1}{2}$ miles due west of the ironworks. The mineral branch was extended from the ironworks to a new railhead to serve the Loddington iron ore pits and opened for traffic in April 1891, the new iron ore pits commencing operations the same year. These pits provided the ore for the Gransley Ironworks for the rest of their working life.

One blast furnace was rebuilt during 1891 and for the next 34 years the works had two furnaces although for much of this time only one furnace was in blast. In 1924, an ambitious reconstruction programme for the works was started. An electric turbo-blower of 16,000 - 17,000 cubic feet per minute capacity with 7 - 8 pounds per square inch blast pressure was installed, replacing two reciprocating steam engines of 1876 and 1882 (one of which was reputed to be of the grasshopper arrangement). These two older engines were kept on stand-by until the works closed.

In 1925 a new furnace was erected, replacing one of the previously existing two. This new furnace, with a steel shell, had a height of 66 ft, with $10\frac{1}{2}$ ft hearth diameter and produced about 800 ton per week. It was provided with a steam ram for stopping up the iron-hole with ganister. Other improvements included calcine bays, two new Lancashire boilers giving steam at 160 pounds per square inch compared with the older boilers at 75 pounds per square inch, water softening plant and water cooling plant. In 1930, another new furnace was built with a hearth $11\frac{1}{2}$ ft diameter but also 66 ft high to fit in with the 1925 furnace and so avoid new elevating plant for raising the raw materials to the top of the furnaces. The anticipated output was 900 ton or more per week.

Beaver (57) considered that the Gransley works in 1930 were essentially a one furnace plant and not laid out for two. At that time he described the plant, as a whole, to be extremely up-to-date and well organised and the extensive scheme of reconstruction then being pursued would make it one of the most efficient plants in the country.

At that time, the ore was brought from Loddington at a railway charge of 5d per ton, using the Gransley Company's own wagons. About 55 - 60% of the ore used in the furnace was raw, the remainder being calcined in one of 10 brick bays, each of which held 3000 tons of ore. The method of working was one bay empty, two containing burnt ore being fed to the furnaces, three burning and four being charged with raw materials. The calcined ore was not riddled: lumps and dust were all hand-shovelled into large wheel barrows which were hoisted by a vertical lift between the two furnaces and tipped by hand from a charging platform at the top of the furnace.

Limestone, for fluxing, was obtained from Lloyds Quarries at Corby and carried in Gransley Company's wagons at a railway charge of 1/6d per ton. Fifteen different brands of coke were used at the works, 80% of this coming from South Yorkshire. The furnace was charged about 110 times every 24 hours, each charge consisting of :-

2 barrows of raw ore	at $15\frac{3}{4}$ cwt per barrow
2 barrows of calcined ore	at 14 cwt per barrow
1 barrow of limestone	
8 barrows of coke	at 8 cwt per barrow

i.e. about 7 tons per charge and this yielded about 21-22 cwt of pig iron.

The furnace was tapped for iron 4 times each day at approximately 4 a.m., 10 a.m., 4 p.m. and 10 p.m. The output was about 92% foundry iron and 8% forge iron (Pre-1914 the percentages were 55% foundry, 45% fidge). The pig iron was sold through iron merchants but it is known that some went to South Wales. A very small amount of the production was used by the company in casting railway chairs for their own sidings and also frames for their slag trucks. About 40 ton of sand was used on the pig beds each week. Most of this came from near Mansfield, Nottinghamshire but some yellow sand was obtained from the Stanton Iron Company, Glendon - north of Kettering. Ganister for closing the iron tapping holes was brought from the Sheffield area.

The slag was run off into iron tubs at the side of the furnace and, on solidification, was lifted out and sold to Constable Hart Limited who operated a small crushing and tarring plant in the space between the furnaces and the L.M.S. Gransley branch.

There were 7 Cowpers hot blast stoves, 6 in use at a time: 4 being heated and two heating the blast air. The average temperature of the blast was 1300°F. The boilers for raising steam for the turbo-blower to give the blast, were heated by waste furnace gases. These were said to be intermittent because of a "thick gas" - a white fume heavily charged with alkaline, due to forcing the furnaces to work very hot so as to produce iron suitable for foundry use from the low grade of ore used.

Gransley Ironworks ultimately came under the control of Stewarts and Lloyds Ltd and ceased production on November 1, 1957: the furnaces and blowing engine houses were demolished the following year. The brick bays for calcining survived until much later and were taken down in 1968. The site is now occupied by George Cohen, Sons & Co. Ltd., dealing with all kinds of scrap including large numbers of British Rail locomotives (even diesel locomotives nowadays!) and also the redundant steam locomotives from local iron-ore quarries. Some of the smaller red brick buildings remain, including the locomotive shed, and the embankment to the calcine bays and the slag bank also survive.

Kettering Furnaces (SP 860 802)

The Kettering Coal and Iron Company Limited was formed to exploit the iron ore deposits at Warren Hill, south of those at Glendon (see page 21). Although there was much speculation about the possibility of mining coal in Northamptonshire during the third quarter of the 19th century, the use of 'coal' in the title of the company is thought to derive from the North of England origins of the first directors of the company (58).

The company started quarrying in 1871 but the ironworks were not built until a few years later, the two furnaces being put in blast during June and July 1878. These were situated on the west side of the Midland Railway, about 1¼ miles north of Kettering station, and the quarries serving them were all situated on the west side, being linked to the works by a 3 ft gauge tramway. An old picture in Kettering Museum shows the layout of the works at this time, with two parallel sided furnaces with the gases being burnt to atmosphere at the top. The raw materials were raised on a vertical lift between the two furnaces. The blast engine house, surmounted by a rectangular cast iron water tank, was at the south end of the works whilst at the north end, adjacent to the open pig beds, were portable steam engines driving the pug-mills for the ganister used in stopping up the tapping holes in the furnaces. It is believed that there were originally two vertical blowing engines built by Kitsons in 1878. On each engine, the steam cylinder were 40 inches diameter, the air cylinder was 84 inches diameter and the stroke was 4 ft 6 inches giving 300 horse power when operating at a pressure of 70 pounds per square inch.

In 1889 a third furnace was added and in 1893 one of the original blowing engines was replaced by a 600 horse power engine, built by the Lilleshall Company. This had a steam cylinder of 44 inches diameter, an air cylinder of 100 inches diameter and a stroke of 5 feet. The steam pressure was as for the older engines and the flywheel rotated at between 20 and 36 revolutions per minute. About 1916 one of the original furnaces was replaced by a new 85 ft high furnace (59). Due to increased fuel consumption and difficulties in operating with the rest of the ironworks, this furnace was taken down in 1928 and a smaller, although more modern, furnace built in its place.

Stewarts and Lloyds Ltd. took over the Kettering Iron and Steel Co. Ltd in October 1956. The new owners were already committed to a policy of rationalising the production of foundry iron, with the former Stanton Ironworks plant. However, they are reputed to have relined one of the furnaces at considerable expense with a new material but this was never put in blast. The decision to close the works was announced in 1958 and production ceased in April 1959, the North Furnace being finally blown out in the afternoon of April 26, 1959.

At the time of closure, the furnaces were using calcined and raw ore. The calcining was done in brick lined bays behind the furnaces, the 3 ft gauge tramway from the quarries running over the top of these so that wooden side-tipping wagons could discharge their contents directly into the calcining bays. Coke and limestone were brought in standard gauge railway wagons to a siding between the calcine bays and the furnaces. Calcined ore, raw ore, limestone and coke were loaded into two-wheeled iron barrows and pushed to one of two vertical hoists. Number One hoist was operated by a horizontal steam engine built by Oliver (later Markham) of Chesterfield, No. 106 and reputed to have been installed when the furnaces were built.

The blast engine at the south of the works was, externally, very similar to that shown on the old picture referred to above, although with a similar but larger building, also with a cast iron water tank on top, added to the west side. The combined engine house contained one of the original Kitson blowing engines, the Lilleshall engine installed in 1893, a turbo-alternator, a vertical steam engine direct coupled to a generator and a Bull engine, lifting water from the pipe from a reservoir to the tank on top of the engine house. Another, much larger, engine house had been erected at the north end of the works. This contained a Galloways vertical blowing engine rated at 1000 horse power, when operating on 150 pounds per square inch pressure of steam. The steam cylinder was 36 inches diameter, the air cylinder 100 inches diameter and the stroke was 5 feet.

The blast air for the furnaces was heated in Cowpers hot blast stoves and there was a row of Lancashire-type boilers for utilising the blast furnace gases to raise steam for blowing engines.

The slag from the furnaces was run off into slag ladles, carried on low-framed railway wagons. In later years, these were taken by locomotive to several sidings at the south end of the works, but at the north end of the large banks formerly used for dumping the slag. After allowing time to cool, the solidified blocks of slag were tipped from the ladles alongside the sidings. A steam crane, using a large metal ball, was employed to break up the slag blocks and the resulting smaller pieces were fed to the adjacent slag crushing plant.

After the blast furnaces ceased in April 1959, the ironstone quarries continued in production, sending the ore to Corby. The old calcining bays behind the furnaces were demolished except for four bays which were converted into a tipping dock by knocking out the centres of the transverse brick walls and laying railway lines for standard gauge wagons to run beneath the discharge from the narrow gauge wagons on the tramway on top of the bays. The quarries were eventually closed on October 24, 1962. Meanwhile the furnaces had been dismantled and all the engines scrapped except the Bull engine. This was acquired by the Birmingham Museum of Science and Industry but is not yet on display.

Most of the site has now been cleared and new industrial buildings erected for the present occupiers - Ernest N. Wright, British Steel Corporation. The former iron company's offices, of comparatively recent construction remain close by the footbridge over the Kettering - Leicester railway line (SP 861 800). There is also a small bridge, built of slag blocks, formerly carrying a single standard gauge railway track from the ironworks over a road at the north end of the works (SP 859 804). As usual, there are still significant remains of the slag banks (SP 860 797). Several smaller relics of these ironworks are on display in Kettering Museum.

Wellingborough (SP 903 694)

Rixon and Company operated a brickworks on the north side of Wellingborough. From 1874 they quarried iron ore and in 1883 formed a new company - Rixon's Iron and Brick Co. Ltd. to erect the Wellingborough Ironworks on land leased from a Mr. Stockdale. Production started with a single furnace in 1885 and the next year a second furnace was put into blast (60). The iron ore for these came from a series of workings, immediately to the east of the Wellingborough - Finedon road (Now the A510), about one and a half miles from the ironworks. (61).

The following year, the company passed into the hands of a liquidator who worked the plant and quarries. In September 1888, the Wellingborough Iron Company Limited was formed and took control of the former Rixons Furnaces on February 12, 1889. For the first few years, the new company concentrated on improving the supply of ore to their furnaces and constructed an elevated platform at the works to facilitate the unloading of the side-tipping rail wagons from the quarries. By 1898 a third blast furnace had been constructed. During the first quarter of the twentieth century, the company gradually increased the area covered by its quarrying leases, partly by taking over the leases of neighbouring quarries. The trade recession of the late twenties stopped further expansion and production had to be cut back to a single furnace in blast.

In March 1930, two of the three furnaces were in blast (62), the production of each furnace being about 550 - 600 tons per week. By this time a steam turbo-blower of 30,000 cubic feet per minute was in use, replacing a large vertical reciprocating steam engine, with a 28 ton flywheel and of 20,000 cubic feet per minute capacity.

The latter engine was retained on stand-by. Steam was supplied from 10 Lancashire boilers, each 30 feet long by 8 feet 6 inches diameter, heated by the waste furnace gases. Cowpers hot blast stoves were used to give the required blast air temperature.

All of the ore was calcined before charging into the furnaces. There were two methods for calcining: in open clamps, in the form of oblong heaps containing about 3000 tons of ore or in kilns, about 50 feet high taking 2 cwt of coal for every ton of ore. In the kilns, the base of the fire was said to be about 20 feet from the top. Each furnace was charged approximately 48 times during each 8 hour shift, each charge consisting of :-

- 4 barrows of calcined ore
- 2 barrows of limestone
- 8 barrows of coke.

A special fireclay was obtained from Earls Barton and limestone for use in the furnaces was also obtained locally. Prior to 1930, this was quarried in an area north east of Carrol Spring Farm buildings (SP 920 702). In 1930, the Wellingborough Iron Company started to work a limestone quarry at Stanwick, near Higham Forrers. The stone was taken by lorries to a tipping dock at Irthlingborough station for transport by rail to the ironworks (63).

By the 1930's, there had been working agreements between the Wellingborough Iron Company and the Stanton Ironworks Co. Ltd. Eventually the latter company assumed a greater control over the activities at Wellingborough and the mines, quarries and ironworks were closed on September 22, 1932 to enable reorganisation of operations. This involved complete rebuilding of the ironworks, with only two furnaces, and alterations to the methods of bringing the ore from the quarries.

In 1939, Stewarts and Lloyds Ltd. purchased all the shares in the Stanton Ironworks Co. Ltd. (64). By 1942, a third furnace had been erected (65). During the late 1950's there was a general slackening in demand for foundry iron which was rapidly being superseded in many applications by other and newer materials. As part of the rationalisation programme, the production of foundry iron was concentrated at the Stanton Ironworks, near Nottingham, and Wellingborough Ironworks ceased production on October 26, 1962. Demolition of the works started quickly, the blast furnaces being toppled in 1963 but the quarries remained in production, sending ore to Corby and using the sidings in the ironworks site for transfer of ore from the narrow gauge railway from the quarries to the standard gauge wagons for despatch to Corby. In June 1965, this transfer operation was moved to a site to the north of the former ironworks area which was then rapidly levelled and developed as an industrial estate by the Wellingborough Urban District Council. The quarries in the Finedon area, formerly serving these ironworks, closed in October 1966.

There are now few remains of the ironworks. Viewed from the air, the area to the north west of the blast furnaces still shows traces of the slag banks but these are quickly being removed by modern earth moving equipment. The long tunnel (SP 904 694) under the former Midland Railway, north of the Finedon road (A510) is still apparent although, apart from its west portal pointing in the direction of the ironworks site, this is more a relic of the tramway for moving the ore from the quarries.

Corby (SP 896 895)

Despite the earlier ironworking in Rockingham Forest, in the revival of the Northamptonshire iron industry, the Corby area was virtually the last to be exploited. It was not until a report dated August 30, 1875 by a mining surveyor - Mr. J. Tolson White of Wakefield - that there is documentary evidence relating to ironstone in the area. Mr. White was called in by the agent of the Cardigan Estate to ascertain the nature of the strata to be encountered by the proposed Kettering - Manton branch of the Midland Railway in passing through the Cardigan estates. His report (66) indicated good deposits of ironstone and this eventually came to the attention of Mr. Samuel Lloyd (of Lloyd & Lloyd Ltd, tubemakers at Birmingham - see activities at Towcester, page 26). The building of the Midland Railway's branch verified Mr. White's predictions, showing that there was very good stone under 12 feet of cover as the railway passed through the Cardigan estate.

After difficult negotiations, Mr. Lloyd secured a lease, dated August 11, 1881, to work the ironstone on the Cardigan estate and despatched 4140 tons before the end of that year. The first Lloyds Ironstone Co. Ltd. was incorporated in 1893 and two years later

the company introduced the first mechanical diggers for iron-ore quarrying in this country. With greatly increased production, and the example of six companies with blast furnaces at work in the county, Lloyds made plans for the erection of their own furnaces. To raise the necessary capital, the company went into voluntary liquidation in 1907 and a new company of the same name was formed but with four times the share capital. There was at this time, no financial connection between Lloyds Ironstone Co. Ltd. and Stewarts & Lloyds Ltd although Mr. A.W.Lloyd was a director of the latter since its formation in 1903 and was also a director of the new Lloyds Ironstone Co. Ltd.

The erection of blast furnaces was started in 1908, close to the site of the earliest workings, on the east side of the Kettering - Manton railway line and a little north of the Rockingham Road bridge. The first furnace was blown in on 1910 and the second in 1911, but both were shut down by a serious strike in the summer of that year. No.2 furnace was back in blast on August 1 and No.1 on September 20. The furnaces were large compared with the others in Northamptonshire. Each was capable of producing about 1000 ton of pig iron per week - double the average for the other furnaces in the County (67). Such a large output necessitated large amounts of ores to supply the furnaces and this led to a great increase in the productivity of the Corby quarries which were soon the largest producing unit in the whole of the ore field.

At the start, the Corby furnaces made foundry and forge iron (as did all the other blast furnaces in the County) but in late 1911/early 1912 one furnace was put on to making a specified basic iron which was used for steelmaking at Stewarts & Lloyds Clydesdale Steel Works. This does not seem to have been very satisfactory and basic iron was not made again at Corby until 1915. There was a shortage of basic iron for steelmaking and in September 1917 the Ministry of Munitions gave financial assistance towards the erection of a third furnace and auxiliary plant at Corby, specifically for the production of basic pig iron. This new furnace was completed in 1918.

Lloyds Ironstone Co. Ltd. were anxious to link up with a steelmaking concern and had hoped that Stewarts & Lloyds Ltd. would be interested. After long consideration, on March 8, 1917 the Board of S & L turned down the proposal to acquire Lloyds Ironstone in favour of acquiring the North Lincolnshire Iron Co. Ltd., Scunthorpe. Lloyds Ironstone were soon discussing an amalgamation with Alfred Hickman Ltd., ironmasters and steel manufacturers at Bilston in Staffordshire who were in need of obtaining increased supplies of pig iron and iron ore. The whole of the share capital of the Lloyd Ironstone Co. Ltd. was taken by Alfred Hickman Ltd. by an agreement dated March 31, 1919. On October 30 of the following year, Alfred Hickman Ltd was purchased by Stewarts & Lloyds in an attempt to secure steel for their tubeworks at Coombs Wood, Halesowen. During the next decade, Stewarts & Lloyds acquired numerous firms leading to a rationalisation of the British steel tube industry.

In August, 1929, S & L instructed the U.S.A. consultants, H.A.Brassert & Co. to make a complete investigation of their existing ore properties, coal mines, blast furnaces, steel works and tubeworks with a view to recommending economies in manufacturing operations. Brasserts' made their report on February 1930 and recommended that as stage one of the company's development, that a steel works be erected at Corby to produce Thomas (i.e. Basic Bessemer) steel to supply the requirements of all the tubeworks and also semi-finished steel for sale. They further recommended that a tubeworks be built at Corby for the production of all butt-welded tonnage.

The determining factor in Brassert's choice of Corby as the best location for S & L to concentrate their iron, steel and tube production was the large areas of ironstone controlled by the company through the Lloyds Ironstone Co. Brasserts estimated cost of making basic iron (for Bessemer steelmaking) at Corby using the local ores was £ 2. 4. 0.78d per ton compared with £ 2.18. 6.14d per ton when the basic iron was made from imported ore at a coastal site (68). Because of the importance of the area of ore reserves in Brasserts' calculations, efforts were made to increase the areas under lease in the vicinity of Corby which by the end of 1930 virtually quadrupled the amount controlled at the time of Brasserts' investigations to some 26,000 acres, containing not less than 450 million tons of workable ore. The new acquisitions included the Islip Iron Co. Ltd and its large areas of mineral rights as well as its blast furnaces (See page 22)

Some years elapsed in discussion of Brasserts' scheme and methods of financing it and at this point it is worth considering the Corby Ironworks as they were in March 1930 (69). Quarries around Corby supplied the ore, some of which was calcined before being fed to the furnaces. Ore from the Rockingham & Gretton pits was calcined in open clamps of huge

dimensions, situated just east of where the railway serving the aforementioned pits crossed the Deene road (SP 896 912). The clamps were built up by side tipping from wagons on a railway laid on top of the clamp and steam navvies were used to load the calcined ore into railway wagons for transport to the furnaces. Other ore was calcined in brick bays of which there were 24 behind the furnaces, although some of these bays were used merely for storage. At the north end of the bays was a 30 ton vertical wagon hoist which lifted full wagons up to the rails running across the top of the bays. Some calcined ore was sent to the Cleveland area.

All of the furnaces were charged by inclined hoists, electrically operated and with automatic discharge into the furnaces. The skips on the hoists were loaded from hand barrows, the charge for the three furnaces being as follows:-

- No.1 Furnace (producing foundry iron) : 7 barrows raw ore; 4 barrows calcined ore
- No.2 Furnace (producing basic iron) : 10 barrows raw ore; 5 barrows calcined ore
- No.3 Furnace (for steelmaking) : 8½ barrows raw ore; 4 barrows calcined ore

The blast for the furnaces was provided by 3 turbo-blowers, one giving 18,000 cubic feet per minute at 8 pounds per square inch, one giving 25,000 cubic feet per minute at 12 pounds per square inch and the third also giving 25,000 cubic feet per minute but at 15 pounds per square inch. The blast air was preheated in Cowper stoves.

The iron was tapped every 6 hours and produced about 400 pigs in the bed, laid out on the west of the furnaces. Each pig weighed about 1½ cwt so that the total weight from one tapping was about 35 ton. The total weekly output from the three furnaces was 3000 ton or approximately 150,000 ton per year (70). The iron produced was of variable quality because there was no ore preparation to cope with variations from the many different quarries worked around Corby. The basic iron for steelmaking was sent to South Wales and Scotland, via Kings Lynn or Boston to Grangemouth (71). All of the slag was dealt with by Tarmac Limited. (When S & L acquired Alfred Hickman Ltd. in 1920, they became considerable shareholders in Tarmac Ltd)

After considerable discussions regarding finance, the S & L Board approved a reduced form of Brasserts' scheme on October 28, 1932 and the financial arrangements were completed on December 31 of that year. Work on clearing the site for the steelworks and reconstructing the ironworks started immediately. The initial scheme had provided for new furnaces but the scheme finally adopted in 1932 provided for:-

Rebuilding No.1 furnace, raising the height and increasing the hearth. This was the first unit of the new works to be brought into production and was lit on May 8, 1934.

Rebuilding No.2 furnace, making it slightly larger than No.1. This rebuilt furnace was blown-in on November 7, 1934.

Adopting the modern layout to the old No.3 furnace. This had been kept in operation during the reconstruction of No.1 & 2 furnaces and as soon as the latter was back in production, No. 3 was blown out on November 9, 1934.

The newly-erected Bessemer shop consisted of one 1000 ton Mixer and three 25 ton Converters (built by Gutehoffnungshütte) with space for a fourth converter. The first steel was made at Corby on December 27, 1934.

By the end of 1934, conditions had changed enormously from the trade depression of 1930 which had caused the modifications to Brasserts' original scheme. As a result of a survey of the situation and alternative schemes for future developments at Corby, the S & L Board agreed that No.3 blast furnace be rebuilt to produce approximately 420 ton of iron per day. The new No.3 furnace was blown-in on October 28, 1935 and was then the largest blast furnace in the country. The Corby works then consisted of the three blast furnaces, extensive ore preparation plant, coke ovens and by-products plant, the Bessemer plant with one mixer and three converters, which were capable of producing 300,000 tons of ingots per annum, together with adjacent rolling mills and tube works.

On October 29, 1935, the Board agreed to expand production to 450,000 tons of ingots per annum by improving the facilities at the blast furnaces and adding a second 1000 ton mixer and a fourth converter to the Bessemer plant. On June 30, of the following year the Board approved yet another enlargement of the works to give 600,000 tons of ingots per annum and this included the installation of a fourth blast furnace, capable of making 150,000 tons of iron per annum together with extra coke ovens.

This was the last major extension before the Second World War. The fourth blast furnace came into operation during 1938 but during the war years, the number of tons of ingots per annum was rather less than the 600,000 tons planned, being in 1939: 494,000 tons; 1940: 486,900 tons; 1941: 489,700 tons; 1942: 494,500 tons; 1943: 502,800 tons; 1944: 479,700 tons (72).

The building of such a large integrated iron and steel works on a 'green field' site raised many problems. From employing 739 workers in connection with the old ironworks in 1932, S & L had nearly 4000 employed in the new works by November 1936 (73). The company created a new township, building some 2200 houses by 1939 together with a block of shops and flats and a large recreation centre. These were situated either side of the Corby-Rockingham road, north west of the bridge over the Kettering - Manton railway line.

In 1937, S & L made an agreement with the Lancashire Steel Corporation, creating the Lancashire & Corby Steel Manufacturing Company. This erected works adjacent to the S & L tubeworks at Corby, to produce cold-rolled strip from semi-finished steel supplied by the S & L Bessemer plant (74).

By 1944, the steelmaking plant consisted of 5 basic Bessemer converters and two electric furnaces. The latter were installed during the war for alloy steel production, as a result of a decision to place as much of the new alloy steel capacity as possible, away from Sheffield to reduce air raid risks (75). Later two Open Hearth furnaces were installed. The last "blow" of the Basic Bessemer plant (the last in the country) was on January 22, 1966. On the closure of the Bessemer plant, a Basic Oxygen Steelmaking plant (LD/AC) was brought into full use.

It was stated on page 31, that Brasserts' decision to concentrate S & L's production at Corby was mainly due to the favourable costs of using the local ore compared with smelting imported ore at coastal plants. By the mid 1960's the relative prices of high-grade foreign ore and low-grade Northamptonshire ore had changed significantly, to the disadvantage of the local ore. Because the Corby furnaces used ores from nearby quarries, mostly on the company's own railway system, the freight costs were very small and it was stated in 1967 that 'at Corby there is at present no economic disadvantage as compared with coastal plants using imported ores' (76).

On July 1, 1968, the major steel firms were again nationalised to form the British Steel Corporation. (The first time was under the Iron and Steel Act of 1949, when the companies were vested in the Iron & Steel Corporation of Great Britain, on February 15, 1951. The companies became subsidiaries of the corporation but continued much as they were before, making it easy for denationalisation under the Iron & Steel Act of 1953 whereby the properties of the corporation were transferred on July 13, 1953, to the Iron & Steel Holding and Realisation Agency. Most of the companies, including S & L repurchased their previous properties.) This time, although most continue to trade under their old names, the firms were formed into Groups. The Corby works are part of the Tubes and Pipes Division of the Northern & Tubes Group. The British Steel Corporation's policy has been to concentrate on the production of iron and steel from imported ore and many Northamptonshire iron-ore quarries have been closed during the past 18 months. It is rumoured that the Corby quarries may close during the next four years and rather than incur the rail freight charges in bringing imported ore to Corby, it is likely that the Corby blast furnaces may also close so bringing to an end iron production in Northamptonshire.

At the moment there is plenty of physical evidence of the working of iron-ore, ranging from the present vast quarries, some with over 60 feet of overburden, to the afforested hill and dale formations left by early workings. Good general views of the blast furnaces may be seen, looking north east from the bridge carrying the Corby-Rockingham road over the Kettering - Manton railway line. The steel-making furnaces are well away from public inspection and the tubemaking processes are effectively hidden by the long plain walls of the works paralleling the Corby - Oundle (A 427) road.

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COMMENT

From J.Kenneth Major : -

The Foundry Trades Journal, December 18, 1969, carries an article by C. McCombe entitled "Bellfounding at Loughborough". This worthwhile article deals fully with the modern manufacture of bells which will give a guide to the industrial archaeologists who are working on bells in CBA Group 9.

From Mrs. J. Palmer, Earls Barton : -

The Comment by Dr. Buchanan (Bulletin No. 10, page 12) regarding the National Record of Industrial Monuments was interesting but it would be helpful to know where the record cards can be inspected in each county so that one can see what has already been covered. It is not always easy to get in touch with the county representatives and it would be useful to have a list published, perhaps in the CBA 9 Bulletin, with lists of additions in each issue.

From K. Rider, Kilsby : -

Having read Mr. Major's Comment on the article 'Flashlocks on English Waterways - a Survey' I cannot agree with his observation "the pattern of early transport in the area of Group 9 is more clearly shown by the publication of this article than previously". As far as the River Nene is concerned, the authors have given an adequate description of the staunches and the present remains of these but the article tells us nothing about the traffic on the river, the position of the wharves and the distances involved - and from the title of the article it was not the intention of the authors to deal with these matters appertaining to the 'pattern' of transport. In any case, in Northamptonshire the improvements to the river to make it navigable again (Mr. Victor Hatley, the Northampton local historian, has said that the river was navigable in the Middle Ages) came after the introduction of the turnpike system on the roads: the first turnpike in the county was authorised in the 1706 - 1707 session between Old Stratford & Dunchurch and many of the places served by the river were also served by the Peterborough to Wellingborough, via Oundle and Thrapston, turnpike which was authorised in 1753 - 4. Thus in one county in CBA Group Nine the pattern of early transport involved more than just the river with its staunches.

From J.Page, Luton : -

I cannot see the point of including reports of Roman finds in a Bulletin of Industrial Archaeology. There are plenty of publications dealing with ordinary archaeology and the readers of these would no doubt be more interested in the Roman Well at Leighton Buzzard than the readers of (this Bulletin).

(Editor: The reference to the Roman Well in Bulletin No. 10, page 13, is rather unfortunate as the report was intended to emphasise the kiln which has industrial implications. However, we should welcome further comment on how far back our industrial archaeology should go)

REPORTS OF INDUSTRIAL ARCHAEOLOGY FROM THE INDIVIDUAL COUNTIES

BEDFORDSHIRE

Studies

1. Forders Lime Works, Sewell (SP 991227). Mr. Cyril Tilling of Dunstable has found a set of about six photographs dating from about 1920 showing the various stages in the manufacture of lime at Forders Lime Works at Sewell. These works adjoined the Dunstable/Leighton Buzzard Railway Line and were closed down in the early 1930's. During the early years of the Century the firm of B. and J. Forder owned several chalk quarries in the South of the County and were eventually bought out by Associated Portland Cement Manufacturers Ltd.
2. Dunstable Steam Laundry. What was probably the last surviving steam engine in Dunstable ceased work this Autumn when the steam laundry in which it was employed closed down and was subsequently demolished. I understand that the engine is quite small and bears no manufacturer's plate. Fortunately it has been salvaged and it is hoped has found a good home.
3. Main Drainage in Houghton Regis, c 1908-1912. David Goseltine is studying this topic and has found that by the completion of the drainage scheme it had involved the bankruptcy of the Contractor, the resignation of the Council's Engineer (he was subsequently surcharged to the extent of £200) and a High Court case.

Report of Exhibition - Leighton Buzzard Light Railway Jubilee Exhibition.

A small group of local enthusiasts thought it appropriate to mark in some way the 50th anniversary of the L.B.L.R. which was opened on 20 November 1919. Accordingly it was decided to hold an exhibition in the Cedars School Hall, Leighton Buzzard on 29-31 December 1969. In order to gain funds for advertising the two major local sand firms connected with the L.B.L.R., namely Joseph Arnold & Sons Ltd. and George Garside (Sand) Ltd., willingly agreed to donate the necessary cash. It was decided that any profits made at the exhibition by means of the small entrance fee should be donated to the Leighton-Linslade Old Peoples Welfare Association as a tribute to the service of the many local people who have worked both for the railway and in the sand quarries during years gone by.

The exhibition was open on the evenings of Monday and Wednesday 29 and 31 December and also for the afternoon and evening of Tuesday 30 December which is market day at Leighton Buzzard. During the three days attendance totalled 187 which, although not a large number, comprised many people who were genuinely interested in Leighton Buzzard's oldest industry and who went away pleased with the displays provided.

Each visitor was handed an exhibition leaflet upon paying the admission fee. This leaflet contained a brief history of the sand industry and L.B.L.R. together with a map of the railway system. To the left of the entrance could be seen the handiwork of local railway modellers which included both electric and live steam Gauge 0 locomotive models. At the other end of the hall was a division behind which a regular slide show was presented depicting scenes on the L.B.L.R. and in the quarries during recent months. These shows, which lasted for half an hour, presented an interesting "trip" along the line for those who were interested.

Along both sides of the hall were stands displaying material provided by Joseph Arnold & Sons Ltd., George Garside (Sand) Ltd. and the Leighton Buzzard Narrow Gauge Railway Society, all of whom had representatives available to answer visitors' queries.

Joseph Arnold & Sons Ltd. displayed a world map showing countries to which their sand has been sent during the past two years together with samples of some of their many different types of sand. They also had on display a wealth of historical material of which the earliest was an article dated 1896 describing the firm's activities which had started around 1865 under John Arnold. Further articles were dated 1925, 1930 and 1934 followed by more recent press cuttings. An interesting price list of 1898 showed that one ton of Building Sand could be purchased for the princely sum of 1/6d.! Their display was completed by a series of photographs of their quarries dated during the 1930's alongside similar views taken during 1969 which made some interesting comparisons.

George Garside (Sand) Ltd. displayed a similar world exports map and sand samples which included the Standard Leighton Buzzard Sand used for testing the strength of cement when mixed into concrete. They also had a good selection of photographs of their quarries both past and present. Most interesting were three etchings by an

unknown artist of early quarry scenes made during the era of horse and carts long before the advent of the L.B.L.R. Another feature of their display was an excellent aerial photograph showing the complete route of the L.B.L.R. and associated quarries taken towards the end of World War II. (R.A.F. Stanbridge, which now has a footbridge entrance over the L.B.L.R., was replaced during production of this photograph by open fields - a sign of the times in which the map was produced!)

The Leighton Buzzard Narrow Gauge Railway Society had a stand displaying the work both already undertaken by their members and the work lying ahead in their gallant efforts to run a passenger service over the L.B.L.R. This they have succeeded in doing from Pages Park to Stanbridge Road in 1969 and they intend to extend services to Hockliffe Road commencing at Easter 1970. A marvellous selection of photographs and maps of the L.B.L.R. was provided. The photographs provided many views of the railway from 1919 to the present day - from the days of the two original steam locos, through the life of the petrol locos, and to the present age of the diesel locos.

All things considered this was an excellent exhibition containing a wealth of information for railway enthusiasts, local historians, and industrial archaeologists alike. It is perhaps a pity that final arrangements for the exhibition were unavoidably delayed so that insufficient time was available to enable wider advertising to have been employed.

P.R.A.

Publications

1. Without doubt, the publishing event of the decade in this County was the publication of Miss Joyce Godber's "History of Bedfordshire 1066 - 1888" (Bedfordshire County Council 60/-). The author was County Archivist for over 20 years and she has produced a definitive history which runs to nearly 600 pages. Whilst only of limited use to the industrial historian it is without doubt a volume which should grace the shelves of any historian irrespective of his particular interest.

D.T.G.

2. 'The Leighton Buzzard Light Railway' by S.A. Leleux, published by The Oakwood Press, 1969. Price 18s.

The industrial archaeologist should not be deterred by the title of this book, as the subject of the title is inextricably bound up with the later history of the local sand industry and Sydney Leleux has devoted a considerable amount of space to the quarries. In fact, out of the 126 pages (not including the twelve pages of photographs) about half are concerned directly with the L.B.L.R., 37 pages describe the quarries connected to the Light Railway and a further 20 pages deal with local quarries not connected to the L.B.L.R. The result is a very thorough coverage of the sand industry in the area and the author has obviously spent a lot of time 'in the field', locating many interesting items remaining from long closed quarries.

It is pleasing to see reference, with gracious acknowledgment, to information reported in this I.A. Bulletin although whether the Clay Cross Coal Depot at Linslade can be related to the subject of the book is doubtful. It is even more surprising to find the inclusion of the short-lived Woburn Abbey Parkland Railway which was not erected until 1968 (and was dismantled to be re-erected at Overstone Park, near Northampton in 1969!) and has nothing to do with the Leighton Buzzard sand quarries or the L.B.L.R. itself.

The greatest criticism must be directed at the publisher whose poor layout and production have, to a large extent, spoilt what could have been an excellent book.

G.H.S.

BERKSHIRE

Studies

1. Newbury Gas Works (SU 473 668). Mr. Roberts has been working on the gas works sites in the Newbury area. The site at SU 473 668 is the site of the original works built in 1825 which was demolished in 1880. However many of the ancillary buildings were allowed to remain and from these and old plans Mr. Roberts has built up a record showing exactly how gas was first made in Newbury.

2. Wickham - old brickworks (SU 403 716). Mr. Roberts has reported the finding of old bricks from the site of a brickworks at Wickham. The foundations of the kilns have been recorded and identified by the old plans of 1911. The use of a horse driven pug mill on this site has been recorded but old photographs would be a great help.

3. Abingdon - Barns and Maltings (SU 497 967). Mr. Gray of Abingdon has been working on the U shaped range of barns which are about to be demolished in Abingdon. This range contained evidence of a malting kiln and associated malting floors. The barns themselves could go back to the 16th century and the malting arrangements had been very ingeniously inserted into the buildings.

4. Bradfield School Brewery (SU 602 728). A disused building on a farm north of the school complex shows unmistakeable evidence of being a brewery, the upper storey ventilators being the first indication. The building is of flint with diaper patterned brickwork with a pantile roof. More research needs to be done into the use of this building and its relationship with the school.

Courses

The course at the W.E.A centre has done well this year with an exciting group of lecturers assembled under the leadership of Lawrence Cameron. One interesting experiment was to go outside the county, to Alton in Hampshire, where the class separated into 5 groups to visit 5 segments of the town. Each group found everything they could which was in any way of industrial archaeological interest, photographed it. The class then talked about what was seen at the students evening. A point outside the county was chosen so that the responsibility for presenting the records was not so important. The same action is proposed for another day in April or May but this time in a town within the County - Wantage. At this session we hope that the N.R.I.M. cards will be very much in evidence.

J.K.M.

BUCKINGHAMSHIRE

Studies

Rowley Park Farm, Wexham (TQ 004 827. This farm belonging to Bucks. County Council, contained a water driven saw and corn mill which is now being gutted for other uses. Before it was gutted, the interior was recorded by J. Kenneth Major.

The buildings were built for this purpose in the Swiss Chalet Style about 1860 and were built of wood with large overhanging eaves and verges supported on fretted brackets. The single storey element contained circular saws and reciprocating saws served by little rail tracks. The three storey building contained one pair of mill stones on the first floor and a rack hoist on the top floor. There were apparently no dressing machines. The power was obtained through an "American" turbine with a 40' head of water delivered through a 20" diameter pipe.

J.K.M.

NORTHAMPTONSHIRE

Studies

1. Windmills. The 'Old Crafts and Industries' course being held at the University Centre, Northampton during the Winter has enabled the collation of much of the information collected by various people on windmills in the county. Subsequent to one discussion meeting, the number of known windmill sites increased from just below a hundred to 122. Even more important has been the number of old illustrations of windmills brought to the Group's notice, and details of the machinery is being obtained from advertisements in old issues of the Northampton Mercury.

2. Watermills. The same 'Old Crafts and Industries' course has collated information on Northamptonshire watermills and there are now 175 mill sites which have been identified. Most of these have been photographed and extra information is being collected from old newspapers and talking with people who knew the mills when they were working.

3. Northampton Brewery (SP 754 598). Through the kindness of Watney Mann (Midland) Ltd. it has been possible to record some of the older items of plant as they have gone out of use. After starting as a common brewer at Towcester in 1801, Pickering Phipps started a brewery on the present site in Northampton in 1817. This original brewery was replaced by the 'New Brewery' in 1865 driven by a large double-cylindrical horizontal engine, built by Thornehill & Wareham, the Burton-upon-Trent brewing engineers. This engine was scrapped during the Second World War but recently some photographs of the engine have been located.

One item of equipment no longer used is a small single cylinder reciprocating pump for collecting the carbon dioxide given off during the fermenting process. The pump, together with a copper receiver, have been recorded.

Publications

Wright, Ian. "Old and New in Wellingborough's Iron Ore Traffic". Railway Magazine 116, No.825, December 1969, pp 16-18. This article gives a brief review of iron ore quarrying in the Wellingborough area, with the emphasis on railway operations.

Forthcoming Exhibitions

1. "Horse and Man". This exhibition, showing how the horse has been used for work and pleasure, is to be held in the Abington Park Museum, Northampton (cars may be parked in Park Avenue South, near the entrance to the park) from Monday 26 January until Saturday 7 March. Open from Monday to Saturday, 10.00-12.30; 2.00-5.00. The exhibits will include items from the horse-worked Blisworth Hill Railway and displays related to the wheelwright and farrier.
2. "Industrial Archaeology". The Northamptonshire Industrial Archaeology Group is holding an exhibition at the Northampton Central Museum, Guildhall Road from Saturday 25 April until Saturday 9 May 1970. An illustrated guide to the exhibition will be available. For other details, see notice on page 5.

Notice of Courses

The History and Architecture of Canals

Two linked weekends at Knuston Hall, Irchester, Northants 30/31 May and 13/14 June 1970.
P.A. Stevens MA and J.H. Denton

The course will deal with the rise, growth and decline of the canal system of England, concentrating chiefly on the trade arteries of the Midlands, from the Bridgewater Canal to the Grand Junction, the Shropshire Union to the Trent. The location and use of original source material will be outlined, and there will be a critical appraisal of secondary sources for students wishing to conduct their own research. The archaeology of canals will be treated under specific headings, and will include a survey of the tramroads which were an integral part of many canal schemes. Slide illustrations will be used, and there will be two excursions to places of canal interest.

For further information, contact Miss Smith, Warden, Knuston Hall, Irchester, Northants.

Corby, Kettering & District Industrial Preservation Society

The first AGM of the society took place on 11 November 1969, when the constitution was ratified and the general structure defined.

To date 46 members have enrolled, the grades being:-

Members	£1. 0. Od. per annum
Associate Members (Exempted from duties)	£1.10. Od. per annum
Junior Members (Juveniles still at school)	5. Od. per annum.
Membership is open to both sexes and there is no age limit.	

The most pressing need at present is the acquisition of a site. In this the society has met with considerable difficulty. While there are innumerable old quarry sites in the locality, ideally suited to its needs, landowners who might be willing to lease these are bound by the regulations regarding the restoring of agricultural land. The Society is therefore pursuing various avenues of approach and any advice which any readers care to offer will be most welcome.

The acquisition of items has been delayed due to the land difficulty, but the Society has obtained several small industrial artifacts of an historic nature which it hopes to store temporarily in the yards of builders and contractors who are sympathetic to its aims. Several members possess part shares of such items as Locomotives and Steam Tractors, or are imminently considering their purchases as soon as a suitable site becomes available.

There is a strong body of sympathetic opinion in the District, especially in the local councils, and considerable enthusiasm amongst the members. Fund raising schemes include the sale of photographic slides and postcards, and while these are of a general nature at present, the Society would hope in future to specialize in the historic objects in the District.

While the major purpose of the Society is to preserve industrial objects and to set up a museum with historic exhibits, preferably in working condition, there will also be activity in the cataloguing of drawings, photographs and documents. The field is intended to be as wide as possible, embracing wind and water mills, canal systems, leather working machinery, iron and steel manufacturing, railway systems and so forth, limited only in that it must be industrial, and relate to the history of the district.

As our activities crystalise in the future we hope to be able to be more specific in our reports.

The Leighton Buzzard and Hitchin Light Railway (continued from page 16)

Arnold made some rough notes on the back of Cumberland's letter dated October 17 and these were probably for use at the meeting, suggested in that letter, between himself and the two sand owners. These notes raised the following:-

- (a) What guarantees do the promoters offer the senders in through traffic?
- (b) What cash will they provide for the sidings to be constructed?
- (c) What rebate is offered off both the light railway toll and main line rates for large tonnages?

He would not consent to pay the high tolls set down at the outset and certainly would not sign such a document under any circumstances.

This would have appeared to have completed the final destruction of the scheme. However, another map dated 1908 and signed by J. Wilmer Ransome, Engineer of Cheapside, showed a tramway from the quarries to join the L.B. & H.L.R. at a large triangular junction to the north of Egginton. Presumably Joseph Arnold having failed to agree with the promoters of the standard gauge line decided to construct his own feeder line from the quarries.

This too came to nought and nothing more is known. However, the sand owners' problems were solved in 1919 by the opening of their own 2 ft. gauge line from the quarries to the L.N.W.R. Dunstable branch on the outskirts of Leighton Buzzard - The Leighton Buzzard Light Railway.

Key to Abbreviations:

LBLR	Leighton Buzzard Light Railway
LB&HLR	Leighton Buzzard & Hitchin Light Railway
LRO	Light Railway Order
MR	Midland Railway
GNR	Great Northern Railway
LNWR	London & North Western Railway

References:

The Leighton Buzzard Light Railway by S.A. Leleux. Oakwood Press. 1969.
Bedford County Record Office.



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