SUSSEX INDUSTRIAL HISTORY

No. 13

1983

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Cover Picture
Gas Lamp near Worthing Parish Church, 1890 (from photograph by Walter Gardiner)

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Journal of the Sussex Industrial Archaeology Society

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EDITORIAL

The world seems to be rushing headlong into a highly technological era in which the maxim that 'If it works, it's obsolete' is often literally true. While it is not the purpose of the Sussex Industrial Archaeology Society to comment on this it is certainly its duty to record, and where possible preserve, details of past technological achievements.

An important part of this duty is the careful preservation of early documents, drawings and maps - it is tempting, when an industrial organisation moves to shiny new premises, or makes other major changes, to consign such old and perhaps rather fusty old records to the dust heap. In an effort to avoid such destruction the Society has recently appointed two Honorary Archivists, one to handle Documents and the other to handle Photographs, each of whom will be available to offer advice regarding the value of such material; they will also supervise the safe storage and cataloguing of the material thus making it more readily available to interested research workers.

It is hoped that Members of the Society and other Readers of this Journal will assist by being vigilant in preventing the inadvertent destruction of such archives remembering that conventional records of today's Current Practice may very quickly achieve important Historical Value.

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BRICK AND TILEMAKING ON THE DICKER IN EAST SUSSEX

By M. Beswick

In the 18th and 19th centuries the manufacture of bricks and tiles expanded throughout Sussex, but on the Dicker Common, in the parishes of Chiddingly and Hellingly, this expansion amounted almost to an explosion. To discover the reason for this, two factors of particular importance must be considered: firstly, the suitability of the sub-soil, the Weald clay, and secondly, the fact that the area, being waste land, was not under cultivation and was therefore available for exploitation when the demand arose.

The Geology of the Area

The properties of the Weald clay are clearly demonstrated in a report commissioned in 1925, when it was proposed to expand the brick and tilemaking side of the business at the Dicker Pottery. The report was not in fact acted on, which seems a pity when one reads: "The Wealden beds contain a more diversified series of clays than perhaps any other geological formation used in the trade. Clays are found within a relatively small area for nearly every type of clay-ware from common and facing bricks to sanitary pipes and, on the site of the Dicker Pottery, this is found in a considerable degree." The clay in the three fields adjoining the pottery was inspected by making bore-holes to a depth of 15 ft. "Field one: beautiful dark red clean plastic clay - suitable for highest class red wares (pottery, facing bricks, roofing and floor tiles and terra cotta). In field adjoining: similar clay but not quite so deep, accompanied by rougher texture clay suitable for common brićks. In third field, clean but more sandy clay is found, suitable for common or facing bricks. Below, at one point, a bed of greenish-grey clay is found, believed to go to a considerable depth. This burns to an excellent buff colour: should make good salt-glazed stoneware pipes. There is enough clay for 100 million bricks or equivalent."(1)

This report referred to an area of approximately 12 acres, but it may safely be assumed that the geological strata described are typical of the Dicker as a whole.

Brick Kilns on the Waste

It is not possible to say with any certainty when bricks and tiles were first made on the Dicker itself, but in the surrounding area there are early examples of both: Roman tiles have been found at Arlington; there was a medieval tile-kiln at Michelham Priory; the brick mansion at Laughton Place was completed in 1534 and a brick 'oste' was in existence at Ripe in 1571.(2) However, in the houses of ordinary people, the introduction of bricks only took place gradually, being confined to fireplaces and chimneys to begin with. The small quantities required could be purchased by the cartload from one of the independent brickmakers, whose kilns were generally sited on waste land well away from the village. One of the earliest brickmakers on the Dicker may have been Nicholas Willard who supplied bricks and tiles to the churchwardens of Chiddingly in 1672.(3) A man of that name was renting land near Boship Green in 1703 (4) and was also mentioned in connection with an encroachment made on the waste near Starnash on the East Dicker.

The Dicker Common formed part of the wastes of the Manor of Laughton and it is in the Manor Court Books that much useful information about the activities of the brickmakers can be found.(5) When a site was required for a kiln or for clay extraction, the brickmaker generally obtained a lease of a suitable piece of waste ground, but it was only when that lease was converted into a 'grant' that it was recorded in the Court Book. Occasionally 'encroachments' were made: that is to say: clay was extracted or land enclosed without permission and the man reponsible was 'presented', or reported, to the Manor Court. A presentment of this kind was often followed by a grant of the land in question. Thus in several cases a brick-kiln was already in existence when the grant was made.

Fig. 1. A section of the map drawn by Yeakell and Gardner in 1783 showing the extent of the Dicker and the enclosures already made at that date, several of which were brickyards.

By the second half of the 18th Century, the demand for bricks and tiles had grown very considerably (6) and there was corresponding growth in the number of independent brickmakers. In 1756, nine people were presented for encroachment on the wastes of the Manor of Laughton. Only one of them, William Funnell, was described as a brickmaker, but several of the others were names later associated with the trade. Grants were subsequently made to William Funnell in 1756 and to Richard Guy, another of the offenders, in 1766. Three more grants of parcels of the waste were made to brickmakers in 1765: Bartholomew Gorley, a brickmaker from Heathfield who had migrated to Chiddingly in 1752, was granted one acre on the East side of the Dicker near Stern Ash; William Cuckney, first described as a brickmaker when he was admitted to a tenement at Upper Margers in Chiddingly in the previous year, was granted $1\frac{1}{2}$ acres of waste also on the East Dicker and William Wenham was granted "a messuage, tenement, brick-kyln, lime-kyln, garden, orchard and $1\frac{1}{2}$ acres of waste on the East side of the Dicker near Boarship", a site which his family had leased for some time previously. These were followed by two further grants: to Thomas Wood in 1767 and to Willian Funnell jun. in 1773, making a total of seven new grants of waste to different brickmakers in less than 10 years.

Lime-burning and Pottery Manufacture

It should be noted that although the brickyards were numerous, they were all fairly small-scale operations. A very simple up-draught wood-fired kiln was the normal method of burning bricks in the Weald at this period. William Funnell senior had two brick-kilns but the other brickmakers, when the kiln was specifically mentioned, had one only, although some, for example Wenham, Wood and William Funnell junior had a lime-kiln as well. Chalk for lime-burning had to be brought from the Downs, but it was clearly an advantage to have both a brick- and a lime-kiln on the same site, as the ingredients for the type of lime/sand mortar used at this period could then be purchased at the same time as the bricks.

Another activity now made its appearance: that of pottery manufacture, though this seems to have been confined to the East side of the Dicker. The new grant made to Thomas Wood in 1767 was of "one brick-kyln and one lime-kyln with the yard thereto belonging on the East side of the Dicker near Stern Ash .... Also the liberty of taking water out of the pond there to make his bricks and ware." At first the pottery was operated in partnership with his neighbour William Cuckney, but in 1774 Cuckney built his own 'Crockhouse'. Details of the rivalry between these two establishments may be found elsewhere.(7)

A Family Business: The Guys of Chiddingly

Meanwhile, on the West side of the Dicker, a 'take-over' operation was in progress. Like nearly all of the brickmakers at some period, William Funnell senior, seems to have lacked the necessary capital to operate successfully. He raised a mortgage of £40 in 1769, increased it to £75 three years later and to £120 in 1779. In 1787 he sold the brickyard. It is not clear who operated it during the next decade, but in 1800 it was acquired by Walter Gut, who was working in partnership with his father Richard. Meanwhile, in 1789, William Funnell junior had died and his brickyard at Millhouse Farm was bought by Richard Guy, who made it over to his son Walter three years later. Richard Guy's own brickyard was also transferred to Walter in 1796. In his will, made in 1802, Richard Guy, who now described himself as a yeoman, bequeathed to two of his sons, Jesse and David, "equally to be divided between them, my moiety or half part of all the stock of bricks and tiles which at the time of my death shall be in or belonging to my business of a brickmaker wherein I am now engaged in partnership with my son Walter."(8) Another son, John, was also described as a brickmaker when he received from his father a messuage and land called Lower Margers in Chiddingly in 1792.

This, then, was the foundation of 'Guy & Co.' who were listed on the Chiddingly Tithe Award of 1844 as tenants of two of the brickyards.(9) This was a new generation, as appears from the Census of 1851, when Thomas Guy was 51 years old and John Guy was 32.(10) A split seems to have occurred by 1867, when Kelly's Directory lists G. Guy and J. Guy separately as brickmakers on the Dicker.(11) According to the Census of 1871 Gaius Guy, the son of Thomas, was living 'near the lime-kiln' (site No. 1) whereas John Guy was at Millhouse (site No. 2). When John Guy died 1879 he was succeeded by his son Stephen but by 1886 the latter seems to have sold out. Gaius Guy's last entry in Kelly's Directory was in 1878.

The Guys may best be classed as farmer/artisans. They were never wholly dependent on brickmaking but retained their interest in farming, which cushioned them to some extent against hard times. During the depression of the 1820's they were forced to sell all three brickyards but they remained as tenants of two of them. In 1871 Gaius Guy was described as 'brickmaker and farmer of 29 acres, employing 4 men and 3 boys'. Probably only one of those men was a skilled brickmaker, the others working on a seasonal basis either on the farm or in the brickyard. This made good economic sense until competition from bigger, more mechanised brickworks finally drove the small man out of business.

A Boom in Brickmaking

We must return to the last years of the 18th century. The Guys had by then established their monopoly on the West side of the Dicker, but on the East side a state of stagnation had been reached. Too many aspiring brickmakers had attempted to take advantage of the surge in demand. In spite of the diversification into lime-burning and pottery manufacture, some inevitably went out of business. Gorley had died and Cuckney, having forced Wood into bankruptcy, had to sell his own business in 1789, after which date it seems to have operated principally as a pottery. However, a revival of interest in brickmaking began to take place in the 1790's when the Goldsmith family arrived on the scene.(12) By the end of the decade Benjamin, James, George and Robert Goldsmith were each running their own brickyard on the East Dicker and there was another yard at Price's Farm, as well as Wenham's brickyard North of the turnpike road.

Already in 1792 there was a serious shortage of underwood to fire the kilns, which is scarcely surprising if pottery and lime-kilns are also taken into consideration. It was stated that the Dicker brickmakers expressed the intention of switching to coal, but whether in fact they did this is not clear. Any coal they used would have had to be brought by barge from Newhaven up the Cuckmere River, which at this time was navigable at least to Alfriston, and then brought on by cart.(13)

The question arises: why this second upsurge in brickmaking? The answer may in part be the outbreak of hostilities with France. When war was declared in 1793, large numbers of troops began to be brought into Sussex and barracks had to be built to house them. If coal was coming up river by barge, then bricks could make the return journey to Exceat, Seaford and even further along the coast to Brighton. When a new programme of defence works was ordered in 1797 and again in 1805, when the Martello Towers were being built along the Sussex coast,(14) Dicker bricks may also have been in demand. However, Nelson's victory at Trafalgar in 1805 turned the tide, the fear of invasion receded and soon the troops were dispatched to the Peninsular War.

The Bubble Bursts

As far as the brickmakers were concerned, the period of prosperity was now at an end. In general they seem to have been under-capitalised. They first leased their site, then when they received a grant either of the brickyard itself, or of the odd acre of ground in order to extract more clay, they almost invariably had to raise a mortgage. This can be seen by studying the Manor Court Books over the period from 1793 to 1806 when George Goldsmith, for example, received two separate grants of unenclosed land and acquired two holdings of already enclosed land on the Dicker. In each instance he obtained a mortgage of between £50 and £200. Then, in 1806, one of the mortgages was sharply increased to £600 and, by 1810 he was having to sell some of his land. He at least weathered the storm but James Goldsmith who was also in difficulties by 1808, was forced to sell out to satisfy his creditors in 1811. Robert Godlsmith defaulted on mortgage repayments and also had to sell some land in 1811. He must have abandoned brickmaking and returned to farming at about this time,(15) as did Richard Price.

So, when the Napoleonic Wars were over, only two brickmakers were left in business on the East side of the Dicker, George and Benjamin Goldsmith. The difficult period extended through the depression of the 1820's, when even the Guys in Chiddingly were having to realise some of their assets, and business did not pick up again for some time. Even then there was no return to the boom conditions of the turn of the century. When the next generation of Goldsmiths inherited their father's property, both appear to have been in financial difficulties. Stephen Goldsmith sold the yard at Upper Dicker in 1840 but managed to buy it back again 10 years later. John Goldsmith however, who inherited his father George's business in 1857, was declared bankrupt shortly afterwards. Proceedings dragged on until 1865 but the brickyard must have been abandoned, as there is no trace of it on the Ordnance Survey map of 1875.

The Final Phase

One new entrepreneur appeared on the Dicker in the mid-19th Century. This was Uriah Clark, who took over the Goldsmith brickyard near Boship Green and turned it into the Dicker Pottery. As the name implies, pottery was his main concern but he also continued to make bricks and tiles as can be seen from his entry in Kelly's Directory for 1874, which reads: "Uriah Clark, potter, maker of red and white chimney pots, socket pipes and junctions; slate crest and roll and fancy ridge tiles, plain and paving bricks; all kinds of pottery made to order; coal and coke merchant etc., Dicker Pottery Works." On the 1871 Census returns he is listed as brickmaker and potter, employing 13 men and 2 boys.(16)

The shift in emphasis on the East Dicker from brickmaking to pottery manufacture during the 19th Century can be gauged from the census returns for Hellingly. In 1841 there were 11 persons employed in brick and tilemaking and only one potter. In 1851 there were 10 brick and tilemakers but the pottery workers had increased to seven and by 1871 the ratio of brickmakers to potters was 9 to 15.

Two more brickyards briefly made their appearance in the late 19th Century, one in Chiddingly and one in Hellingly, but the final decline of brickmaking in the area had already set in with the coming of the railways to Sussex. If one compares the Dicker, which was not crossed by the railway to a similar area, St. John's Common in the parishes of Clayton and Keymer, which was, the difference made by the railway can clearly be seen. The brickworks on St. John's Common flourished to such an extent in the late 19th Century, sending bricks South to Brighton and North to London that a new town, Burgess Hill, grew up round them.(17) In the area surrounding the Dicker, new and more efficient brickworks sprang up at Hailsham, Polegate and Berwick, all served by the railway, but the building boom of the Victorian era passed the Dicker by.

The Dicker Pottery and the brickyard at Upper Dicker survived into the 20th Century, the latter by specialising to some extent in paving bricks, which fulfilled a demand in the developing coastal resorts but, as was noted earlier, the attempt to modernise and expand in the 1920's came to nothing and, by the time road transport took over from the railways, the Dicker brickworks had ceased to exist.

The Sites (numbers refer to the accompanying map)

1. Brickworks (now Nicholls Farm) in Chiddingly near the Chalvington parish boundary. Grid ref. TQ 538113

Came into operation some time before 1766 when Richard Guy was granted the "brickyard on South side of Dicker containing three roods adjoining the brick-kiln of Richard Guy together with the use of the pond called Sand Pitt Pond." It was made over to Walter Guy in 1796, sold to a Mr. Gwynne of Lewes in 1826, but leased back. It was operated by Guy & Co. in 1844, Gaius Guy until 1874 at least, still marked as 'Brick Works' on O.S. map of 1898 but in 1910 was 'Old Kiln'.(18)

2. Brickworks at Millhouse Farm on the West Dicker in Chiddingly. Grid ref. TQ 540120

Came into operation shortly before 1773 when a new grant was made to William Funnell junior, of a "piece of waste on the Dicker near lands called Millbank, otherwise Dicker Lodge, with a new brick and lyme kiln thereon lately erected abutting to the Dicker on all sides." It was sold to Richard Guy in 1789 and transferred to Walter Guy in 1792. In the census returns for 1841, Thomas Guy, brickmaker, aged 40, was living at Millhouse, though John Guy is listed as occupier in 1844. The site is marked on the O.S. map of 1875 but it had disappeared by 1898.

3. Brickfields Farm near Golden Cross, Chiddingly. Grid ref. TQ 534123

Between 1756 and 1764 William Funnell, brickmaker of Chiddingly was mentioned in the Manor Court Books in various connections. In 1765 he was granted a "piece of waste whereon two brick-kylns and a workshop are now erected, containing two acres

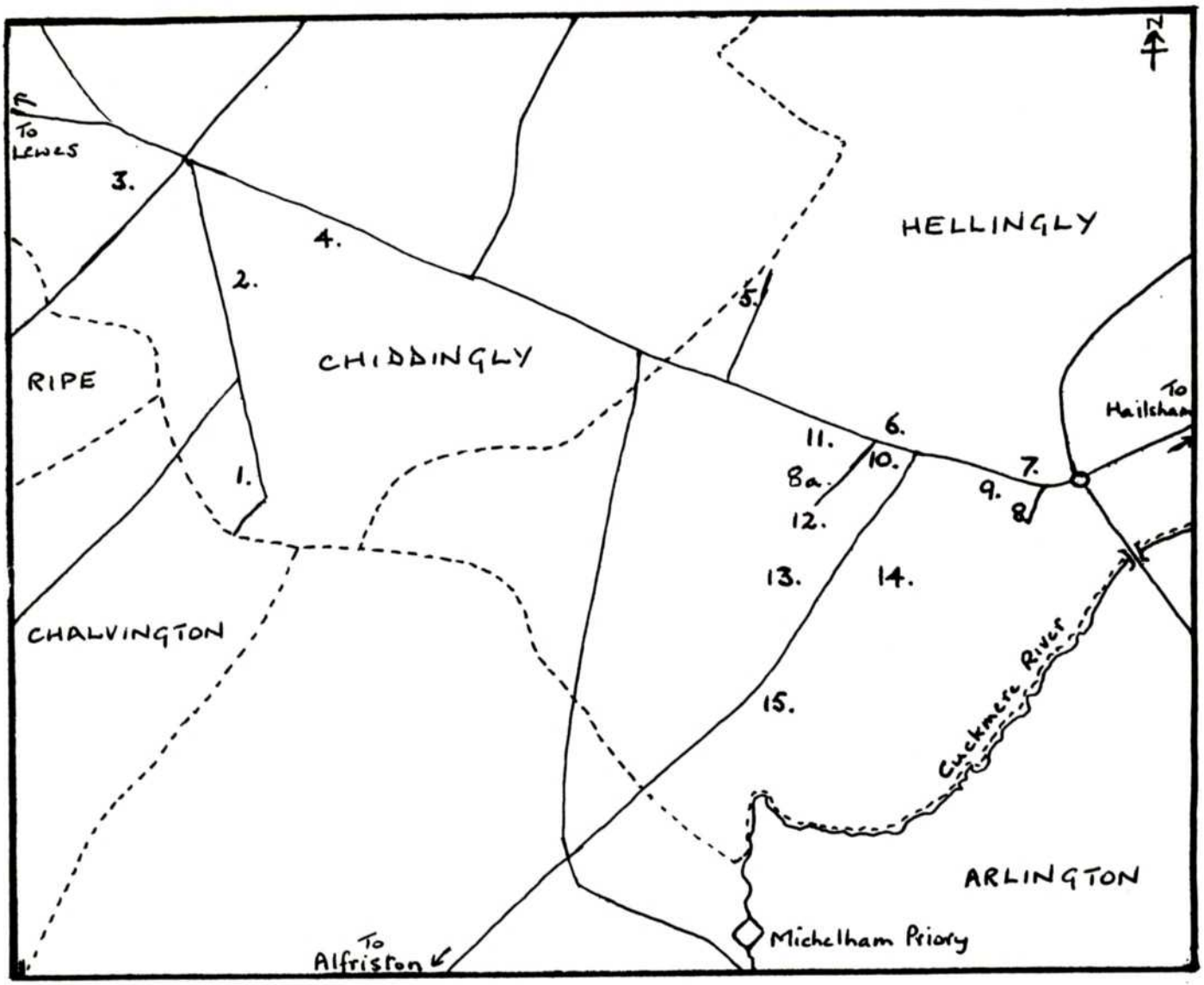


Fig. 2. Sketch map showing the location of the brickyards.

on the West side of the Dicker adjacent to the Dicker pond on the North." This pond is no longer in existence but both pond and enclosure are marked near Broad Oak on the map of 1783 (illustrated). The yard was bought by Walter Guy in 1800 and sold in 1824. It seems probable that this was the end of brickmaking on the site, although two fields are named "Brickyard Field" and "Brickyard Plot" on the Tithe Map of 1844.

4. Brickworks on the South side of the turnpike road (now A22) in Chiddingly. Grid ref. TQ 542122

This land was unenclosed waste prior to 1815.(19) It came into use as a brickyard in the 1860's. Benjamin White first advertised in Kelly's Directory for 1867 and on the 1871 census he is described as "farmer and brickmaker, employing 7 men and 3 boys". The yard is shown on the O.S. map of 1875 but only continued until 1884, when the land was sold and a house built on the site.

5. Brickworks on the West side of Hackhurst Lane on the boundary between Chiddingly and Hellingly. Grid ref. TQ 557118

A 20th Century brickworks which is now being redeveloped as an industrial estate. The wood to the North of the site was formerly called Kiln Wood, so there may have been much earlier brickmaking operations in the area.

6. Brickyard on the North side of the turnpike road in Hellingly.
Grid ref. TQ 564114

This site was leased by the Wenham family from at least 1708.(4) The will of Edward Wenham. brickmaker, made in 1758, mentions his stock of bricks and tiles.(20) However, it was not until 1765 that the property was granted to his son William. On the latter's death in 1799 it passed to his brother Edward, who died three years later. The site, with a pond, is marked on the Enclosure map of 1815,(19) but the owner at that time, Ody Wenham, was not a brickmaker.(15) By 1842 the only record of its former use is the name "Kiln Plot" on the Hellingly Tithe Award.(21)

7. Boship Pottery on the North side of the turnpike in Hellingly.
Grid ref. TQ 570113

Though never a brickyard, the Boship Pottery is included in this survey as tiles formed an important part of its output. In 1821 William Miller of Hellingly, potter, bought a small plot North of the turnpike. Over the next ten years three other members of the Miller family, all described as potters, appear in the parish registers. In 1842 the pottery is listed as "Tile Yard" with Edward Miller as owner and occupier. The site is still marked on the O.S. map of 1898 but not in 1910.

8. The "Old Brickyard" at Boship Green in Hellingly.
Grid ref. TQ 569111

Though not in fact a part of the Dicker Common, this site has been included as it appears to have been the starting point for George Goldsmith's operations and its use as a brickyard may go much further back than that. It is marked as "Old Brickyard" on the Tithe Award of 1842 and the house adjacent to it was occupied by Goldsmith's son John, who was listed in Kelly's Directory for 1855 as a brickmaker. The pond is still there and a field with a very uneven surface can be seen between it and the Boship Hotel.

8a. Grid ref. TQ 561112

George Goldsmith's grant of land on the Dicker.

9. Dicker Pottery on the South side of the turnpike road in Hellingly.
Grid ref. TQ 568112

This site also does not form part of the Dicker Common, although the fields behind it do. In 1842 the site is listed as a brickyard, owned by George Goldsmith but occupied by John Morris. Uriah Clark took it over in 1845.(7) On the O.S. map of 1875 the sites of the Dicker and Boship Potteries are transposed but the mistake is rectified in 1898 and by 1910 the Dicker Pottery alone survived. A photograph taken between the wars shows a stack of bricks outside a shed on the Pottery premises.(1) The buildings have now been demolished and the site redeveloped.

10. Brickfield on the South side of the turnpike road in Hellingly.
Grid ref. TQ 563113

This appeared briefly at the end of the 19th Century, marked on the O.S. map of 1898 only. It was probably part of Uriah Clark's operations.

11. Brickyard on the South side of the turnpike road in Hellingly.
Grid ref. TQ 561114

In 1800 a new grant was made to Robert Goldsmith of Hellingly, brickmaker, of "one acre on the Dicker adjacent to lands of Hellingly parish on the South East, to the Dicker on the East and West and to the Lewes to Horsebridge turnpike on the North." This was followed in 1806 by a further grant of one acre to the West of the above. A mortgage was raised in the following year and when Goldsmith died in 1839, the property was forfeited because the interest had not been paid. The brick-kiln, though still mentioned in the Manor Court Book, had clearly not been in use for some time.

12. Brickyard on the East Dicker in Hellingly.
Grid ref. TQ 561111

In 1798 James Goldsmith of Hellingly, brickmaker, was granted $\frac{1}{4}$ acre with a cottage on the Dicker. Another acre of land was added in 1801 and in 1806 a further $\frac{1}{2}$ acre "with the brick-kiln and other buildings thereon." The site was sold when Goldsmith went bankrupt in 1811, but may have been leased and operated thereafter by George Goldsmith, as he was occupier in 1842. It was probably also the workplace of his son John in 1855. By 1875 the brickyard had gone and the site had been returned to agricultural use, although the field still has a very uneven surface.

13. Price's Farm on the East Dicker in Hellingly.
Grid ref. TQ 559108

Richard Price is first referred to as a brickmaker in 1800 when he was granted one acre on the Dicker adjoining his other copyhold land. However it is interesting that the earliest grant of part of this copyhold was to William Cuckney, a brickmaker, in 1775 and that the adjacent holding, called Warren House, had been granted to Thomas Wood, also a brickmaker. Therefore, although no brick-kiln is specifically mentioned, the site was in use for brickmaking over a period of time. When Richard Price died in 1838, the property passed to his wife and daughters and no further mention is made of brickmaking.

14. The "Old Pottery" on the East side of the Dicker in Hellingly.
Grid ref. TQ 563108

In 1765 William Cuckney was granted $1\frac{1}{2}$ acres of waste. A mortgage of 1775 mentions a "Crockhouse lately erected" but to begin with the pottery was subsidiary to the brickmaking business. Cuckney sold the property in 1787 and from 1790 onwards the owners seem to have been primarily potters. By 1842 the site had become a brickyard once more, with Stephen Goldsmith as tenant. Goldsmith moved back into his father's old yard in 1850 and this was probably when this site was returned to agricultural use. The pond and several fields with a very disturbed surface are the only remaining evidence of its former use.

15. Brickyard and former pottery at Upper Dicker.
Grid ref. TQ 557103

This site was in use over a very long period. A brick in the chimney of nearby Starnash farmhouse is dated 1697. The first documentary evidence for the brickyard itself is the grant of the site to Thomas Wood in 1767. After Wood's bankruptcy in 1776 the new owners, Thomas and James Peckham, continued to run the business, being on record as supplying tiles to the Pelham estate at Bishopstone between 1780 and 1789.(22) The property was acquired by Benjamin Goldsmith in 1799 and he was succeeded by his son Stephen in 1827. In 1840 the yard was sold to Samuel Gravett, a brickmaker who had his own business in Eastbourne. He must have leased it to George Goldsmith, who is rather surprisingly listed as owner and occupier in 1842.(21) On Gravett's death in 1850 Stephen Goldsmith bought the property back and he was still described as brickmaker in a mortgage of 1862. By 1871, however, he had retired and James Goldsmith was listed in the census returns as brick and tilemaker. The brickyard was sold on Stephen's death in 1876. James Goldsmith was still the brickmaker in 1887 (11) but by the 1890's Harry Page was running the yard. His name still appeared in Kelly's Directory for 1927 and he is stated by Mrs. Pelling, the present occupier of the cottage on the site, to have been the last brickmaker. The footings of the kiln are still visible in the cottage garden and across the road is the pond and a field with a very disturbed surface.

References.

1. East Sussex Record Office (ESRO) AMS 4439

2. British Library (BL) ADD CH 30793 (inf. C. Whittick). 'Oste' was the term generally used for a kiln in the 16th Century.

3. ESRO PAR 292/9/1 Chiddingly Churchwardens' Accounts. (Inf. E. Doff).

4. BL ADD MS 33184 Manor of Laughton Rentals 1378 - 1740.

5. ESRO SAS/A663 - 676 Manor of Laughton Court Books 1737 - 1893. All subsequent references to grants, transfers and mortgages are based on information contained in these volumes.

6. For an account of the growth of the use of bricks and tiles at this period, see M. Beswick, Bricks and Tiles: the Story of a Village Industry. (Warbleton 1980).

7. John Manwaring Baines and Judith Fisher, Sussex Pottery (Brighton 1980) pp 80 - 5. It should however be noted that the map on page 80 is inaccurate.

8. ESRO W/A70/188.

9. ESRO TDE 105 Chiddingly Tithe Award.

10. ESRO microfilm XA 19/6, 9/9, 2/3, 17/10. Decennial census returns for the parish of Chiddingly 1841 - 71.

11. Kelly's Directories for Sussex 1855 - 1927. Use has been made of these to determine which sites were in use from the mid-19th Century onwards.

12. The relationship of the various Goldsmiths to each other is by no means clear. Benjamin, who worked at Upper Dicker, may not have been related to the others at all, but George, James and Robert had their yards in very close proximity. The confusion grows as the names George, John, Stephen and James are duplicated in succeeding generations.

13. J. Farrant, "The Seaborne Trade of Sussex 1720 - 1845" Sussex Archaeological Collections Vol. 114 (1976) pp 111-2.

14. B. K. Pegden, "The Purchase of Bricks for the Martello Towers in the Year 1804" Fort (1980) pp 55-7.

15. ESRO PAR 375/1/2/1 Hellingly Parish Register. Robert Goldsmith is described as an agricultural labourer in 1820.

16. ESRO microfilm XA 19/4, 9/8, 2/3, 17/10. Decennial census returns for the parish of Hellingly 1841 - 71.

17. F. M. Avery, "Burgess Hill Brickworks and Potteries" Sussex Genealogist and Local Historian Vol. 1 No. 2 (1979).

18. 6 in. Ordnance Survey Map Sheet LX, editions of 1875, 1898 and 1910 will be referred to throughout this section.

19. ESRO QDD/6/E2 Enclosure map for the wastes of the Manor of Laughton.

20. ESRO W/A61/521.

21. ESRO TDE 5 Hellingly Tithe Award.

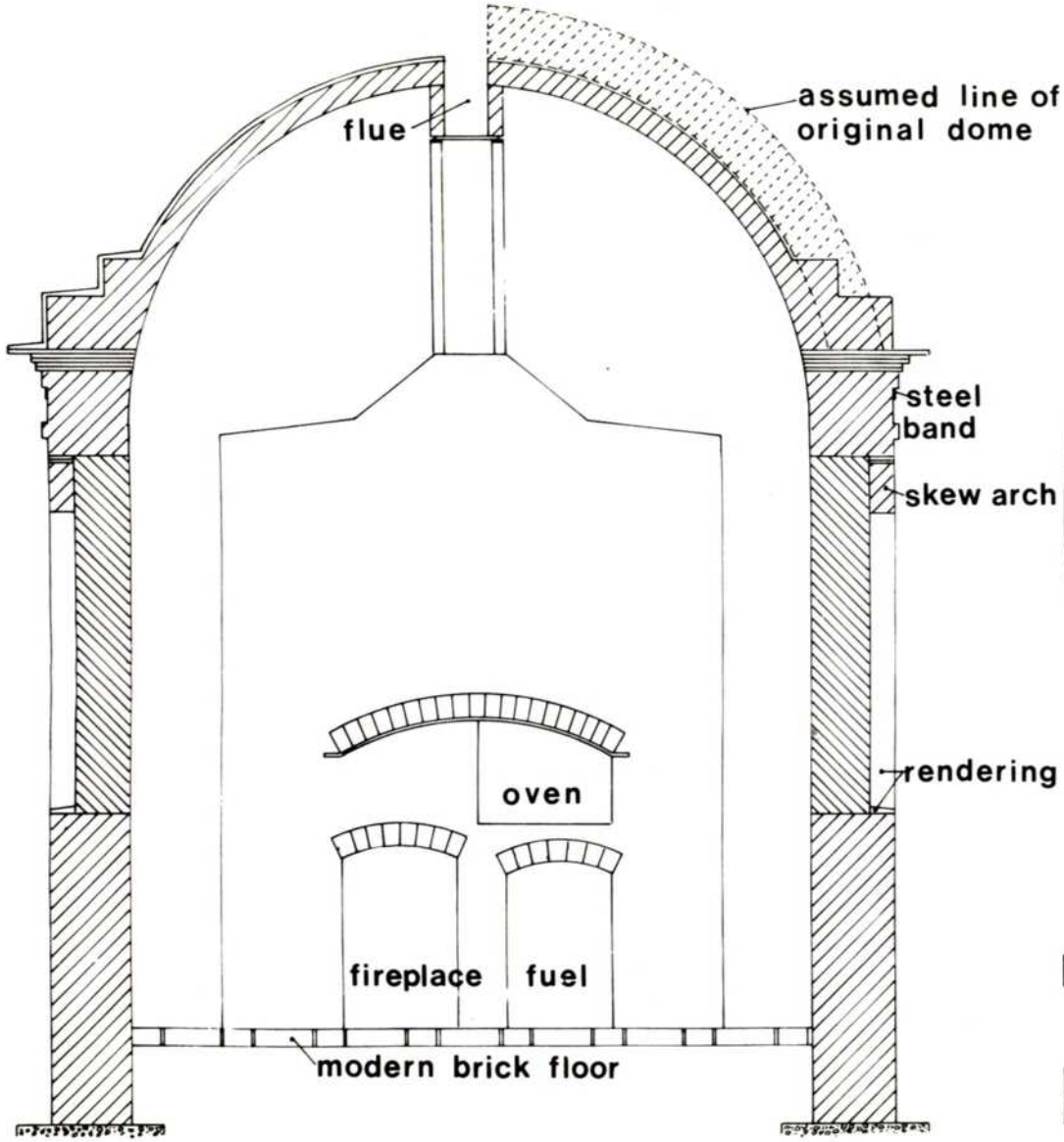
22. ESRO AMS 2132-3 Halland Estate Account Books.

My thanks are due to the staff of the East Sussex County Record Office for help in locating material for this study, to Elizabeth Doff and Christopher Whittick who read the first draft and made a number of helpful suggestions and to my husband for his encouragement as well as his assistance in examining some of the brickyard sites.

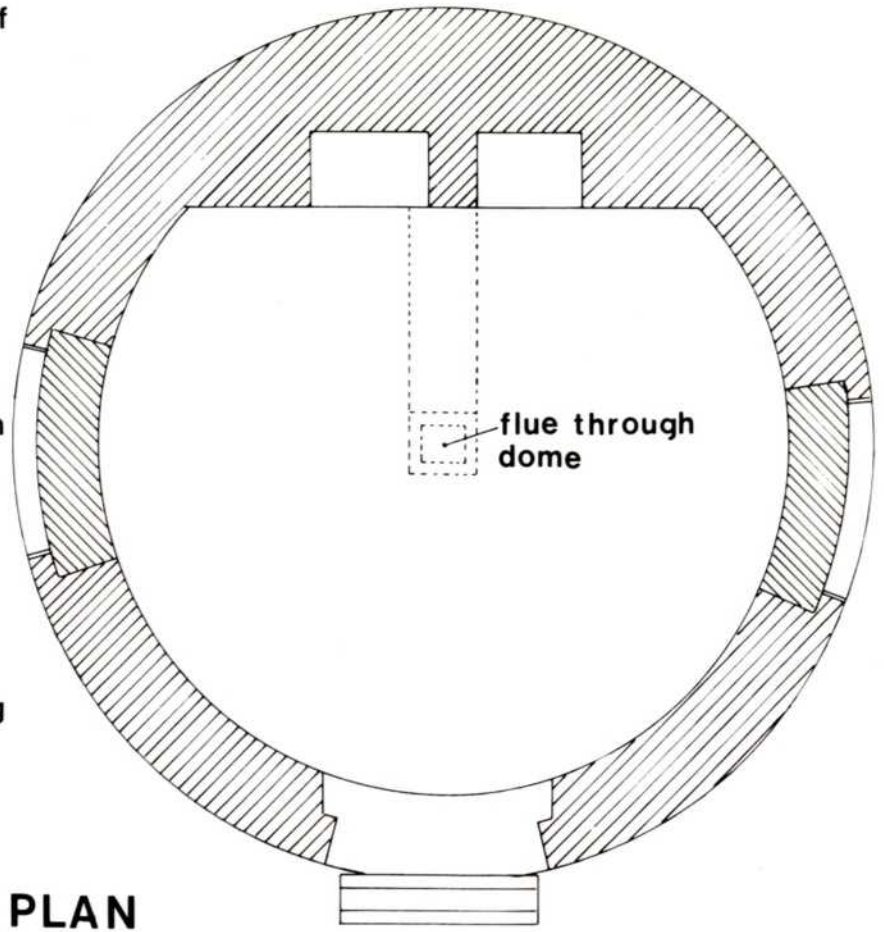
THE ROUND HOUSE, ASHCOMBE. A TECHNICAL NOTE

By E. W. O'Shea.

This building, which appears to have been the domestic unit serving a now-demolished toll house, has some interesting technical features. It is built entirely in brick and is perfectly circular in plan. It is so precise inside and out that either a trammel or drum must have been used to maintain the accuracy. The bricks are a standard stock facing for the outer skin, the colour and texture suggesting that they probably came from Chailey or Ramsey brickworks, the inside skin being of "common" stocks from the same works.



CROSS SECTION



PLAN

original brickwork
filling to openings
dome removed?

Scale 0 1 2 3m

THE ROUND HOUSE, ASHCOMBE, LEWES

TQ 389 093

EWO'S 1982

The walls are one-and-a-half bricks thick, showing standard size headers on inner and outer faces, confirming that tapered or "oast-house" bricks were not used. The thickness of the walls is 39 cm. whereas normal one-and-a-half brick walls are 32.5 cm. The additional thickness would be an allowance for unequal cropping to obtain two faced half bricks for the outer ring. The equal perpends inside and out suggests that the outer skin was of half bricks as at 1.92 m. radius, full length radiating headers should have produced a perpend of at least 2 cm. wide.

The dome as existing is built with a half brick inner skin, but a photograph taken by Mr. G. P. Grivett, shown on page 366 of Volume 21 of the Sussex County Magazine dated November, 1947, shows the dome in its original construction but is so overgrown with ivy and weeds as to be almost unrecognizable, but the profile confirms the line of the dome as springing from the outside diameter of the brick wall. The photograph shows that the external face of the dome was built in header bond and as the joints of the dome are consistent with the walls and the outer ring one brick thick, the bricks must have been "specials" tapering on all four faces. A local resident who had lived nearby for forty years said "it was a shame to take away those lovely little bricks".

The photograph mentioned above shows very severe deterioration to the fabric of the building. The two windows, which, from their reveals, would almost certainly have been double hung sashes with boxed frames have been removed and the external doorway is in a similar condition. Over the openings were skew arches. These comprised a triangular key stone consisting of a single brick tapering to a point at the bottom. The voussoirs are single uncut bricks, laid slightly on the skew bearing against a skewback only 5 cm. wide at the top, which must be considered poor construction. There was probably a wooden lintel and two-ring relieving arch on the inner skin but this would have been removed when the openings were bricked up on the inside. The top of the arch was sealed over with two courses of creasing tiles.

At the junction of the wall with the dome a cornice of five courses of creasing tiles was introduced to throw the rainwater clear of the walls. The only other external feature is the pair of band courses 3 cm. projection and 16 cm. apart set immediately below the cornice.

A further photograph by Mr. Arthur E. Bissell on page 195, Volume 25, (April, 1951) of Sussex County Magazine, shows even further deterioration. The vegetation has been removed and also the outer ring of the dome. Some of the surrounding trees have been removed and altered levels in road widening have lowered the ground level, which shows five courses of brickwork exposed below the door opening.

Perhaps the most interesting feature is the heating and cooking arrangement which suggests that the now removed partner of this building was the toll house whilst this remaining building was the domestic unit. A chimney stack 2.25 m. wide was formed across the building and whilst apparently contemporary with the building, the circular brickwork would have been built first to facilitate maximum use of the trammel or drum and the brickwork for the stack cut and fitted up to it. At floor level a fireplace and fuel recess have been formed in the stack, sealed over with half brick relieving arches, and a similar oven built above them, also with a relieving arch carried on a 5 x $1\frac{1}{2}$ cm. arch bar. Flues from the fireplace and oven converge into the top of the stack and a single flue is carried across to the centre of the dome. This consists of a pair of 5 x $1\frac{1}{2}$ mm. iron quadrant straps with a flat tiled soffit and brick on edge sides cut and fitted between the straps and the dome, with a hole about 20 x 15 cm. passing through the centre of the dome.

All of the internal brickwork was rendered with lime plaster. The restoration carried out by the East Sussex County Council in the mid 1950's comprised the filling in of the openings, leaving the voids of the outer skin of the window openings as recesses, the reconstruction of the arches and repairs to the cornice. The outer face of the dome and cornice feature were rendered in cement and sand to

a smooth face. At the same time a 5 x 1½ cm. steel band, made in three sections, bolted together was fitted under the upper projecting band course to restrain the thrust from the dome.

It was not known what the orginal floor was, but, probably at the time of the restoration a bed of unjointed engineering bricks has been laid and a concrete channel laid across the door opening.

It has been suggested that there was a pedimented porch over the doorway, but no signs of fixings or postholes can be traced.

AN EARLY PRIVATE ESTATE WATER SUPPLY (WORTH PRIORY)

By Worth School Lower VI Form Industrial Archaeology Group, Neville Blewitt, Tim Buckley (Photographs) and 15 other pupils.
Master - Mr. R. W. Allen.

The following is a precis, prepared by Mr. A. G. Allnutt, of the prize-winning project submitted for the Schools Project of 1982 organised by the Sussex Industrial Archaeology Society. The original manuscript was profusely illustrated by photographs, copies of old drawings and descriptions of various types of pumps and rams, but lack of space has necessitated their omission from the precis. The area concerned in the project is shown in Fig. 1 taken from the 2½ in. O.S. map and is mainly wooded country on the Tunbridge Wells sands intersected by streams and draining south; these have cut valleys down to the Wadhurst clay and are fed by springs from the interface. It is typical Wealden Iron country, there having been iron workings at the hammerpond (TQ 328323); slag may be found in the stream bed below the dam.

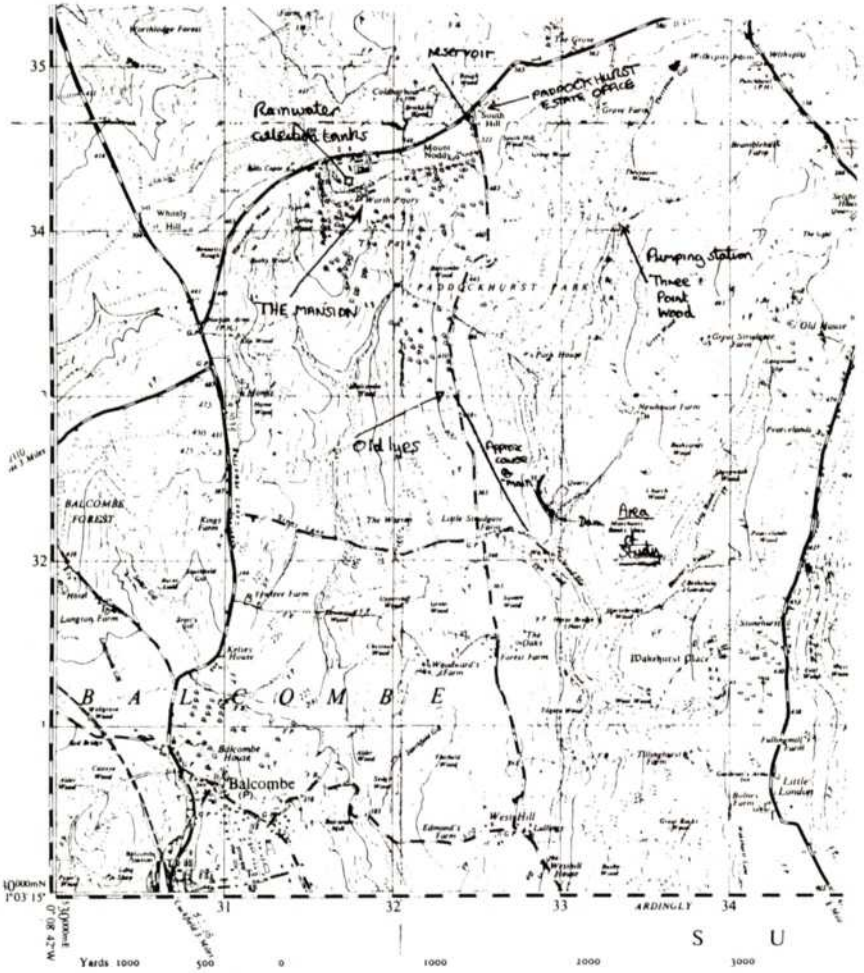


Fig. 1. (Taken from 2½" O.S. Map TQ 33 East Grinstead)

Worth School, a well-known Public School run by Benedictine Monks, is housed in Worth Priory, known until 1948 as Paddockhurst (TQ 318340). In 1894 the house and estate was sold by R. Whitehead (1) to Lord Cowdray (2); the deed of sale described the water supply as being obtained from a ram which pumped from springs in the park (Three Point Wood, TQ 333340) to a reservoir at South Hill (TQ 324346) 280 m. (300 ft) above sea level; distribution was then by gravity. There was a second supply from a 730 cu.m. (160 000 gallon) tank filled by rain water from the roofs; after filtration this was pumped to a tank in the tower and normally used for stock but could be run into the main system in emergency, e.g. for fire fighting.

In 1901 Lord Cowdray decided to take a new supply; a 60 m. (200 ft) heading was driven into the side of the valley at Fire Wood (TQ 329320) to tap the water table in the Tunbridge Wells sands. Parts of these sands are well compacted into soft sandstone but loose sand was apparently encountered and the heading had to be timbered. An attractive pump house was built (Fig. 2) of local sandstone and two three-throw reciprocating pumps driven by two $3\frac{1}{2}$ h.p. Hornby oil engines were installed. The diagrammatic lay-out is shown in Fig. 3.

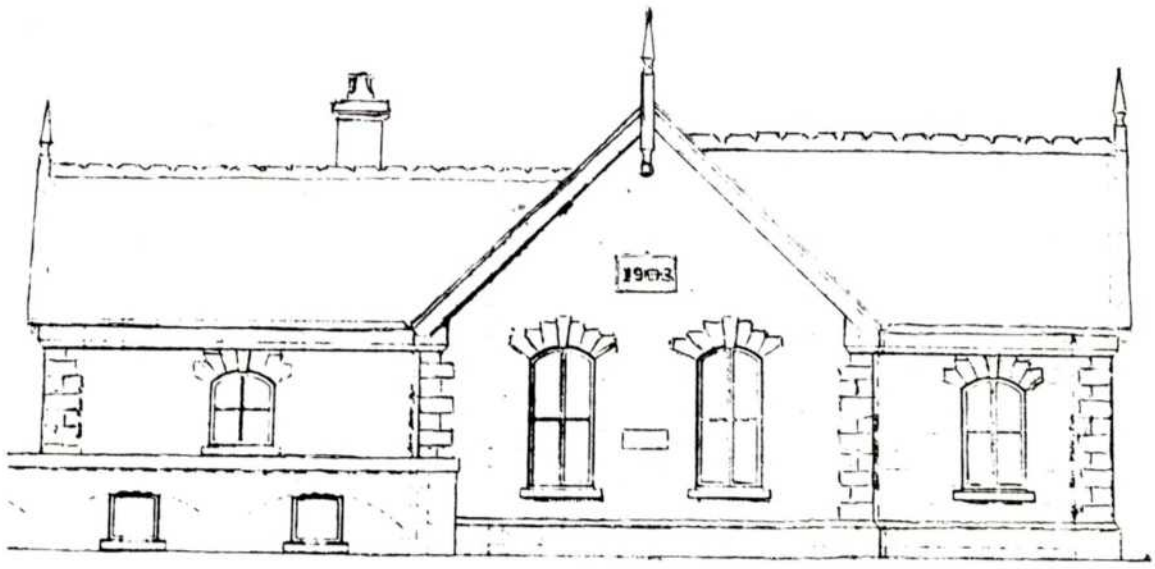
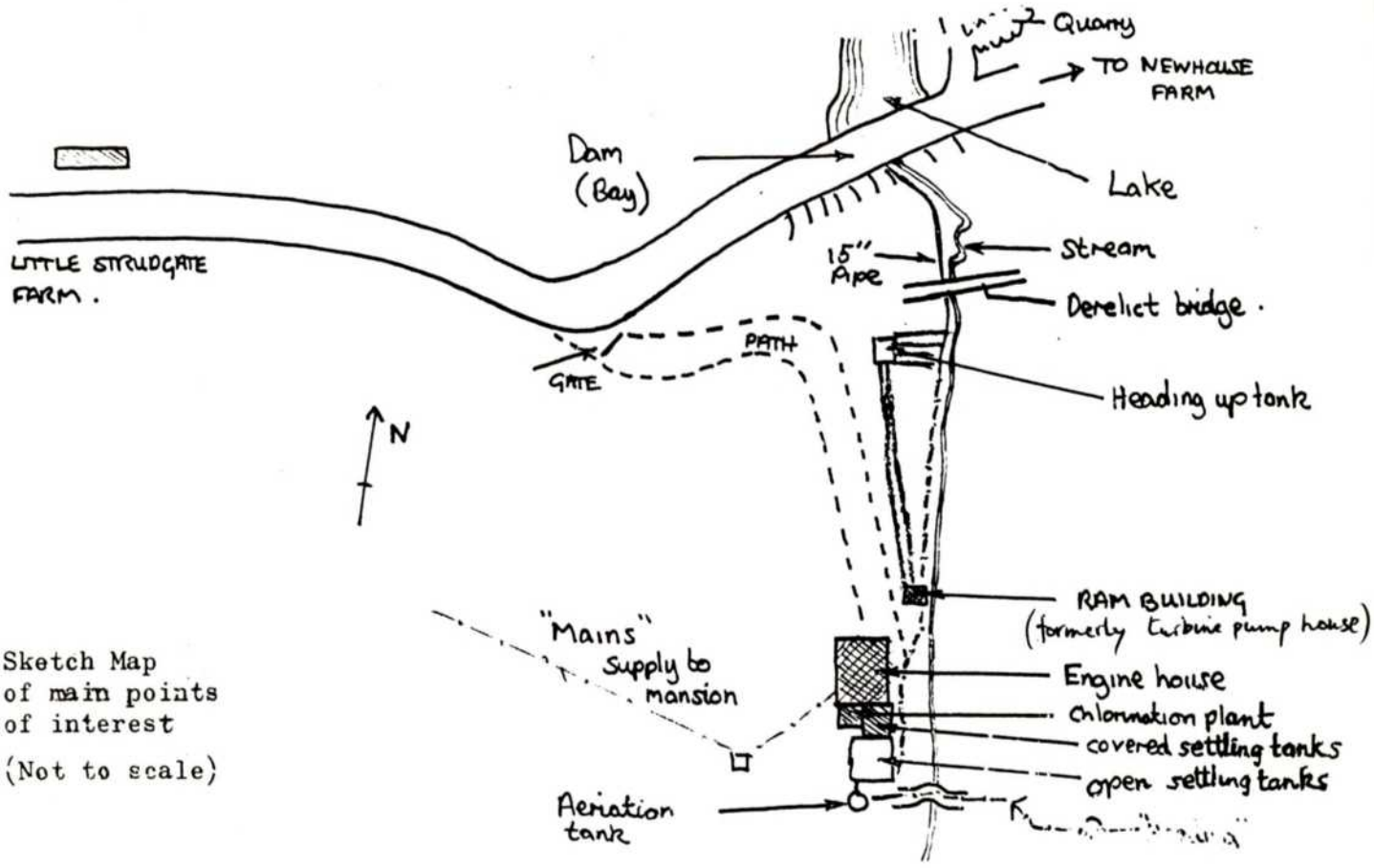


Fig. 2. E. Elevation of 1903 Pump House, covered settling tank on the left.

By 1923 more water was needed and Lord Cowdray therefore briefed Sir Alex Binnie Son and Deacon, consulting engineers, to supervise the work. To obtain more power for pumping they had the oil engines replaced by a water turbine and a new pump sited in a small new pumphouse just north of the 1903 building. This was fed through a 0.38 m (15 in.) diameter cast-iron pipe from the hammerpond (TQ 329323). The pond was first drained so that a new penstock could be built on the upstream face and the new 0.38 m main threaded through an old brick culvert in the dam. At the same time the crest of the dam was raised. Apparently the supply from the heading was still adequate but a settling tank and filter beds were added adjoining the 1903 pump house on its south-east side.

In 1936 a chlorination plant was added, the capacity of the plant at that time being 82 co.m (18 000 gallons).

In 1948 Worth Priory went on to the public mains and the supply from Fire Wood was modified to cope only with agricultural needs. The turbine and pump was replaced by two Glenfield and Kennedy 150 mm (6 in.) compound rams and fresh sand was put in the filters. This system worked until 1954 when a 50 mm (2 in.) Company's main was laid from Edmonds Farm (TQ 325304) to Forest Ridge (TQ 326315) and thence distributed to the steadings.



Sketch Map of main points of interest

(Not to scale)

Fig. 3.

The Main castings of the Glenfield and Kennedy rams and the three-throw reciprocating pumps remain. In 1960 Mr. J. L. C. Hume purchased the Hornby oil engines at a cost of £10 for preservation.

Notes.

1. R. Whitehead gave his name to the Whitehead torpedo which he introduced using gyroscopic controls.
2. Lord Cowdray was Weetman Pearson of S. Pearson and Son, an international firm of civil engineers; they drove the first tunnel under the Hudson River, New York and were responsible for Dover Harbour.

PETWORTH HOUSE ICE-HOUSE

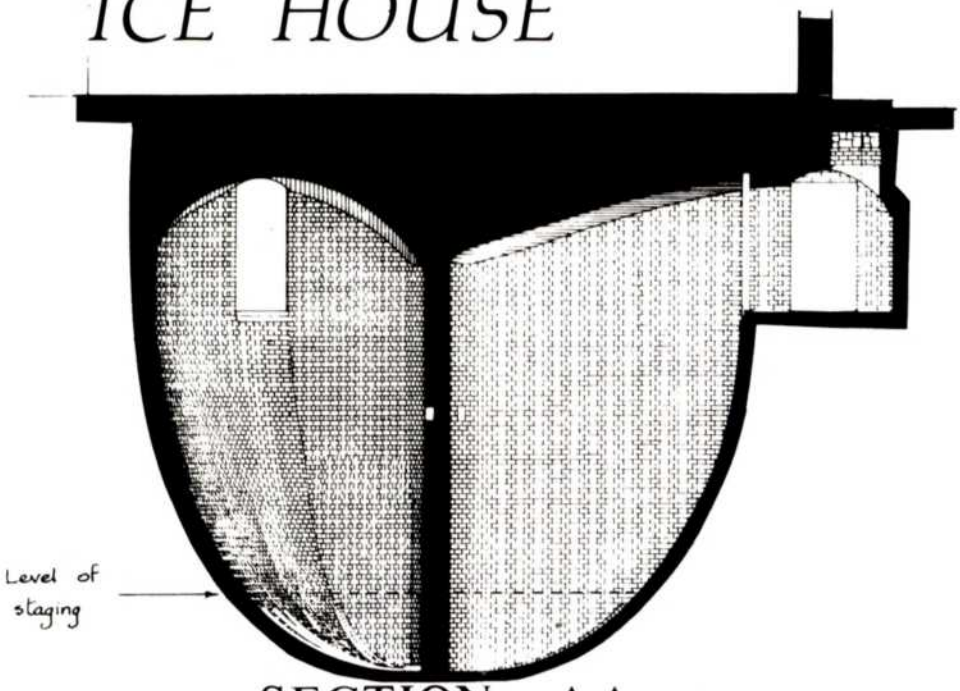
By R. G. Martin.

Introduction

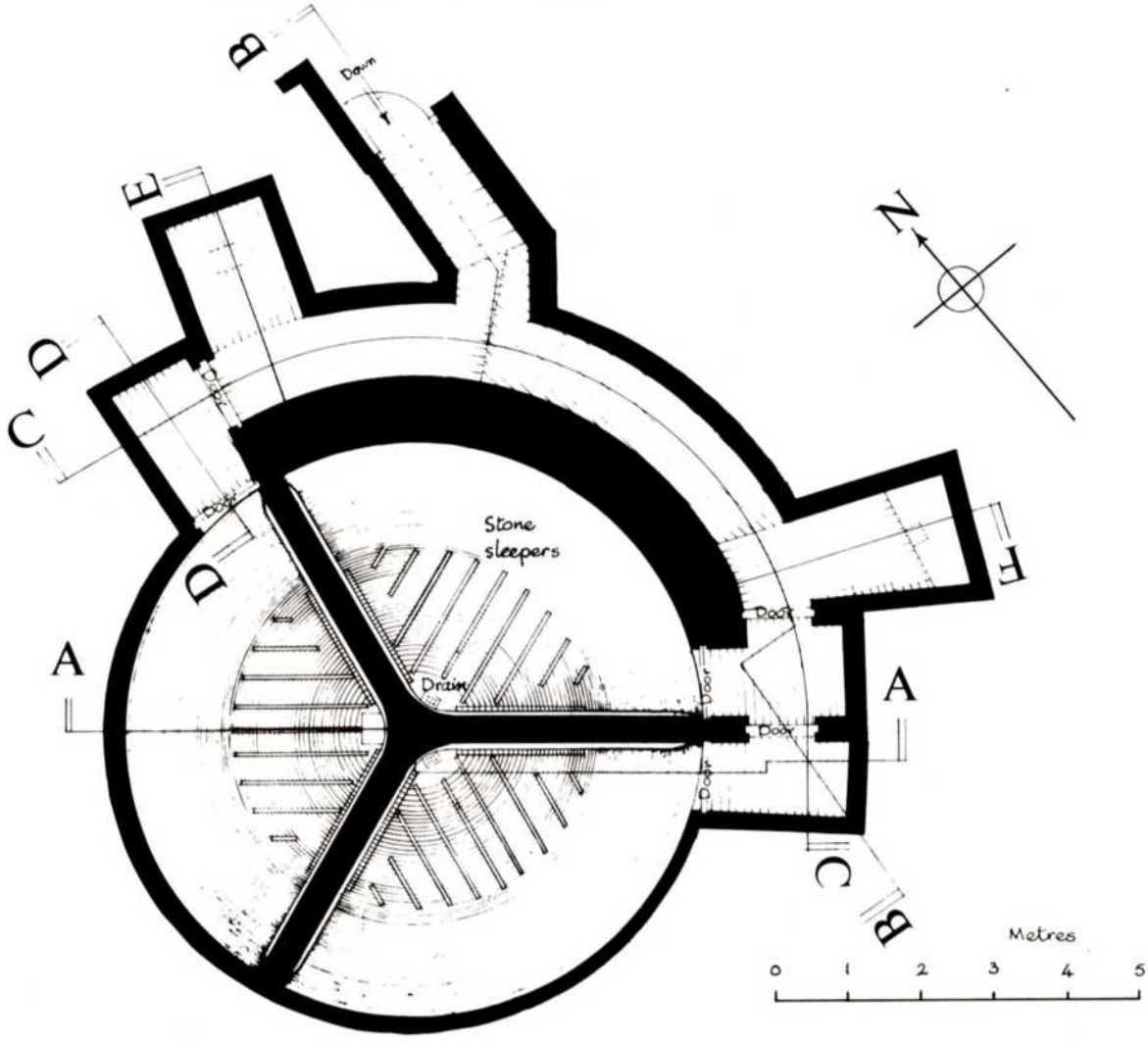
Ice-Houses and Ice-Wells were a common feature in large country estates in the 18th and 19th centuries. Ice was collected from convenient stretches of water and was stacked in the chamber often packed in straw. The ice was used throughout the year in the kitchens for cooling and preservation. During the second half of the 19th century ice was imported from Scandinavia or manufactured locally. Most domestic Ice-Houses were comparatively small with a single sunken circular chamber $2\frac{1}{2}$ - 3 m (8ft - 10ft) in diameter and about 3 m (10 ft) deep, with a domed roof. Loading was normally through a hatch in the roof and the ice was removed through a horizontal tunnel with double doors. Melt water was discharged through a drain

PETWORTH HOUSE,

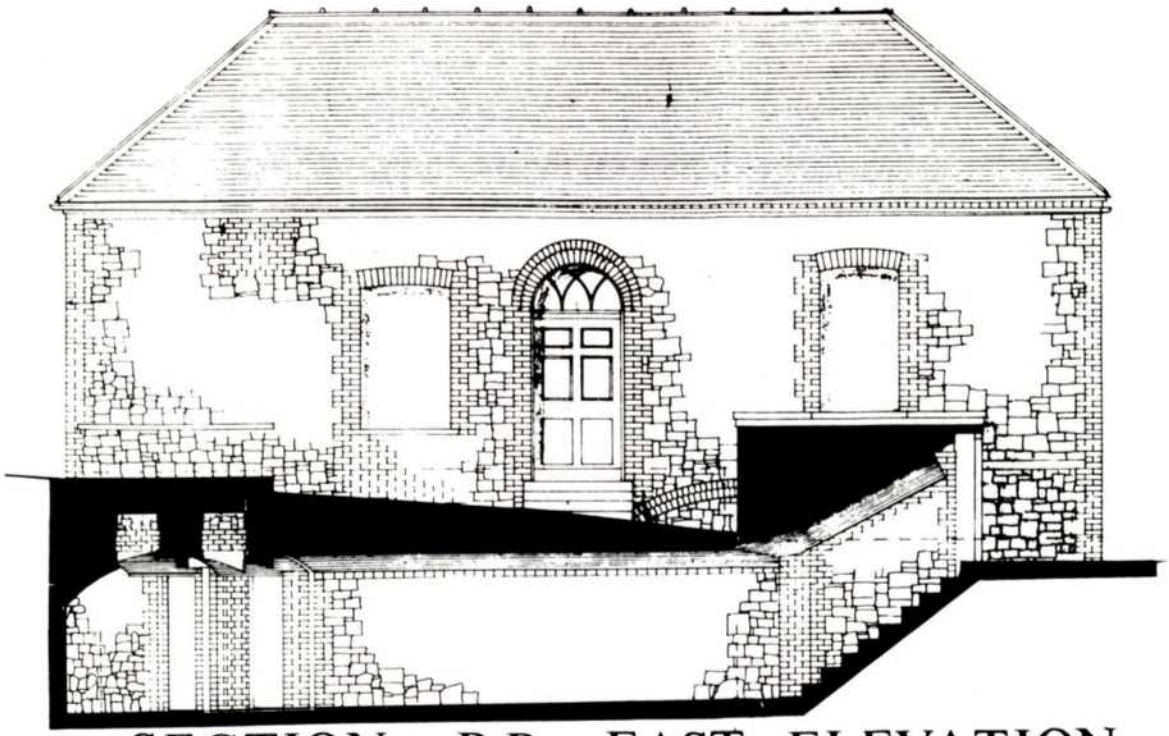
ICE HOUSE



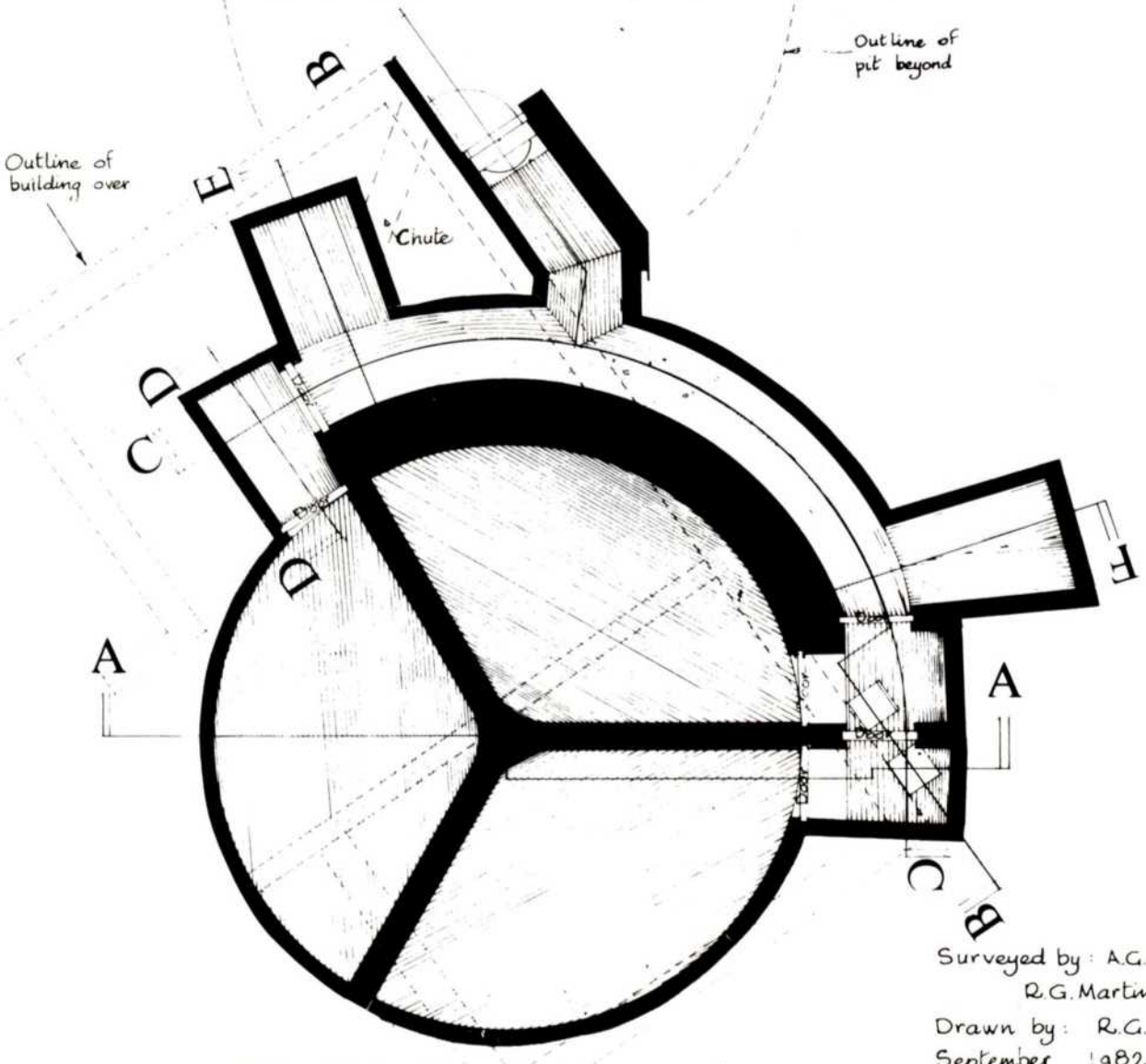
SECTION AA



FLOOR PLAN



SECTION B B, EAST ELEVATION

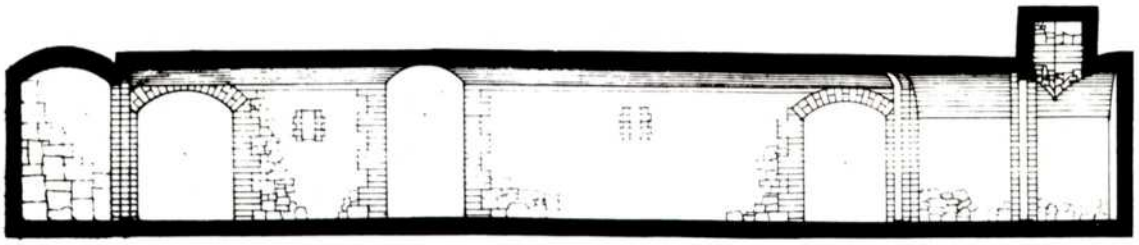


Surveyed by: A.G. Allnutt, R.G. Martin, R.V. Christophers
Drawn by: R.G. Martin
September, 1982

PLAN (Looking up)

PETWORTH HOUSE, SUS

ICE HOUSE



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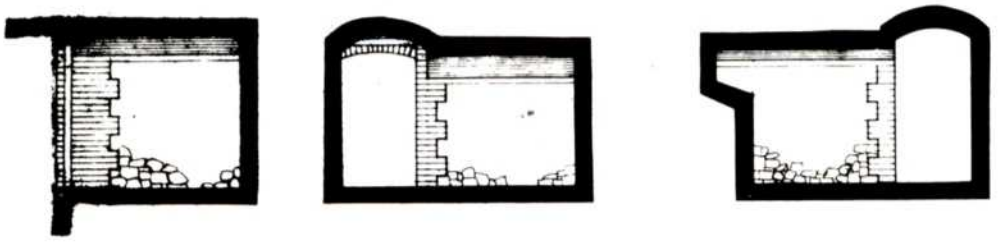

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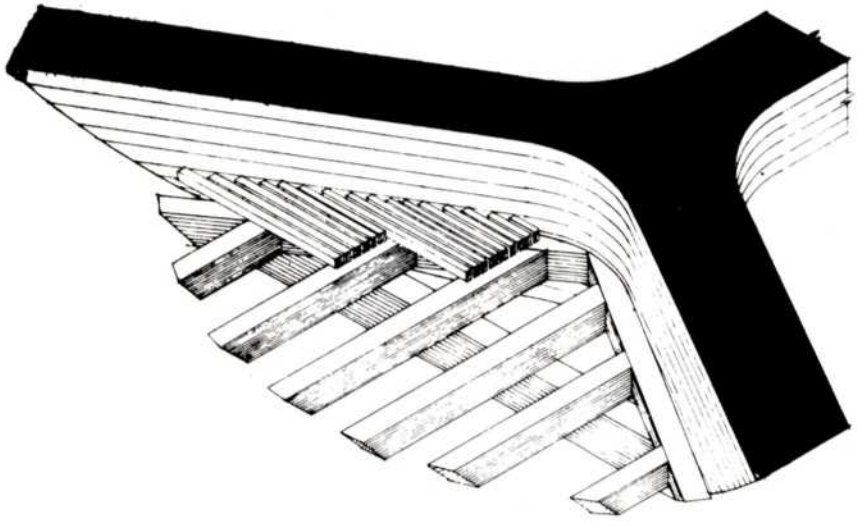
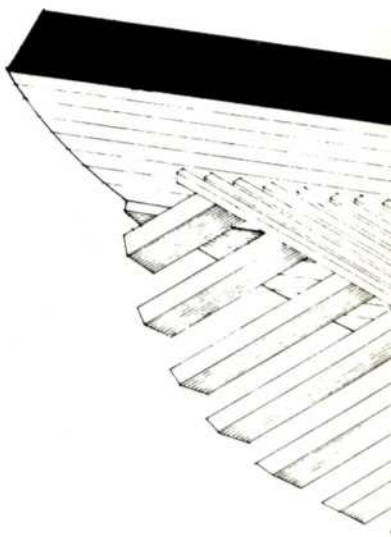
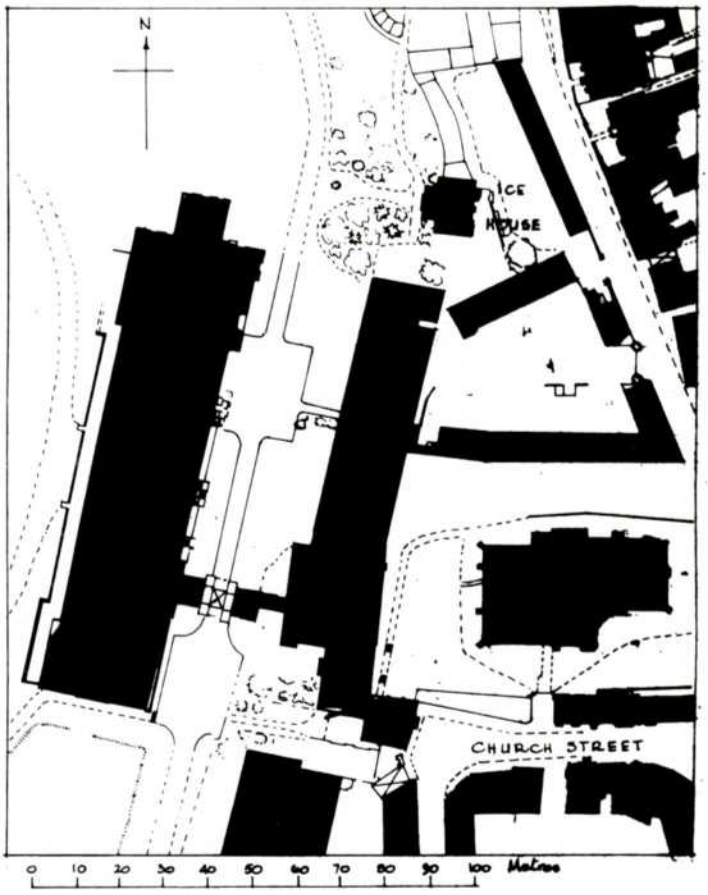


STAGING in Northeast Chamber

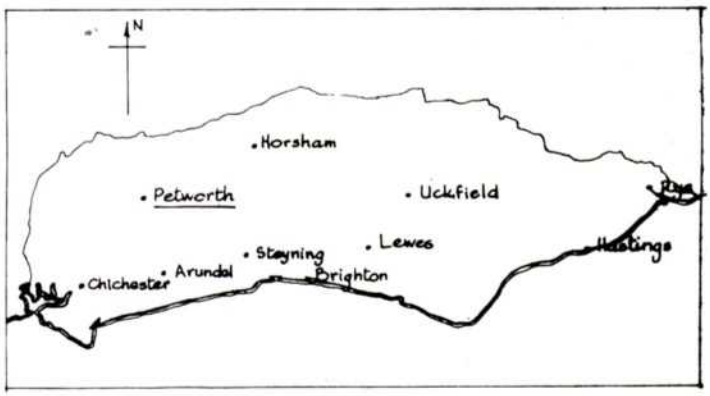


STAGING
North

EX



From OS map dated 1875



South and
Chambers

from the lowest part of the base. They were built mainly below ground or into the side of a bank and were covered with earth to increase insulation.

History

The example at Petworth is far larger than one normally finds and was built in 1784. Work started on 29th May and was completed on 25th December using estate workmen at a labour cost of £168:9:1¾d. This included the removal of the old Ice-House and the construction of the new one with a dairy over. The building now standing (Fig. 1) is substantially as constructed in 1784, there being no evidence remaining of the earlier Ice-House. The first filling of the new house took place between 11th and 18th December.(1)

Description

The Ice-House is constructed in faced brickwork and comprises a cylindrical pit 7.95 m (26 ft.) in diameter with vertical sides between 1.00 and 1.95 m (3ft 3 in. and 6ft 4 in.) high and an inverted dome bottom 4.90 m (16 ft. 1 in.) deep. The pit is divided radially into three equal chambers by 380 mm (1 ft. 3 in.) thick party walls in English Bond increasing to 533 mm (1 ft 9 in.) thick towards the base. Over each chamber is a barrel vault in headers. The maximum height of the chambers is 6.80 m (22 ft 4 in.) and the volume of ice that could be stored in each chamber is approximately 72 cubic metres (2,540 cubic feet). There is one entrance into each chamber in the vertical side of the cylinder and these are connected through lobbies to a curved passage extending around about a third of the exterior circumference of the pit. The passage and the lobbies are faced with random rubble of local sandstone with brick dressings and have brick-laid-flat paving and brick segmental vaults in headers. There are two side recesses off the passage and a flight of steps connecting the passage to the outside yard. The wall between the chambers and the passage is 1.00 m (3 ft. 3 in.) thick.

There are two loading traps, vertically through the lobby vaults of the south and north-east chambers and evidence of a possible sloping chute from the outside of the entrance steps to the recess adjacent to the lobby of the north-west chamber but both ends have been blocked up. The passage was lit by means of candles, there being three locations for them on roughly carved stone brackets. There are also two small niches where a lantern could stand. There are the remains of door frames and chases in the walls where these occured at the entrances to each chamber and between the lobbies. Each chamber was thereby enclosed by a double door "cold lock".

Staging

In the base of each chamber there are a series of parallel stone sleepers 50 mm (2 in.) wide let into and projecting 75 mm (3 in.) above the face of the inverted dome bottom at 400 mm (1 ft. 4 in.) centres, running with the slope. It is possible that these were intended to form channels for melt water as there are outlets at the lowest point of each chamber. There is the remains of timber staging in the base of each chamber. In the south and north-east chambers this comprises 100 x 152 mm (4 in.x 6 in.) joists at 400 mm (1 ft. 4 in.) centres bearing on similar wall plates fixed to the walls with iron wall hooks. The level of this staging is 1.09 m (3 ft. 7in.) above the lowest point and is the same level as the top of the stone sleepers. The staging in the north-east chamber is constructed with joists as above framed into similar trimmers running adjacent to the party walls and supported on a 152 x 303 mm (6 in.x 8 in.) beam. The level of this staging is 460 mm (1 ft. 6 in.) above the lowest point and the stone sleepers have been cut away where the joist ends bear on the surface of the inverted dome, indicative that this staging, at least, is not original.

The staging in all three chambers is floored with 34 x 52 mm (1¾ in.x 2 in.) slats at 65 mm (2½ in.) centres. There is no evidence of any food having been stored within the chambers but various blackened patches on the vault suggest that candles have been used at some time for illumination.

Later Use

The Ice-House was apparently used until the late 19th century, as an elderly estate worker who was alive in the 1940's can remember loading the chamber with ice. The dairy over the top of the Ice-House subsequently became disused and the space at the rear centre was altered to house a fire appliance. This was a tight fit between the columns of the portico and to ensure accurate location, a guide channel was let into the paving and the columns were necked, presumably to allow clearance for the wheel hubs of the fire appliance.

My thanks are due to Mrs. A.G.Allnutt and Mr.R.V.Christophers who assisted me in carrying out the survey and to the National Trust and the Leconfield Estate for permission to have access and help in providing equipment and materials.

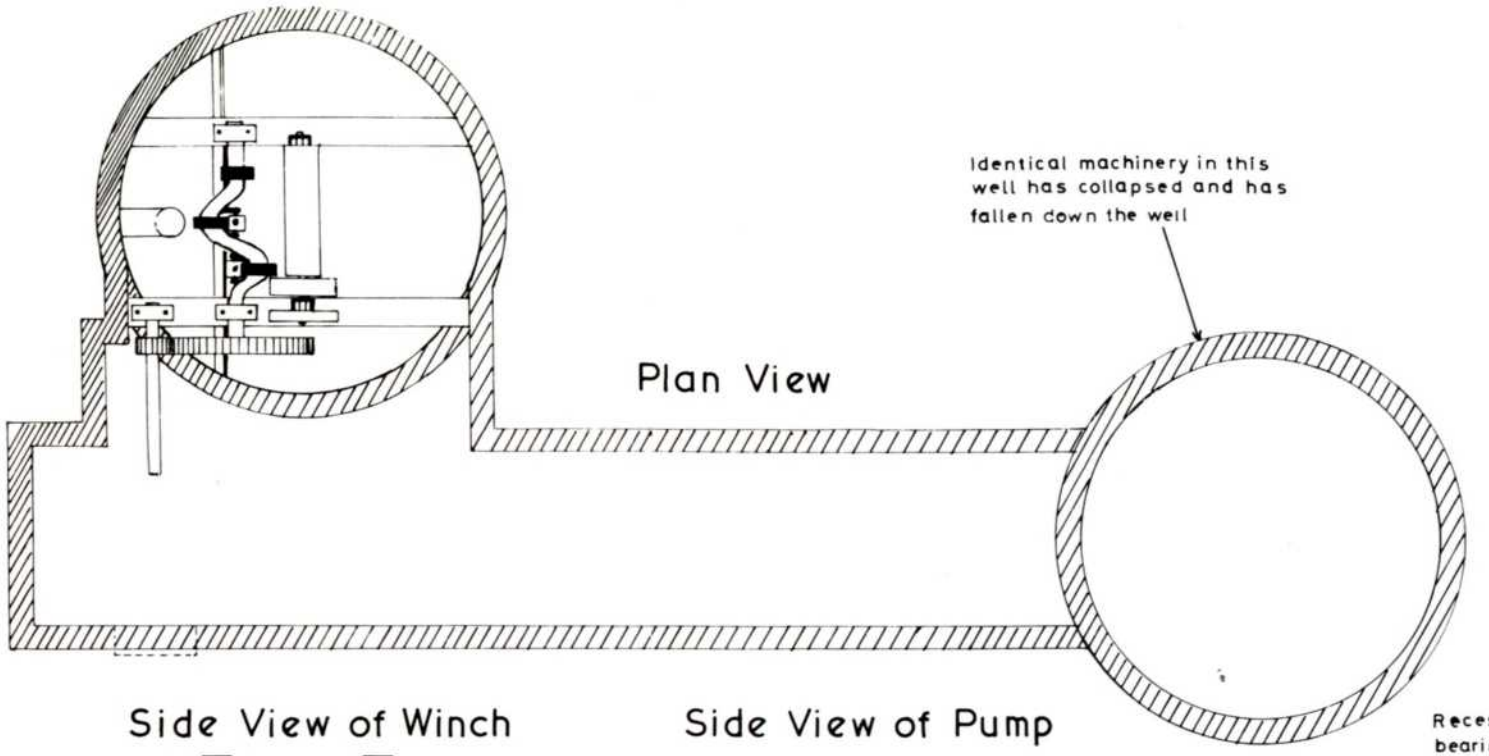
Fig. 1. Entrance Passage to Ice-House.

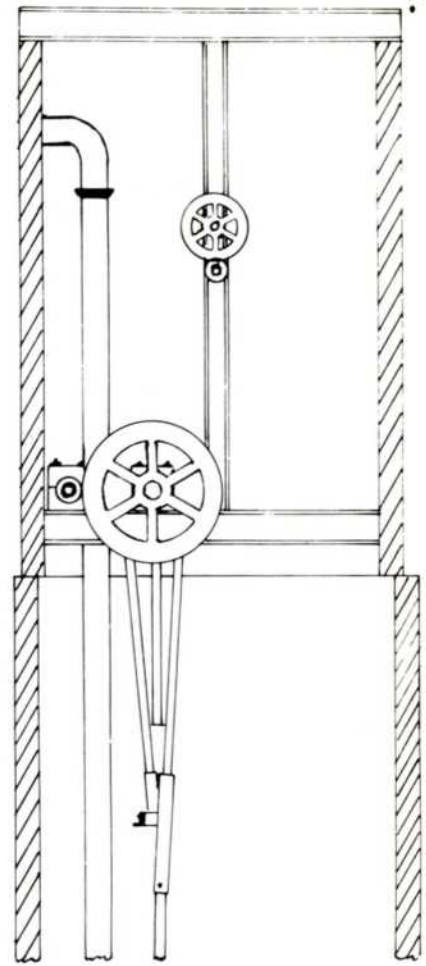
AN OLD BREWERY WELL AT HASTINGS

By A. J. Haselfoot.

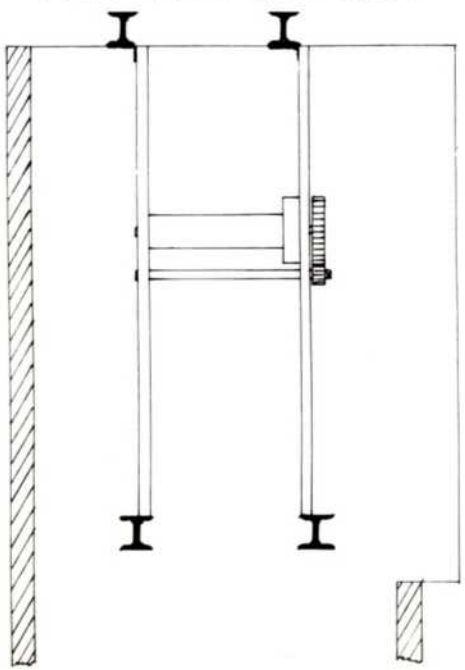
Breeds Brewery appears to have been established in the early years of the 19th century in High Street in the Old Town at Hastings. In early directories the address is given as 61, High Street up to at least 1876, but in 1881/2 is appears as the Hastings Brewery at 32a High Street; later they seem to have acquired a depot in The Bourne also. In 1939 Breeds Brewery Company was taken over by Fremlins Brewery and the depot in The Bourne closed down; also presumably the brewery at 32a High Street, if it had not been closed down earlier, as the 1940 directory quotes a brewer's stores at this address.

In the autumn of 1982 development of the site of the old brewery uncovered the brewery well which was found to have most of the original pumping and hoisting machinery still intact. The curb of the well was about 8 ft. below the then ground level with a narrow chamber alongside it which was found to lead to another well about 16 ft. away to the west. The machinery in this latter well had unfortunately been broken by concrete debris falling into it and it had fallen down the well and jammed.

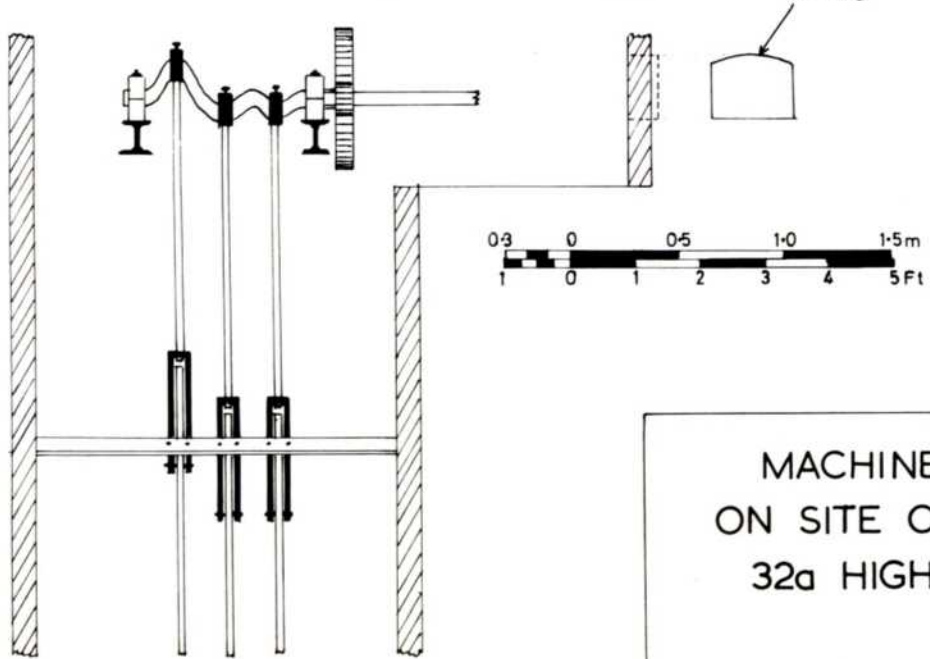




Side View of Winch



Side View of Pump



MACHINERY IN OLD WELL ON SITE OF BREEDS BREWERY 32a HIGH STREET HASTINGS

AH 6/1/83

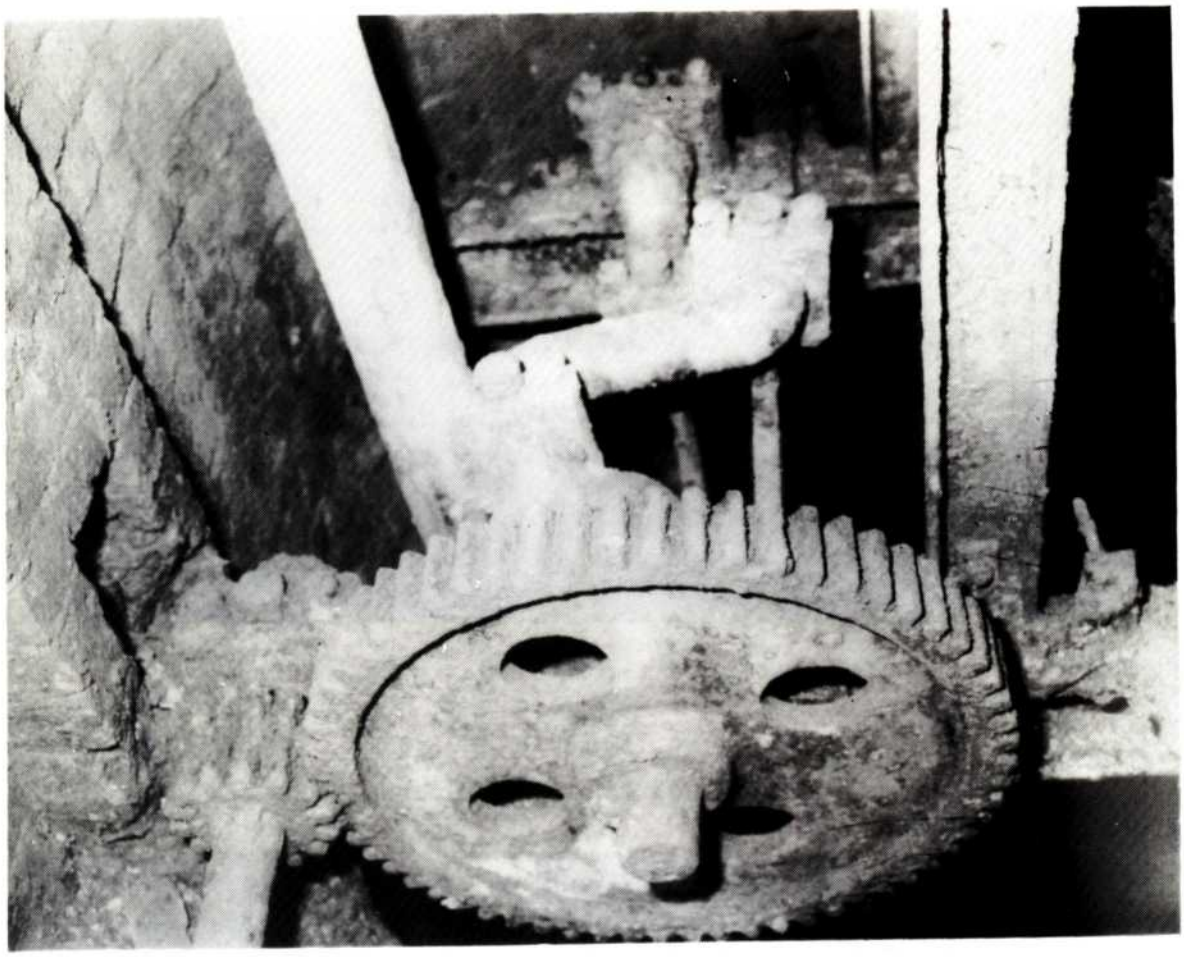


Fig. 1. Gear Drive to Crankshaft.

Fig. 2 Crankshaft:
Discharge pipe on Left,
Support for Winch
on Right.

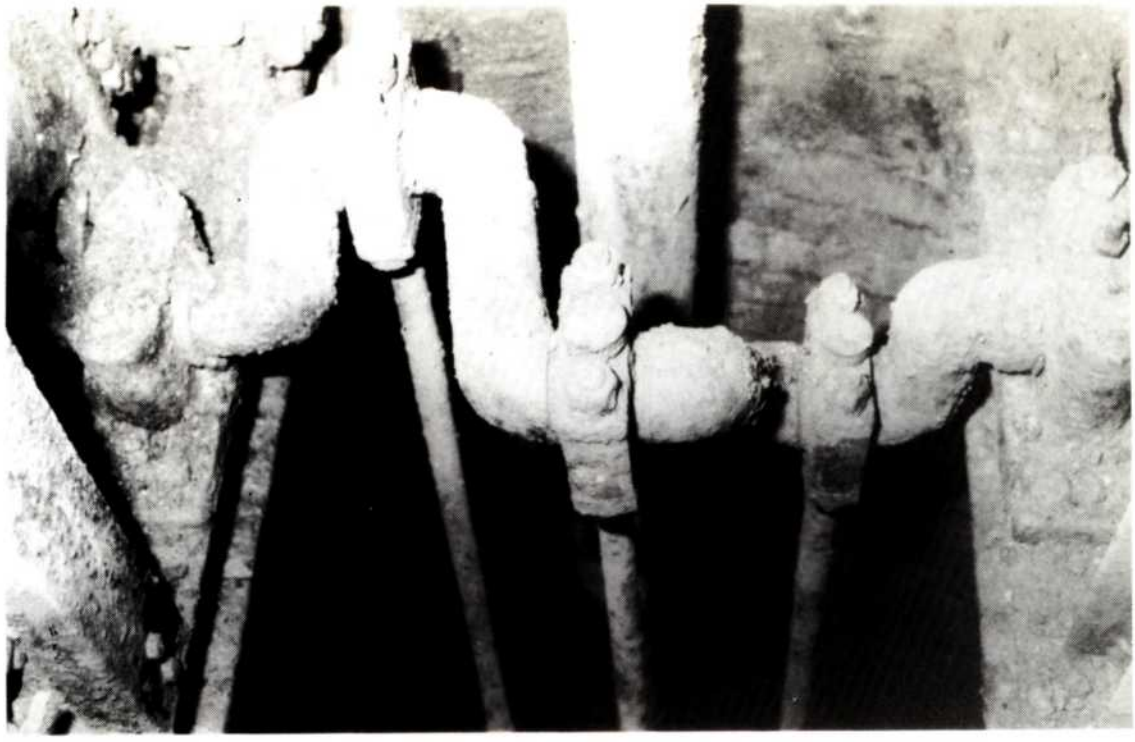


Fig. 3 Crankshaft Showing Connecting Rods to Pump Rods Lower Down Well.

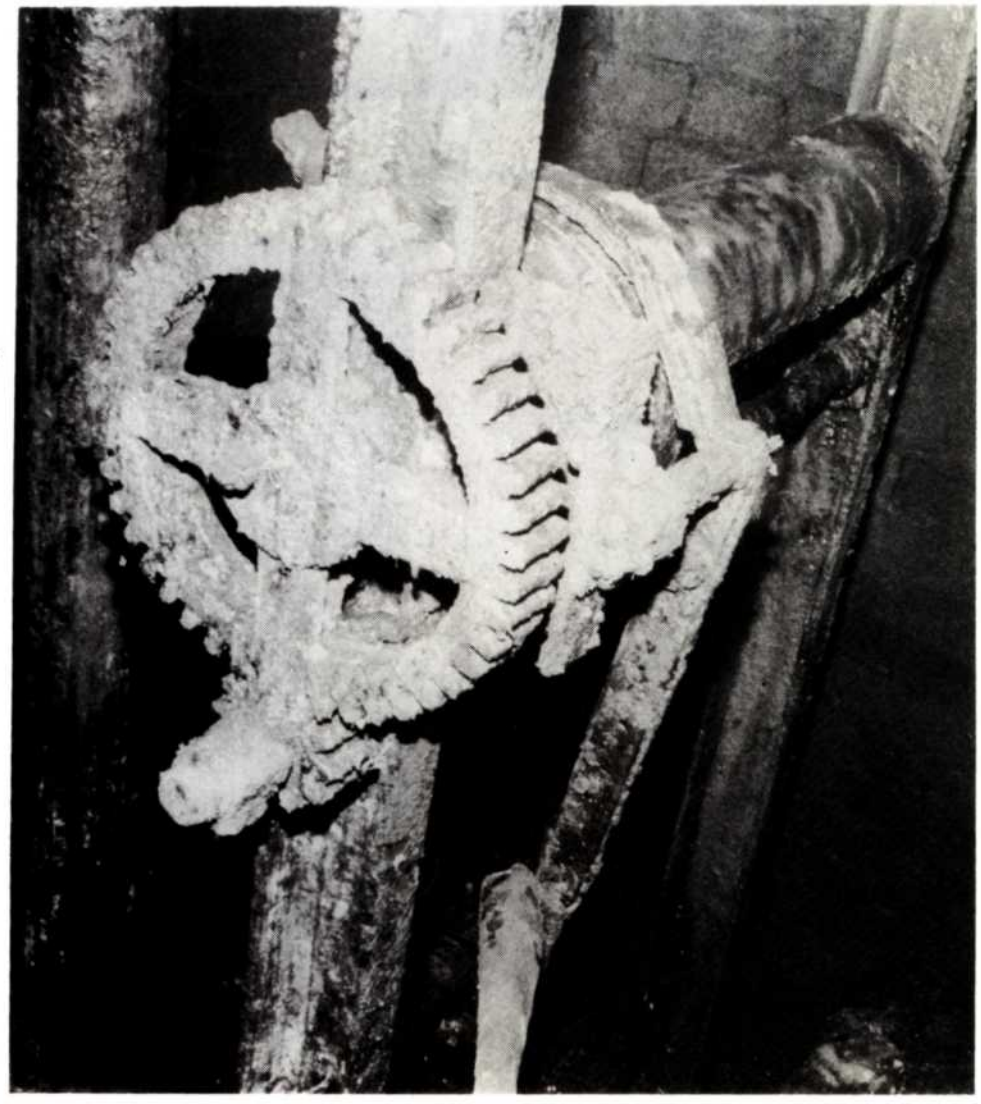


Fig. 4 Winch Showing Gear Drive, Ratchet and Brake Band

The well first found, the machinery in it, and the chamber were fully measured and a photographic record made. The water level in the well seemed to vary between 10 ft. and 15 ft. below the curb of the well, depending on the amount of rain that had fallen recently. The well was sounded and found to be about 60 ft. deep (below the curb) which means its bottom must be below sea level; it has probably been driven down through sand and gravel to the clay.

The well is about 5 ft. 6 ins. internal diameter and is brick-lined, the bricks being curved. The adjacent chamber, also brick-lined, is 2 ft. 8 ins. wide, about 16 ft. long up to the wall of the second well and just over 8 ft. deep from the roof to the curb of the well. In the back half of the well, remote from the chamber, the curved brick wall is carried up to the roof. The arrangement of the machinery at the top of the well is shown on the drawing from which it will be seen that it is supported on two 6 ins. x 5 ins. I-beams let into the walls of the well 6 ins. above the curb. A 3-throw crank-shaft, 3 ins. in diameter, is supported in bearing blocks on these girders, with a 27 ins. diameter, 62 tooth, gear wheel on the shaft outside the bearing nearest the chamber. It meshes with a 6 ins. diameter, 14 tooth pinion, the shaft of which has a bearing on the nearest girder and which originally had a further bearing in a recess in the wall of the chamber opposite. This shaft has been broken off about midway between its bearings and probably had a pulley on it originally which would have enabled it to be belt-driven from an engine mounted either in the chamber or, more likely, at ground level above.

From the crank-shaft three connecting rods, about 4 ft. 6 ins. long go down the well and are connected by stirrups to the pump rods, the upper ends of which slide in steady-bearings mounted on a 3 ins. x 2 ins. angle iron let into the walls of the well about 4 ft. below the curb. The pump rods go down into the water and it is not known at what depth the pump itself is mounted. The pump discharges through a pipe 5 ins. external diameter, which rises up between the crank-shaft and the side of the well and turns at right-angles through the wall about 15 ins. below the roof; the further run of this pipe could not be traced.

An interesting detail about this machinery is the addition of a small hand-operated winch mounted over the centre of the well and presumably used for the lowering and hoisting of material (and possibly men) during maintenance of the pumping machinery. This winch is supported on two 4 ins. x 2 ins. channel irons attached to the 6 ins. x 5 ins. I-beams at their lower ends, and at their upper ends to similar beams fixed to the tops of the walls. The winch, which is 5 ft. 4 ins. above the curb of the well, comprises a wooden roller, 6 ins. in diameter, with a brake drum and ratchet wheel at the end of the roller. On the shaft of this, outside the upright support, is a 12 ins. diameter, 44 tooth, gear wheel meshing with a 4 ins. diameter, 12 tooth, pinion which has a square end to its shaft to take a removable winding handle. The photographs, taken immediately after the well was uncovered, show the crank-shaft and also the winch.

The discovery of this well aroused much interest and the architects for the development kindly arranged for the well and chamber to be covered with a concrete slab with a manhole in it for access, as an approach road and car park were planned to cover the site of the well. The ground level had to be lowered for this purpose and unfortunately, owing to the carelessness of the contractors, much debris was dumped in the chamber, a 4 ft long cast-iron slab was dropped into the well on top of the crank-shaft and the winch and its supports torn out, in the course of which the gear wheel on the roller shaft was completely smashed. It is fortunate that a full record by measurement and photographs was made before this occurred.

WORTHING BY GASLIGHT 1835 - 1901

By Marjorie L. Morris.

The Royal signature on Worthing's Town Charter (1) was barely two years dry, when in 1805 the first public demonstration of gas street lighting took place in Pall Mall, London, to mark the King's birthday. Developed by a Cornishman, William Murdock of Redruth, it was an immediate success and a company was formed at once to provide gas lighting on a commercial scale. By 1809 gas street lighting was an accepted way of life, providing illumination and safety in the streets after dark such had never been known before in the history of Western Europe. Towns and Companies competed with one another to cash in on the social and entrepreneurial advantages of the new illuminant.(2)

But not Worthing . . . . or, at least not at once!

The first Town Commissioners,(3) in whom the Charter had vested responsibility for providing street lighting, were not able so early in the growth of the Town, to get together a sum of money large enough to install street lighting as a major priority. Even after 14 years they could do no better than agree that the Town should have street lamps but the only way they could see to provide them would be to open a subscription fund. With the small amount of money donated a start was made on providing the Town with oil lamps, and for the next 12 years Worthing folk depended for the illumination of their night-time activities on an uneasy compromise between the full moon and the smokey glimmer of seal-oil lamps on the tops of wooden posts.

During the autumn of 1829, the Commissioners began to think about up-dating the street lighting and invited proposals for lighting the Town with gas. George White, a Worthing tinsmith came up with an acceptable proposal and the Commissioners gave him the job of preparing a specification for building a gas works and providing suitable street lamps.

And be it further Enacted, That the ſaid Hamlet of *Worthing* ſhall henceforth be, and be called and deſcribed The Town of *Worthing*; and the ſaid Commiſſioners ſhall and may erect Bound Stones, or Poſts, for the better aſcertaining and preſerving the Limits of the ſaid Town.....

Power to provide Lamps.

And be it further Enacted, That it ſhall be lawful for the ſaid Commiſſioners, and they are hereby authorized and empowered, from Time to Time, to cauſe Lamp Irons or Lamp Poſts to be put up or affixed into, upon, or againſt the Ground adjoining to, or the Walls or Palliſadoes of any of the Houſes, Tenements, or Buildings already built or hereafter to be built within ſuch Part of the Town of *Worthing* aforeſaid, as they the ſaid Commiſſioners ſhall from Time to Time think proper and convenient; and alſo to cauſe ſuch Number of Lamps of ſuch Sizes and Sorts to be provided and fixed, or put upon ſuch Lamp Irons or Lamp Poſts, and to cauſe the ſame, when ſo provided and fixed, to be altered, taken down, or removed, as they ſhall from Time to Time think proper, for well and effectually lighting the ſaid Town of *Worthing*; and alſo to cauſe ſuch Lamps to be lighted at ſuch Time or Times, and to be kept lighted during the whole or ſuch Part of the Night as they the ſaid Commiſſioners ſhall think proper; .....

An Excerpt From Worthing's Town Charter - Act 43, 1803

George White had his specification ready by mid-November and, the idea still appearing feasible, the Commissioners placed advertisements in the Times and the Lewes Gazetteer of 13 December 1829. These stated that the tenders were required for

"lighting the town with 100 gas lights for a term of seven years - nine months in every year from first day of August to first day of May, from sunset to sunrise".

After Christmas a start was made on the detailed planning and in March William Pollard, the Surveyor, had produced a plan of the Town which showed how many lamps would actually be required. This number unfortunately came to 130, and as the cost was more than the rates would stand in a year of marked depression the idea was regretfully dropped.

With light summer nights and the help of the moon, the Commissioners struggled on, but by November 1830 it was obvious that the oil lamps were reaching their journey's end and replacement was becoming urgent. A street lighting sub-committee of the Commissioners consisting of Messrs. Trotter, Whitter, Denys, Munday, Parsons, Marleywick and Newland was appointed, who were unanimous in agreeing that oil lamps were obsolete and that any new street lamps should be illuminated by gas. They reckoned that eighty flat-flame, fish tail or batswing gas lamps would give three times the illumination of the present oil lamps and if these were lit for only six months of the year instead of eight, then the cost of installing a gas plant and lamps would be in the region of £2,000. If the existing eight private street lamps were included, the amount of illumination throughout the Town would be about the same as with the existing oil lamps.

Obviously the Rates would not yet stand the strain - the Town in any case was in financial difficulties and the Rates were already being used as security for other debts - so once more the idea was shelved. Indeed the idea remained shelved for three more years before, at last, on 17 July 1834 the old oil lamps were extinguished for ever.

Worthing's first step into the gas age was taken in August 1833. Tenders had rather forlornly been put out for the contract to light and maintain the oil lamps for the winter of 1833/4, and it was hardly a surprise when no one tendered. What was a surprise however, was the arrival of a letter on 26 August 1833 addressed to Commissioner Plumer which contained a proposal from a Mr. John Bryan for lighting the Town with gas lamps provided by a private company. Mr. Plumer placed this letter before the other Commissioners, who were unanimous in instructing the Gas Committee along with Mr. Plumer to invite Mr. Bryan to Worthing to see what he had to say and submit a report for their next meeting.

On 19 September 1833 the Committee reported: Having met Mr. Bryan (they said) and finding his proposals feasible and having determined the costs involved, they had proceeded to examine the Town's finances to see if they were in a good enough state for them to recommend that the Commissioners should give serious consideration to Mr. Bryan's proposals. They had found that in the last two years the increase in revenue over expenditure had amounted to £231.14s.7d., and a debt of £240 had also been paid off.

In 1831 the Town had been in debt to the tune of £160; in 1832, the debt had been reduced to £78, but in 1833 there was now a positive balance of £68! The Committee therefore concluded that they were "fully impressed with the persuasion that the Commissioners had the means of meeting such expense as the lighting of the Town with gas may require".

The Commissioners, after all the lean years and with £68 in the bank, almost had an orgy of adopted resolutions! Under the chairmanship of the Rev.W. Davidson they resolved that

- the Town should be lighted by gas
- a contract should be entered into with Mr. Bryan
- the Town should be provided with 120 gas lamps

- the lamps should be lit for seven months in every year
- the contract should run for 21 years at £3 per lamp
- a permanent Gas Committee should be formed
- the Town Clerk should prepare a draft contract and send it off to Mr. Bryan.

The Town Clerk, William Tribe, Solicitor, sent off a draft contract to Mr. Bryan on 20 September 1833. Not a man to waste time or opportunity, Mr. Bryan replied on 23 September ". . . I am willing to undertake to light 120 public lamps with gas in your town for seven months in the year omitting four nights at each full moon, at £3 per lamp for the term of 21 years".

This is followed by the terms of the deal, which ultimately had far reaching consequences. In addition to the right to light the Town with gas lamps Mr. Bryan went on " . . the Commissioners giving me the exclusive privilege of supplying shops and private houses with gas . . .". Mr. Bryan went on to ask the Rev. Davidson to look out some plots of land about 150 ft. long by 80 ft. wide suitable for the building of the gas works and which he could inspect on his next visit.

The Commissioners met on 4 November 1833 to consider the draft contract and Mr. Bryan attended by invitation. All the terms were agreed and the contract was signed. Although the lamps were to be provided by Mr. Bryan, the Commissioners reserved the right to approve the pattern of the lamps and also the position of the lamps in the streets.

Work began in January 1834 after a decision by the Commisioners on the pattern of burner - this was described as a 'globe-top burner'. The Commissioners also stated right away that the street lamps should be placed on the south side of the carriage way along the esplanade - a position which they occupy even to this day. (Fig.1) In April Mr. Bryan was also asked to prepare and submit a Town Plan upon

Fig. 1 Promenade Lamp Fitted with Welsbach Gas Mantle - 1896

which all the proposed positions of the lamps were marked. George White, the tin-smith, after waiting since 1829 finally received 10 guineas in payment of his bill for preparing a specification for a gas works - they took it out of the Paving Rate. All that summer of 1834 the Gas Committee arranged and re-arranged the positions of the lamp standards - frequently making Mr. Bryan pull them up and put them somewhere else, and generally making it known that they had the last say on the subject.(Fig.2)

Mr. Bryan had undertaken to start lighting the Town on 1st September, and when this date came and went and the lights were still not on, the Commissioners did not hesitate to take advantage of the situation. Mr. Bryan was told in no uncertain manner that his contract terms had been broken, and unless he made some sort of financial concession, they would have to think about claiming forfeiture of the gas mains. Mr. Bryan promised to have all the lights on within a fortnight but the

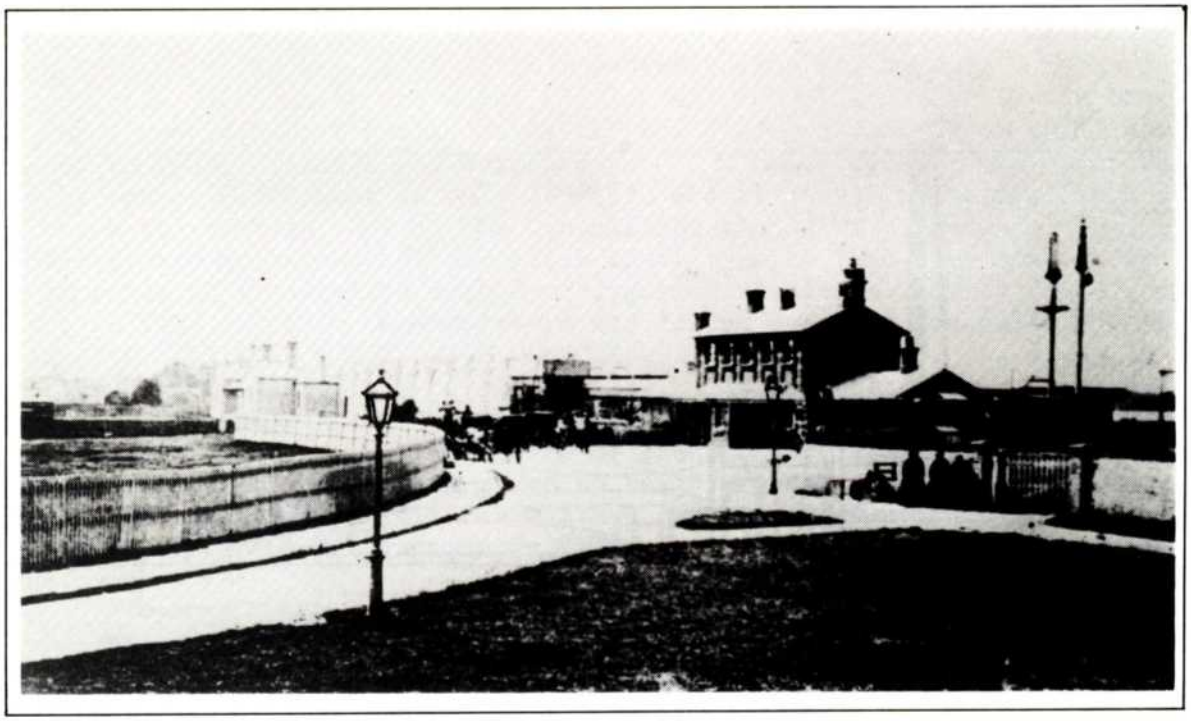


Fig. 2 Gas Lamp Outside Worthing Station - 1876

Commissioners were not content until they had extracted a concession of no rent to pay until all the lamps were operational - this rent being apportioned at £15 per week as from the 1st September.(Fig.3) In addition to the lamps, of course, a gas works had to be erected, and the site chosen was within the Town boundary on the south side of Lyndhurst Road, a site still occupied by the gas holders today.(Fig.4) The fact that the site was within the Town boundary was important - whether or not anyone had told Mr. Bryan that he would have to pay duty on all coal coming into his gas works is not recorded, but the Commissioners must have been very pleased. The gas works was obviously starting to function during the latter part of 1834, but it was not until January 1835 that the Commissioners came to consider the problem of how to assess the gas works for rates. A solution was sought by

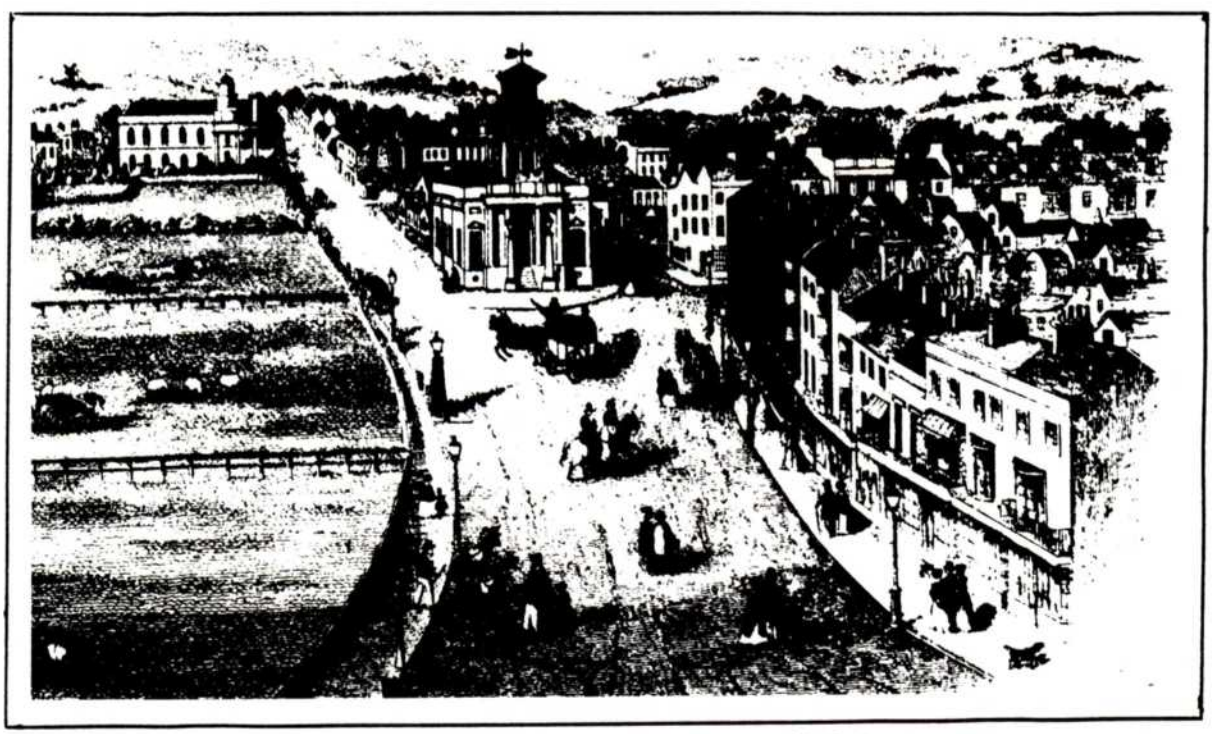


Fig. 3 The First Gas Lamps in South Street - 1846.(Note the one on the Town pump (would now be outside Bentalls)

Fig. 4 The Worthing Gas Works in 1835. (Sketch based on illustration appearing on the first share certificates issued)

instructing the Town Clerk to write to Chichester Town Clerk to enquire about "their mode of rating their Gas House". As a result when March came along Mr. Bryan's gas house was rated in the Poor Rate at £35 per annum.

It had already been decided that the cost of the street lighting was to be met from the Paving Rate. The first payment to Mr. Bryan was made in April 1835. This should have been a half year's payment of £180 but the Commissioners deducted £60 compensation which - at £15 per month - appears to indicate that it was the end of December before the basic contract was completed.

The last act in this story of the coming of gas to Worthing is really the beginning. Once the plant had become operational and the gas supply established, Mr. Bryan lost no time in getting certain local men of substance interested in forming a company and putting capital into it with a view to extending the gas supply into the town shops and houses. The Worthing Gas Light and Coke Company came into being on 1 July 1835 by means of a deed of settlement, Mr. Plumer being one of its first Directors and George White (4) being appointed the first manager. So, at last the lighting of the Town by gas lamps set off on its historical and monopolistic way.

The one serious error of judgement the Town Commissioners had made was that the Local Authority was to sign away to a private company the right to provide Worthing with street lighting. For a long time, this did not seem to matter, and the Company enjoyed some sixty years of undisputed monopoly. Occasionally the quality of the gas was questioned, and from time to time the design of the burners was improved; but the history of the Gas Company has yet to be written, and is beyond the scope of this article. What is of interest is the final challenge to the gas street lights made by the new illuminant - electricity.(5) In some ways the Gas Company was the victim of its own success. For many years it had restricted the laying of gas services to those parts of the Town where it was certain to be paid for gas consumed. However, in 1891 the Town had received its Charter as a Borough and was entering upon its second phase of prosperity after the long lean years of the mid-century. The population was growing, there was a demand for gas, and to clinch matters, the invention of a penny-in-the-slot prepayment meter made it possible for the Gas Company to consider laying their mains into the working class quarters of the Borough. To do this however, required a massive updating of

their plant and an injection of finance for extending the supply. Early in 1894, therefore, the Gas Company set about raising £32,000 by applying to the Board of Trade for a Provisional Order to raise the price of gas from three shillings and ninepence to four shillings and sixpence per 1000 cubic feet. The Order was confirmed by Act of Parliament in July 1894(6), and it proved to be the final straw which broke the camel's back. The Council was the chief consumer of gas, and the Councillors were so enraged at the steep rise in price that they looked for the first time for an alternative method of lighting the lamps. They found, of course, that in 1835 the old Town Commissioners had signed away the Council's rights but only AS FAR AS GAS LAMPS WERE CONCERNED. Now, however, there was an alternative illuminant in the form of electricity. It was better too, as anyone who had been to Brighton would tell. So, in the same year, the Council appointed an Electricity Committee, obtained a Board of Trade Order, called in a Consultant Electrical Engineer, and drew up plans to build a power station and introduce a municipal electricity supply. One mistake it had no intention of making was to let the Board of Trade Electricity Order go out of its hands to another private Company.

The Gas Company fought hard to keep its business. It was considerably helped in this same year by the invention of the Welsbach incandescent gas mantle (7), and by fitting these at once to the strategic street lamps in front of the Town Hall, down South Street towards the pier and along the promenade, it was able to retrieve its position. Not only were the lamps now so bright that people began to wonder why they should go to the expense of changing to electricity (8), but the lamps themselves were fitted with governors which limited the supply of gas so that there was a saving of 6¾ cubic feet of gas per hour per double burner. The financial savings to the Council were so high that the Council even agreed to pay the Gas Company to convert the remaining outlying streets to Welsbach gas mantles and put off implementing their Electricity Order.

For a while the Gas Companies in England managed to hold their own. The first electric street lamps were arc lamps, and although these easily outshone even the incandescent gas mantles, they were expensive to run. Slowly however, the electric light bulb (or 'glow-lamp' as it was called) became more and more sturdy, efficient and economical until at last, the balance of advantage tilted the other way and electric street lighting came into its own.(9)

In Worthing (10), the gas street lighting continued to be the sole illuminant until the end of the century, but in September 1901 the Worthing Municipal Electricity Undertaking came into production and one by one the gas lamps were gradually replaced. The first standards to go were those in South Street, along the promenade and up Chapel Street to Wothing Station. In other streets the Council bought the old gas standards off the Gas Company. Many of these were left in situ, merely having electric cable threaded through the pipes and the gas mantle replaced by electric light bulbs. There are many of these standards still to be found around the Town, now fitted with modern lamps - not all of them are original Gas Company property for some were privately owned.

The Gas Company in 1901 was now ceasing to care about street lighting, being more interested in developing the huge potential market for the use of gas in industry, shops and private houses. With the growth in the manufacture of gas rings and geysers and ovens heated by gas the chemical composition of the coal gas was changed to eliminate the 'white light' and give a hotter 'blue flame'.

The change of emphasis from a product originally developed for lighting into one primarily concerned with heating meant that Gas Companies were finally conceding their leadership in street lighting to electricity.

NOTE: John Bryan is first recorded as assisting a John Gostling to set up a gas works in Maidstone in 1821.(11) When the plant became operational it was taken over by a newly-formed Maidstone Gas-light and Coke Company, Bryan remaining as first engineer. He continued to be employed at Maidstone all the time he was

setting up the Worthing plant. He was also a Director of Bryan, Howden and Company, Engineers and Manufacturers of gas apparatus, 6 Bankside, Southwark, London.(12) In 1832, incidentally, this address was occupied by a James Bryan, Coal Merchant and Lighterman.(13)

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HISTORY OF ST.PANCRAS ENGINEERING WORKS, CHICHESTER

By J. G. Woodruff, MIEE., FIProd.E.

When the Romans occupied parts of England they introduced industrial activities of many kinds based on experience going back for many centuries. These activities included founding in bronzes, brasses and also in iron. In the second century A.D. a rising tide of militant barbarous people began to overrun the Roman Empire from many directions and by the end of the third century the Roman Empire was fallen, resulting in a period known as the Dark Ages when there was a general decline in authority and organisation.

This unsettled state of affairs continued until the ninth century but at the beginning of the tenth century the cultural pattern in various countries slowly established a more ordered way of life. In England, founding, which had managed to survive throughout the Dark Ages, began to be conducted more systematically; the existing methods were, however, used and in the next five hundred years or so only details were improved. Furnace temperatures were increased by the use of water power for providing forced draught but charcoal was still the main fuel. New methods of making steel were developed including the melting of iron in open-hearth furnaces and puddling. In England the iron industry was centred mainly in the Wealds of Kent and Sussex where deposits of iron ore existed and timber for charcoal was plentiful.

By the fourteenth and fifteenth centuries iron founding had developed rapidly and Sussex iron founding had become an industry of national importance. In the early sixteenth century the knowledge of steel making in the area enabled the production of steel needles to begin in Chichester and by the early seventeenth century almost the whole of the English production of such needles came from the Chichester needle makers.

The needle-making industry was based outside the walls of the old Roman city near the East Gate in the Parish of St. Pancras and was largely carried out in the needle-makers' dwellings. In the middle of the seventeenth century, however, a body of Parliamentarians headed by Sir William Walker besieged the area, occupied the Church and sacked the buildings in the parish. The industry was thus severely hit and with strong competition from the north, where steel was then being made and needles supplied very cheaply (although of poorer quality), the Chichester needle-making industry slowly declined in common with its iron founding activities. By 1797 the Universal British Directory published by Peter Barfoot and John Wilkes stated that "manufacturing in Chichester was negligible although there had been a considerable manufactory of needles here, which were very much esteemed, but it has now dwindled almost to nothing". Remnants of the iron founding industry undoubtedly continued in the area and the first sign of the 'rekindling' of the iron foundry furnaces appeared shortly after 1798.

Fig. 1 Exterior of Works

Fig. 2 Interior of Foundry

The first record of this shows that in 1805 a Richard Halsted was in business as a coachbuilder; in 1811 he was still recorded as being in business although he then appeared to be including work as a painter and undoubtedly in many other activities to serve local needs. However, by 1824 Richard had apparently died for Charles Halsted (presumably Richard's son) was operating in East Street, Chichester; his firm's activities were described as ironmongers, agricultural implement makers and founders. By 1855 there was another iron founder operating in Chichester, B. Adames and Son, also in East Street.

The firm of Charles Halsted and Son continued to expand in a site behind their shop in East Street and foundry activities were developed. The firm of B. Adames and Son had, in the meantime, ceased to trade and it can be assumed that in 1918, when Charles Halsted and Son became Halsted and Sons Limited, they had taken over the business of Adames and Son. 'Halsteds' were now described as ironmongers, engineers, iron and brass founders, plumbers, gasfitters, etc. - a selection of activities probably going back as far as 1800. The entrance to Halsted's foundry yard was in East Pallant and even today the pillars of the main gates of the foundry may still be seen beside the house called East Pallant Cottage.

Shortly after the 1914 - 18 war a group of Chichester men decided to start an engineering business in the St. Pancras area where there was vacant land and several stables. Part of the land, including some stabling, was purchased by this group and, with the help of steelwork from an aircraft hanger at Tangmere, they converted the buildings into an engineering establishment which they called the St. Pancras Engineering Works (Motor Engineers). However as motor engineering in those days covered a wide range of requirements their activities included not only machining, fitting, welding and smith work but also iron founding. Some of the employees in this first St. Pancras Engineering works partnership came from Halsted and Son Ltd., both from the engineering side and from the foundry; the firm of Halsteds was now decreasing its activities since the proprietors were the end of the Halsted 'line' and they (the two brothers) wished to retire. The Halsted company went out of business about 1936.

When the present owners took over the iron foundry was still making plough shares for local farmers and the engineering side was building agricultural machinery. Now, 35 years later, the foundry no longer operates in St. Pancras but is on a three-acres site on the Chichester Industrial Estate; it produces sand castings both ferrous and non-ferrous (aluminium and copper alloys), to the drawings and designs of engineering companies all over the country; most customers are in the southern part of England but castings are sent as far north as Glasgow. Local trade is, however, small as agricultural items are no longer made.

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FIELD PROJECTS

The Sussex Industrial Archaeology Society is currently undertaking, by itself or in conjunction with other bodies, a number of field projects of which the following are the more significant.

Coultershaw Water Pump. The pump is now operative and the building was open to the public on alternate Sundays throughout the year and will be similarly open this year on the first and third Sundays of the month starting in April.

Clayton Mills (Jack and Jill). Weatherboarding of 'Jill' has started, two new sails have been made, two old sails refurbished and the wheels and gearing for the fantail carriage have been made.

Ifield Mill. The wheel is now working and the upper floors are being used by the Crawley Museum Service as a local history museum.

Work is also being carried out at High Salvington Mill, Cobb's Mill, Dean's Mill, Plumpton Upper Mill and West Blatchington Mill.

The Brick Study Group. Valuable work has been done in recording individual brickworks throughout the County although the areas around Rye, Billingsworth/ Petworth and Bognor/Chichester still require detailed investigation. Work has also been carried out in connection with Mathematical Tiles.

Chalk Pits Museum, Amberley. Many additions and improvements have been made during the past year, the most important having been the reconstruction of the Horsham Tannery dating from the 1840's and the merger with the Brockham Museum, a narrow-gauge railway centre: transfer to Amberley of the track and rolling stock of the latter, now being carried out, will make the Chalk Pits Museum a major centre for the display of industrial narrow-gauge railway equipment.

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