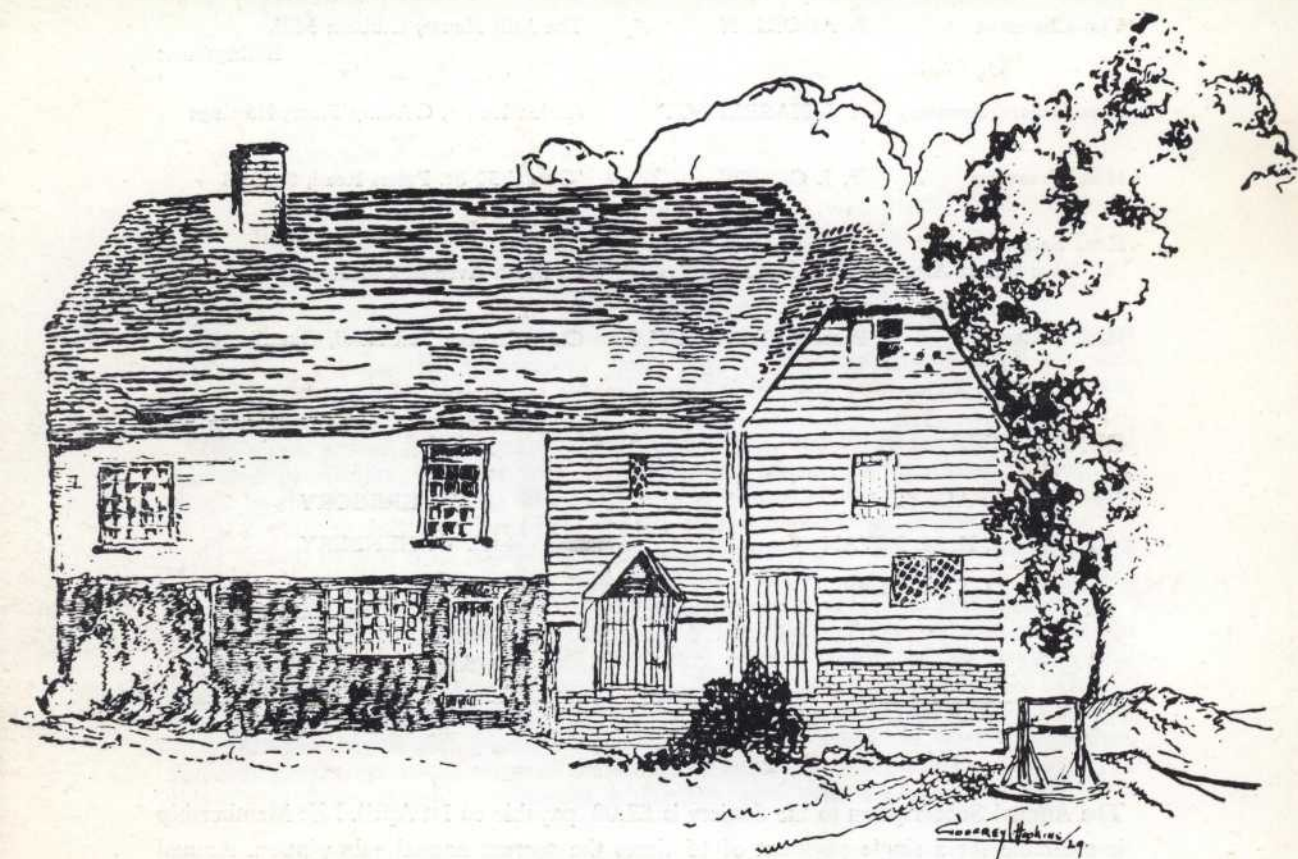




SUSSEX INDUSTRIAL HISTORY

No. 7

Spring 1976



KIPLING'S MILL, BURWASH

RAILWAYS AT MIDHURST
BATEMAN'S WATERMILL, BURWASH
WATER CISTERN, RYE
TOKENS OF SUSSEX
GOLDSTONE PUMPING STATION, BRIGHTON

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Founded, as the Sussex Industrial Archaeology Study Group in 1967

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The Society is registered as a Charity, registration no. 267159.

SUSSEX INDUSTRIAL HISTORY

Journal of the Sussex Industrial Archaeology Society

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EDITORIAL

The Journal 'Sussex Industrial History' was initiated in 1970 to record the work of the Sussex Industrial Archaeology Study Group. Although the Journal was well received, circumstances beyond its control forced it to cease publication after the sixth issue in 1973.

The recent growth in the stature of the Study Group, now called the Sussex Industrial Archaeology Society, together with the increasing interest in industrial archaeology shown by the general public as well as by various official bodies has led the Committee of the Society to decide that the time is appropriate for a revival of the Journal.

As before, its aim is to publish research articles relating to the industrial history of Sussex and its surroundings and to record the work of the Society in surveying, recording and, where possible, preserving industrial sites, buildings and machinery.

Much research into industrial archaeology is inevitably concerned with the period of the industrial revolution. Sussex, however, escaped much of the concentrated impact of industrial development during that period so that a wider and more balanced view going back to mediaeval times, or even earlier, can more readily be achieved. It is therefore hoped that Sussex Industrial History will relate the work of industrial archaeologists to the whole range of the economic and social history of the County. The Editor will welcome any contributions within this very wide field.

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The Cover picture is taken, by kind permission, from the drawing by Godfrey Hopkins entitled 'Kipling's Mill, Burwash' in 'KIPLING'S SUSSEX REVISITED' (Barrie and Jenkins).

Railway Development in the Midhurst Area

By F. H. SMITH

Introduction

Until fairly recent times the small country town of Midhurst was served by a remarkable network of branch lines in the shape of the letter 'T'. The London and South Western Railway (LSWR) ran westwards to Petersfield and the London, Brighton and South Coast Railway (LBSCR) ran south to Chichester and eastwards to Pulborough. In addition there was a proposal for a line from Midhurst to Haslemere and, as late as 1902, the redoubtable H. F. Stephens of light-railway fame drew up plans for a light railway between Selham, Cranleigh and Ockley.

One reason for this state of affairs was that each of the three lines constructed was envisaged as part of a through route — not merely as a branch to serve Midhurst. The Chichester-Midhurst line was, for example, first proposed as part of the Guildford, Chichester, Portsmouth and Fareham Railway's main line and was revived many years after the GCPF scheme had been abandoned. Railway politics were also responsible as Midhurst lay on the border between the LSWR and the LBSCR territories and was thus served by both companies.

All that remains of this system today is a two-mile spur from Chichester to a gravel pit near Lavant.

Early Schemes

The earliest proposal for a railway that the author has been able to trace was put forward in 1823; in February of that year William James published a 'Report or Essay to illustrate the advantages of direct inland communication through Kent, Surrey, Sussex and Hants., to connect the Metropolis with the ports of Shoreham, Rochester and Portsmouth by a line of engine rail road . . .'. James did not prepare any detailed surveys but a map shows the Portsmouth line passing near Cocking. Somewhat strangely, the two chief centres of population (Midhurst and Chichester) were by-passed altogether! James's proposals never materialised, partly because they were somewhat ahead of their time.

The next railway scheme concerning West Sussex appeared in 1845 as the Guildford, Chichester, Portsmouth and Fareham Railway. The proposed line was to run from Guildford to Chichester by way of Godalming, Selham and Singleton joining the Brighton and Chichester Railway's Portsmouth extension on the western outskirts of Chichester. Midhurst would have been served by a branch line to Petersfield. There was also a branch from Chichester to a railway pier at Itchenor and a further branch from Portsmouth to Fareham which completed the proposals. The GCPFR was surveyed by Joseph Locke and had the support of the LSWR. Its influence on Midhurst's subsequent railway history was significant for its proposed route became the agreed border between the LSWR and the LBSCR as mentioned later. Reference should also be made to a rival company, the Direct Portsmouth and London Railway, which originally proposed to run through Midhurst (with a branch to Chichester) but changed its plans and decided to run through Haslemere. Neither scheme materialised and Midhurst lost its chance of being on a main line to London.*

The Mid-Sussex Railway

Despite the failure of earlier schemes, Midhurst continued to attract railway promoters. In 1852 the Weald of Sussex Railway made its appearance, proposing to run from Horsham to Midhurst via Billingshurst and Petworth. Unfortunately the promoters experienced difficulties with the approach into Midhurst which would have passed close to Lord Egremont's estates. No plans were ever deposited.

*For detailed descriptions of the routes of the two lines the reader is advised to consult 'The Railways of Mid-Sussex' by Adrian Gray (Oakwood Press).

Five years later a more ambitious scheme was suggested by the Mid-Sussex Railway. There was to have been a railway from Horsham to Pulborough and Arundel with branches from Pulborough to Storrington and Steyning in the east and to Petworth and Midhurst in the west. By the time the plans had been deposited, however, the eastern branch had been abandoned and the western branch had been re-routed to run from Billingshurst; moreover the western branch ran only as far as Petworth and the main line stopped short at Pulborough. Opposition from Colonel Wyndham, an influential landowner in the district, obliged the company to revert to the junction at Pulborough for their Petworth branch and to site the terminus about a mile from the town. Thus altered, the railway was authorised in August 1857, the first trains being run two years later on 10th October, 1859. (fig. 1)

The failure of the Mid-Sussex Railway to serve Arundel and Midhurst prompted local suggestions for a line through Arundel and for an extension to the Petworth line. The Mid-Sussex, Arundel and Littlehampton Junction Railway failed to secure Parliamentary powers but the LBSCR did so (in 1860) and, after acquiring the Mid-Sussex Railway in 1862, opened their own line from Pulborough to Ford on 3rd August, 1863. A branch to Littlehampton was opened two weeks later. Meanwhile, in August 1859, the Mid-Sussex and Midhurst Junction Railway deposited plans proposing an extension of the Petworth branch to Midhurst; this was followed in November by a decision to further extend the line to Petersfield. However the LSWR-sponsored Petersfield Railway objected and the LBSCR would not support the MSMJR owing to a territorial agreement with the LSWR. The terms of this agreement prevented the LBSCR from being associated with any line west of Midhurst and so the Petersfield extension was abandoned.

Although it had less than six miles of railway to construct the MSMJR ran into difficulties firstly with some of the local landowners and then some financial troubles. Progress was slow, and even though the LBSCR absorbed the company in 1862 it was not until 15th October, 1866 that the first trains ran through to Midhurst on this line. 'Wonders will never cease' declared the West Sussex Gazette, referring to the railway as 'Death's Line' and added 'This project has been so long in hand that we began to despair of seeing it fully carried out during the present generation'.

The Petersfield Railway

Shortly after the Mid-Sussex and Midhurst Junction Railway had announced its intention of extending from Midhurst to Petersfield, a rival scheme was put forward by the Petersfield Railway, two of whose Directors had also been Directors of the MSMJR. The Minute Book of the Petersfield Railway Company has fortunately survived and contains the following account of the inaugural meeting.

'At a Meeting of the Promoters held at 41 Parliament Street on May 21st 1860. Present — Joseph Cary Esq. in the Chair. Mr Fox. Mr Knobel. Mr Biddulph. Mr Carnsew and Mr Woods in attendance. It was resolved — That the name of the company be the Petersfield Railway Company. That the Capital be £90,000 in 9,000 shares of £10 each. That the number of Directors be not more than 7 or less than 3, That the qualification of a Director be 50 shares. That the remuneration of the Directors be five guineas for each attendance and travelling expenses. That Mr Edward Woods be the Engineer of the Company. That Mr Carnsew be the Solicitor of the Company. That Mr Bellamy be the Secretary pro-tem of the Company. That Joseph Cary, Henry Harris Fox, William Edward Knobel, and John Antony Wright Biddulph be appointed as the first Directors of the Company.'

The two ex-MSMJR Directors were Joseph Cary and William Knobel. Edward Woods was later the Engineer of the Bognor, Chichester and Midhurst Railway.

The Petersfield Railway Bill became law on 23rd July 1860 and thereafter progress was good for the railway was opened on 1st September 1864. The London and South Western Railway had absorbed the local company in 1863 and may well have assisted in its promotion; certainly it prevented the LBSCR from gaining a monopoly over

the public transport in the area. In addition it provided Midhurst with its first railway service as the MSMJR was not opened until 1866.

There were no through trains between the two Midhurst branches although a short connection was opened on 17th December 1866 but, due to the weakness of the bridge which carried it over the Bepton Road, it was barred to passenger trains.

Chichester and Midhurst Railway

While the MSMJR and the Petersfield Railway were seeking to serve Midhurst from the east and west respectively, a third company was seeking to serve the town from the south. In 1860 the Bognor, Chichester and Midhurst Railway deposited plans to link those three towns; the plans showed a junction with the Brighton to Portsmouth main line to the west of Chichester as shown in fig. 2. It should, of course, be remembered

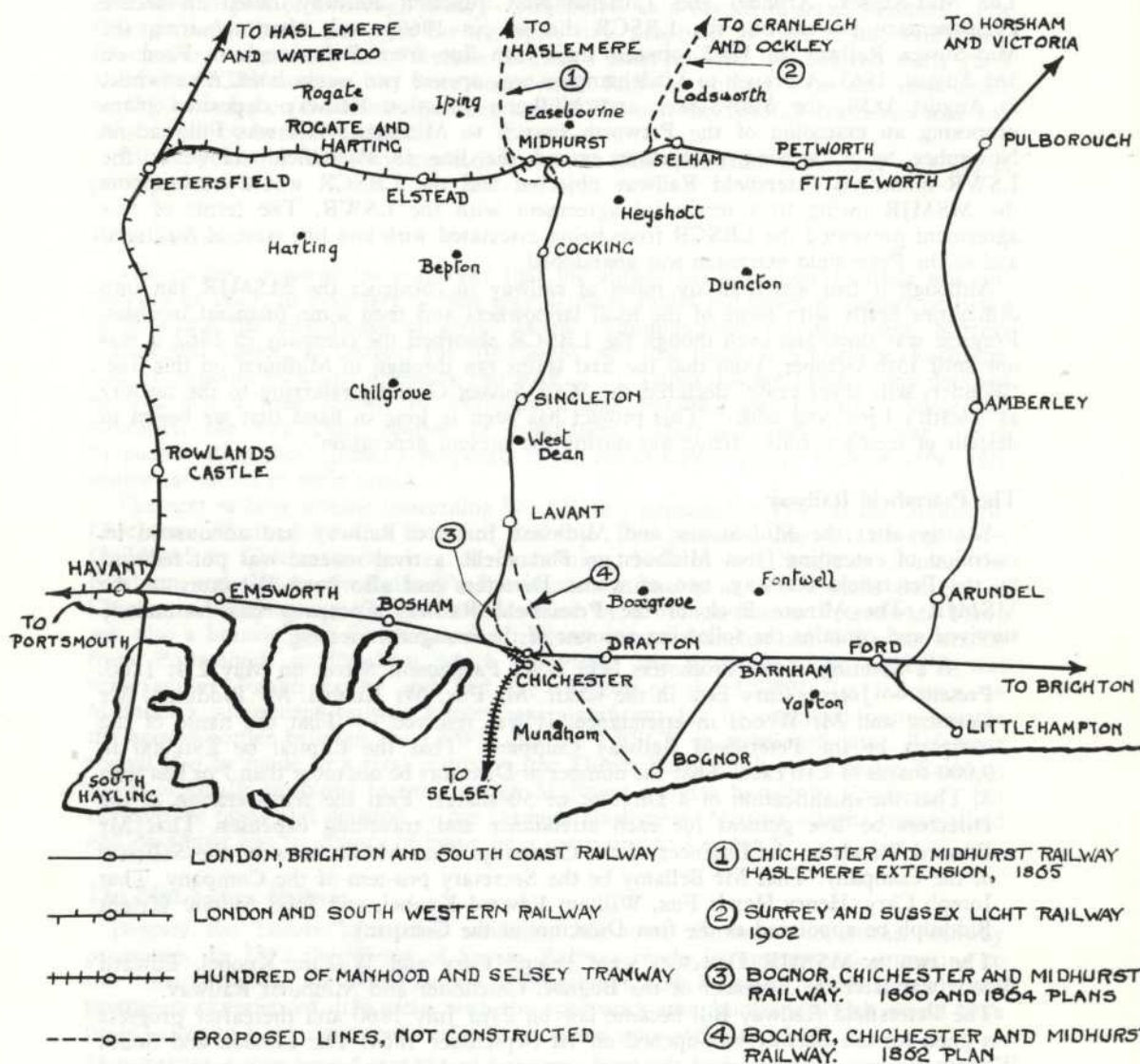


Fig. 1. Early West Sussex Railways

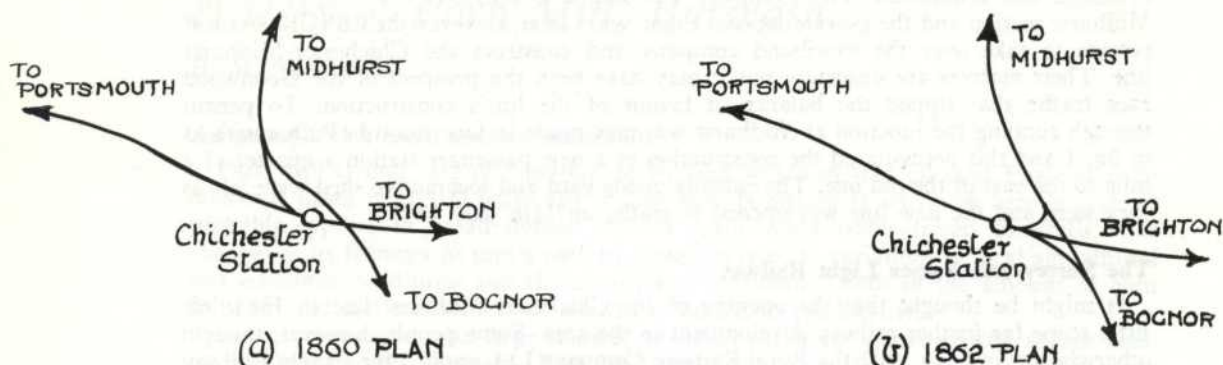


Fig. 2. Chichester Junction

that the present branch from Barnham to Bognor did not exist at that time. The promoters may have had their eye on the traffic potential of the well-known race-course at Goodwood, near Singleton. Two years later, however, further plans were deposited showing a slightly different route with the junction at Chichester to the east of the town as shown in fig. 3.

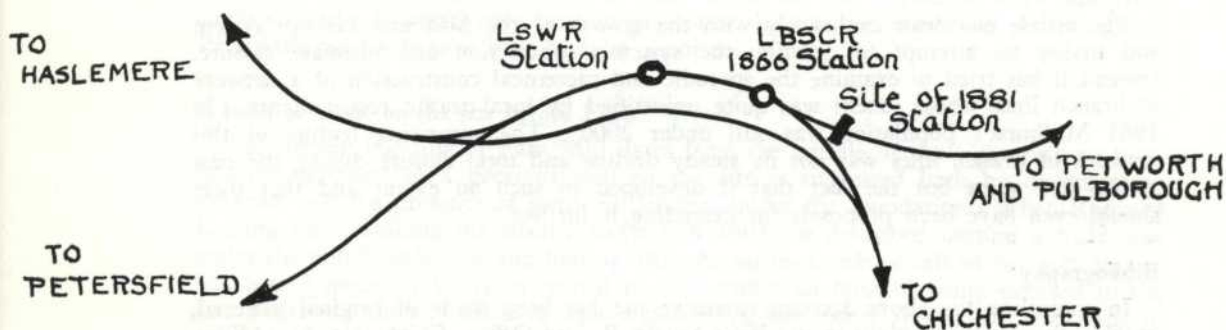


Fig. 3. Midhurst Junction (1865 proposal)

The Company deposited a whole series of plans, each differing from its predecessor. The 1863 plan omitted the Bognor-Chichester section and the line was re-named the Chichester-Midhurst Railway, this being due to the construction of the Barnham — Bognor branch subsequently opened by the LBSCR on 1st June 1864. The 1864 plans reverted to a junction to the west of Chichester as shown in fig. 1.

The Chichester and Midhurst Railway was authorised on 23rd June, 1864 and the first sod was cut on 22nd April 1865. Scarcely had construction work begun, however, when an extension to Haslemere was proposed, and authorised on 5th July. The deposited plans showed junctions with both the MSMJR and the Petersfield Railways as shown in fig. 3.

Some work was carried out but the financial crisis of 1866 prevented completion of the line. In 1868, three years to the day after its authorisation, the Haslemere

extension was abandoned. The Company was unable to complete even the Chichester-Midhurst section and the powers lapsed. Eight years later, however, the LBSCR obtained powers to take over the moribund company and construct the Chichester-Midhurst line. Their motives are uncertain but it may have been the prospect of the Goodwood race traffic that tipped the balance in favour of the line's construction. To permit through running the junction at Midhurst was now made to face towards Pulborough as in fig. 1 and this necessitated the construction of a new passenger station a quarter of a mile to the east of the old one. The existing goods yard and locomotive shed were left as they were and the new line was opened to traffic on 11th July 1881.

The Surrey and Sussex Light Railway

It might be thought that the opening of the Chichester-Midhurst line in 1881 left little scope for further railway development in the area. Some people, however, thought otherwise for in May 1902 the Rural Railway Company Ltd. applied for a Light Railway Order to construct a line from Selham to Cranleigh (on the Guildford-Horsham branch) and thence to Ockley (between Horsham and Dorking), a total distance of 24½ miles. This Surrey and Sussex Light Railway was engineered by H. F. Stephens who had already constructed the Hundred of Manhood and Selsey Tramways less than 20 miles to the south. In the estimates for the railway (dated 31st May, 1902) Stephens reckoned that the railway would cost £156,967-10-0, which works out at about £6,400 per mile. Since the railway was to run through very sparsely populated country it was unlikely to have paid its way even if built, especially since it studiously avoided most of the villages on the route by at least a mile! No construction work was carried out. The Directors of the Company were: Samuel Barrow, William Herbert Hollis, Emile Maurice Marx, Eli George Hale and James Penfold.

Conclusion

The article has dealt exclusively with the growth of the Midhurst railway system and makes no attempt to describe the system's contraction and ultimate closure. Instead it has tried to examine the sporadic and piecemeal construction of a network of branch lines whose extent was quite unjustified by local traffic requirements. (In 1961 Midhurst's population was still under 2000). The surprising feature of this network of branch lines was not its steady decline and total closure during the past twenty-five years but the fact that it developed to such an extent and that there should even have been proposals for extending it further.

Bibliography

In compiling the above account extensive use has been made of original material, notably the deposited plans in the West Sussex Record Office, Chichester. In addition the following books have proved to be of use:

'A Regional History of the Railways of Great Britain — Vol 2. Southern England' by H. P. White. (David and Charles)

'History of the Southern Railway' by C. F. Dendy Marshall.

'The Railways of Southern England: Secondary and Branch Lines' by Edwin Course. (Batsford)

'The Railways of Mid-Sussex' by Adrian Gray. (Oakwood Press)
Various issues of the 'Railway Magazine'.

The author would finally like to thank the many people in Midhurst and Chichester who have provided information.

History of Park Mill, Burwash

By M. BESWICK

An example of a small country watermill.

Park Mill is only one of hundreds of its kind which existed all over England from medieval times until 100 years ago or less, but its history is set down here because it probably typifies in broad outline that of many other water-driven cornmills. The changes in its fortunes fit into a pattern, closely related to variations in local agricultural and economic conditions and the consequent fluctuations both in the amount of corn to be ground and the number of mouths to be fed in the locality.

In this connection, the large number of other cornmills which existed at one time in the district must be noted. Park Mill itself stands on the south bank of the river Dudwell to the south-west of Burwash village (TQ 671 236). Less than half a mile downstream is Dudwell Mill (TQ 677 238) and about a mile upstream is Willingford (TQ 655 226) where in 1610 there were two mills operating at the same time.¹ Cox's Mill (TQ 653 203), on a right bank tributary of the Dudwell, is also in the parish of Burwash and there was at least one windmill² on the ridge on which the village stands. In addition, there may have been a mill, or mills, in the valley of the Rother which forms the parish boundary to the north.

Burwash is known to have been a place of some importance during the Middle Ages. It was granted a market in 1252³ and so would have had a substantial population of tradesmen and craftsmen as well as yeoman farmers and peasants. The population increased further in the sixteenth century with the growth of the wealden iron industry, as a number of furnaces and forges were located in the Burwash area. It seems probable, therefore, that if there was ever a time when all the cornmills were operating simultaneously, it would have been in the 1500s. Indeed the immediate predecessor of Park Mill may well have been built at about this time.

A mill, or mills, on the site before 1750

The present building of Park Mill dates from the middle of the eighteenth century, but the existence of a previous mill on the site is suggested both by documentary evidence and the presence of some old timbers under the foundations. When Rudyard Kipling was installing his electric turbine in 1903, he described cutting a little way under the mill foundations and finding 'that she sat on a crib or raft of two foot square elm logs',⁴ pieces of which crumbled to dust within an hour of being exposed to the air. These old timbers came to light again when the recent restoration work was in progress.

The possible existence of an earlier mill on the site clearly exercised Kipling's mind, and it would be as well to deal at this point with the implication he makes in *Puck of Pook's Hill* and in the story *Below the Mill Dam*⁵ that there was a mill in existence when Domesday Book was compiled. The entry which fired his imagination was probably the following: 'In Berewice King Edward held half a hide. It never paid geld. There Reinbert has one villein and four cottars with one plough and one mill of ten shillings'.⁶ Unfortunately opinions vary as to whether Berewice refers to Burwash or Berwick⁷ and Kipling, who was a keen student of local history, was almost certainly aware of this. The date he ascribed to the mill in his correspondence is a hundred years later than this, but nevertheless a remarkably early one. He described his newly acquired property in a letter to Rider Haggard as 'an old house and a 25 acre farm of good hop land and fruit, and a mill (water) that dates from 1196'.⁸ Attempts to discover on what evidence this assertion was based have so far proved fruitless.

The next date we must consider is 1246. A mill was built in that year at the manor of Burwash⁹ and the question immediately arises: which mill was this? The evidence seems to point to Dudwell Mill which lies on the Burwash side of the river, whereas

Park Mill lies on the far side from the village and would not be so readily accessible. Also, Dudwell Mill takes its water directly from the river, whereas Park Mill has a long head-race and it seems likely that the simpler system would have been adopted at that date. Furthermore it appears, from consideration of the Manor Court Books of the eighteenth century,¹⁰ that Dudwell Mill was copyhold of the manor of Burwash i.e. that it was in fact originally part of the demesne of the lord of the manor, whereas Park Mill was freehold.

To find the first reference to a mill linked to the name 'Park' we have to move on to 1618. In that year the trustees of Thomas Hepden sold to Thomas Pelham, the son and heir of Sir Thomas Pelham of Laughton, who held the manor of Burwash, 'All that the manor of Ffosters And the farme and mansion house called the Parke house . . . And also all that the Corne mill with all the houses, edifices and buildings to the same belonging, situate in Burwash aforesaid'.¹¹ From the description of the position of this group of properties which follows, there can be no doubt that this is in fact the fore-runner of Park Mill. The origin of the reputed manor of Fosters is obscure. The creation of new manors, or sub-infeudations, ceased in 1290, and we know that around that time one Johanne le Forester was a man of some substance in Burwash.¹² It seems not impossible that he took his name from the forest, or deer-park, in which his property was located, and that the manor of Fosters, also spelt Forsters, derives from this also. The site of the manor house would in this case be Park Farm (or 'the Parke house' in the 1618 transaction) and the mill the predecessor of Park Mill. This would be consistent with the property being freehold.

The Thomas Hepden who owned the mill prior to 1618 was associated with the iron industry. In 1592 he was involved in a Chancery suit over the sale of Burwash forge,¹³ but whether he built the mill or acquired it as part of the 'Fosters' estate is not clear. The Pelham family, who now bought the property, owned a number of iron-works in the locality including Brightling (Glaziers) forge and it appears that as long as the iron industry prospered, the mill did likewise. The Pelhams were Parliament men and during the period of the Commonwealth their furnaces were kept busy casting cannon and shot for the Crowellian armies, but after the Restoration the iron industry declined for a time with consequent loss of prosperity for the district as a whole.

The mill was still in existence in 1863 when Sir John Pelham settled on his third son Henry, on his marriage, 'the manor of Fosters and a messuage or tenement called Parke house, a watermill, buildings, lands etc. in the tenure of —. Taylor'.¹⁴ However, at some point between 1683 and the end of the century it looks as though the mill may have fallen into disuse. The Land Tax was instituted in 1698 and records for Burwash parish are fairly complete for the first half of the eighteenth century, but no mention of any property resembling Park Mill is to be found. The churchwardens' Account Book for the period 1674-1740 survives, but is of little help, as no separate mention is made of the mill. In 1680, for example, when we know a mill still existed, John Taylor paid tax 'for the parke'.¹⁵ What is certain is that land values in the district declined steeply over the next twenty years. In his will dated 16th November 1702, Sir John Pelham made extra provision for his son Henry, as the lands settled on him at the time of his marriage (which included the Park Property) had fallen in value.¹⁶

Henry Pelham died in 1721 and his third son and heir, Thomas Pelham of Stanmer, in 1737. There followed a long minority until his son, Thomas, came of age in 1749 and there are some interesting letters about the estates during this period, written by one John Street of Lewes to Thomas's Uncle James Pelham in London, giving account of his stewardship.¹⁷ One dated October 10th 1748 reads: 'No tenants offer for the late Burgess's (Chiddingly) or Park Farm at Burwash, but I hope as corn now bears a good price, tenants will be more plenty but there is a great many farms in gentlemens own hand for want of tenants'. This reference to signs that the depression in agriculture was ending gives additional grounds for the assumption that the mill had been lying derelict because of the slump. In fact a new tenant was found for Park Farm in the following year and on April 19th 1750 Mr Street writes: 'John Foord the tenant for Park Farm entered at Lady Day'.

1750-1822. The mill is rebuilt and trade at first prospers, then declines.

By now, Thomas Pelham had come of age and the correspondence ceased. When he took over the management of his estates, Pelham was already a Member of Parliament for Rye and launched on his political career. Thus he was certain to be aware of the developments which were taking place in agriculture. The enclosure of the manorial lands, begun in the fifteenth century, gained new momentum in the mid-eighteenth century and improved methods of cultivation meant that a good deal more wheat was being grown, so that even the poor now ate white wheaten bread.¹⁸ There was also a significant rise in the population around this time, and so conditions were propitious for the rebuilding of the mill. This seems to have taken place between 1751 and 1753, for when Thomas Pelham married in 1754, he covenanted to trustees a number of properties including 'Park Farm in Burwash. A water cornmill and mill house in Burwash'.¹⁹ In the Land Tax records for 1759 we find the actual name Park Mill for the first time,²⁰ but, as neither the Land Tax records nor the Poor Rate books for the years 1749-1758 have survived, there is no means of discovering from that source in which year precisely the mill was built. In 1759 the mill was assessed at £12 for Land Tax and in 1767 it was assessed at £7 10s. for the Poor Rate.²¹

The indenture of 1618 had referred, in a somewhat grandiose fashion, to 'the Corne mill with all the houses, edifices and buildings to the same belonging.' Certainly, medieval landlords had spared no expense in the erection of mills. They realised the value of efficient watermills, which yielded a high rent from a proportionately small amount of ground.²² The 'water cornmill and mill house' of 1754 somehow sounds much simpler, but it is clear that provision was made for a resident miller, who would grind corn throughout the year and maintain the machinery. This included two pairs of stones, one (of French burr) for wheat flour and the other (Peak stones) for animal feed, as animal husbandry was the other branch of agriculture in which spectacular advances were being made.

The tenant of the new mill was John Skinner, a resident of Burwash who was also a copyhold tenant of the manor of Burwash in respect of a cottage and a rood of land, as we learn from his will in the Manor Court Book in 1764.²³ He bequeathed the cottage and land to his sons William and James, but a third son, John, although only left £20 in the will, succeeded his father as miller, for, in the Land Tax record for 1780, we find 'Proprietor: The Rt. Hon. Thomas Lord Pelham; Occupier: John Skinner'.²⁴ By 1784 Thomas Pelham, who was by now Baron Pelham of Stanmer and an important figure in Parliament and at Court, seems to have been in need of ready money, for in that year he leased to Edward Boodle of St. George's, Hanover Square a number of properties which included 'the manor, or reputed manor of Forsters, Park Farm containing 100 acres in Burwash, and woodlands, 100 acres, and Park House Watermill in Burwash'.²⁵ In the following year, the Land Tax records show that John Skinner was not only the occupier but also the owner of Park Mill.²⁶ The ownership of Park Farm and Park Wood eventually passed to the Fullers of Rose Hill (Brightling).

The second John Skinner continued to work the mill until his death in 1794. His will is recorded in the Manor Court Book on 20th October 1795.²⁷ The mill was bequeathed to his wife Mary for life and thereafter to his son, John. On one of the wooden uprights inside the mill are carved the initials 'J.S. 1795'. It was believed for some time that these commemorated the building of the mill, but it now seems probable that they mark the date when the third John Skinner entered on his period as miller, although his mother was the nominal owner until her death in 1801. This John Skinner appears to have lived up to the traditional reputation of the 'jolly miller'. The story is told of the local solicitor asking him

'how the saying had got about there was never but one miller who went to heaven.

"Oh, sir!" replied Mr Skinner, the miller, "and shall I tell you how it was that he 'bid' (stayed) there when he was there?"

The good lawyer gave it up.

"Because, sir," said the miller, "they couldn't find never a lawyer there to eject him. Good morning, sir."²⁸

His name also appears in a 'poetical directory' published in the *Burwash Parish Magazine* in 1804:

'If a miller you wish to find,
Hilder and Skinner your corn can grind,
Or if good flour you'd wish to buy,
They likewise keep a good supply.'²⁹

It is interesting that among all the trades mentioned in a comprehensive list, there is no baker. It would seem therefore that home baking was still generally practised and that the miller, in addition to grinding the farmers' corn, also bought grain and retailed flour and for this would require a certain amount of capital.

At this point it may be said that, in the fifty years since it was rebuilt, the mill had enjoyed a fair measure of prosperity. John Skinner ii. had been able to buy the freehold and the mill had remained in the family for three generations. The end of the eighteenth century however, saw the collapse of the wealden iron industry.³⁰ This led not only to unemployment for the men who had worked the furnaces and forges, but also in the allied trades, 'the mining and haulage of iron ore, the cutting and carrying of wood to the furnaces, charcoal burning . . . not to mention the wheelwrights, carpenters, harness makers and others, whose services had been in constant demand as complementary to this heavy industry'.³¹ When war with France broke out in 1793, a number of the unemployed no doubt enlisted in the army or navy, but, after 1815, they had to return to their own parishes, as that was the only place where Poor Relief could be obtained, and inflation and unemployment now affected the country as a whole.

John Skinner had still been doing well enough to acquire a few more acres of land in 1807,³² but in July of the same year he had a stroke of misfortune when his barn was destroyed by fire. He also lost his stable, carts, harness, 'a horse killed and two others so miserably scorched that their lives are despaired of'.³³ He kept going until 1822, but it must have been with increasing difficulty, as many of the farmers in the district were insolvent and arable land throughout the county was being converted to pasture,³⁴ all of which meant less corn to be ground. In addition, the Poor Rate was being used to alleviate the general distress and the rise in the amount levied must have fallen heavily on such as the miller. In June 1822, he could not meet his obligations to his creditors³⁵ and the mill had to be sold.

1822-1902. Economic recovery, enlargement of the mill and eventual decline.

Park Mill was bought in 1822 by Elizabeth Weston.³⁶ It was by now assessed for Land Tax at £16, an increase mainly accounted for by the extra land acquired in 1807, but the assessment for the Poor Rate had nearly trebled since 1767 and the amount levied had increased from 1s. 6d. to 7s. in the pound.³⁷ The miller during the whole period of Elizabeth Weston's ownership appears to have been Francis Russell. The parish, in an attempt to provide some local employment, had acquired Bough Farm at Burwash Weald and in the parish Trading Accounts for 1823 there are several entries concerning wheat sold to Mr F. Russell.³⁸ The name of Francis Russell jnr, first appears as 'occupier' of the mill in the Land Tax records for 1830, and at the same time the mill undergoes an interesting transformation to 'Hope Mill'.³⁹ However, this new name seems to have been short-lived, as, in 1834, Weston's trustees advertised the mill for sale under the name of Park Mill once more,⁴⁰ and the Russells were able to buy the property.

The description given in the sale notice (reproduced here) is of interest. Trade is said to be good, which suggests that conditions in the Burwash area were better than those which prevailed in the county as a whole, where the agricultural scene was still disturbed by rick-burning and rioting in protest against the introduction of machinery on the farms. Not only were the Russells able to buy the freehold, they also enlarged the mill.⁴¹ Another bay was added, linking the older part of the mill to the adjacent

**TO BE SOLD BY AUCTION,
By Mr. T. P. DURRANT,**

On Tuesday, the 27th day of May, 1834, between the hours of Two and Three o'clock in the afternoon, at the **BELL INN, at Burwash, in Sussex**, by virtue of a Devis in Trust for Sale, and under such particulars and conditions as will then be produced.

A FREEHOLD HOUSE and WATER CORN MILL, called Park Mill, well supplied with water, and having a good trade and running two pair of stones (one French and one Peak), together with an oasthouse, barn, stable, & out-buildings, and about 14 acres of rich meadow, pasture and hop ground, situated in Burwash, in Sussex, in the occupation of Mr. Francis Russell, junr.

The Premises may be viewed and further particulars known by applying to Messrs. **PHILCOX and BALDOCK, Solicitors**, Burwash, Sussex; or to the **AUCTIONEER, at Mayfield, Sussex**. Letters to be post-paid.

Notice of sale from the *Sussex Weekly Advertiser* of 12 May 1834.
(Reproduced by courtesy of Brighton Public Library)

mill house, which may have undergone alteration at the same time. Another pair of wheatstones was installed, one of which bears the date 1836 on the rim. Extra space was probably also required for the machinery needed to separate and grade the meal. Formerly millers had been content to grind the corn only, leaving bolting and dressing to whoever baked the bread, but by the nineteenth century, ancillary machinery had been perfected which enabled this work to be done in the mill.⁴² As we see also from the notice of sale, the mill had fourteen acres of land, including hop-grounds, and these provided a second source of income for the miller. The extent of the property can be seen in detail on the Tithe Award Map and the accompanying Schedule of 1839.⁴³ The fourteen acres comprise all the land between the mill-race and the river Dudwell and also a field on the opposite bank of the river. Of these, about six acres were under hops.

There follows a period of forty years when nothing of great moment seems to have occurred and we may assume that the mill was prospering. C. F. Trower writes in 1869: 'Better times have since set in (i.e. since the rick-burning, smuggling and robbery with violence of the 1820s). Land has improved in value. Agriculture has been encouraged; good roads laid down; waste lands enclosed. Opulent families, attracted by the beauty of the situation are choosing it (Burwash) for their homes. The South-Eastern Railway sends its blue puffs of steam every hour through our valley, and has made us an accessible population.'⁴⁴ The 'good roads' referred to were probably the turnpikes, but there had been an improvement in the state of the roads in general, which must have pleased the millers. The Rev. John Coker Egerton, in a lecture on the history of the parish of Burwash delivered in 1871, quotes one of his older parishioners, a carter, 'who tells me that he remembers six horses to a two-wheel cart from Dudwell Mill, with the slub up to the cart-axles'.⁴⁵ Indeed transport to and from both Dudwell Mill and Park Mill must have been a hazardous business in bad weather, as there was not only the mud, but also a very steep hill to be negotiated on both sides of the valley.

By the late 1870s we know that the district was once more experiencing economic difficulties, from accounts in the Burwash Parish Magazines of the time. The rector (Rev. J. C. Egerton) laments the repeated failure of the hop harvest and is so concerned about the number of young people unable to earn a living, that he exhorts his more

prosperous parishioners to contribute to a fund to help young men to emigrate. He makes no specific reference to the grain crops, or to difficulties experienced by millers, but it is with no surprise that we learn that in June 1878, Park Mill was for sale.⁴⁶ In the Parish Magazine for September 1878, the death is recorded 'at an advanced age' of Francis Russell sen. — the thought of having to uproot himself after 56 years was probably just too much for him — and by November of the same year, an advertisement for help in the mill appears, the owner now being one J. Guest.⁴⁷

This, however, was not quite the end of the Russells. The mill changed hands again and in February 1881, the new owner, Samuel Barrow, who seems to have been interested in farming the land only, advertised the mill to let.⁴⁸ His tenant for the next four years was Ephraim Russell⁴⁹ but then in April 1885, the advertisement 'Mill to let' appears once more.⁵⁰ Russell continued to work as a miller for the rest of his life, next at Darvell Mill in the neighbouring parish of Brightling and finally at Bugsell Mill on the river Rother at Etchingham. Park Mill, however, seems to have gone out of business for the time being. The electoral registers between 1886 and 1898 continue to record Samuel Barrow as occupier of the house and land⁵¹ and Kelly's Directory for 1895 lists him as 'farmer and miller' in that order, so the mill may have been used occasionally during this period, if only to grind animal feed.

Two local reasons can be given for the decline of Park Mill. One was the agricultural slump of the 1870s and 1880s, which has already been mentioned, and the second was the existence of a competitor in Dudwell Mill, less than half a mile away, when the volume of work was contracting. The most significant reason, though, was a national one. The industrialisation of flour-milling had begun about 1840, when iron rollers started to supersede stones in the mills which were growing up in the big towns.⁵² The repeal of the Corn Laws in 1846 had allowed foreign grain to enter the country, but this only became really cheap and swelled from a trickle to a flood when the prairie provinces of the U.S.A. and Canada began to produce immense quantities of wheat for export and the development of steamships greatly reduced freight charges. By 1875, nearly half the wheat consumed in Britain was imported and the bad harvests of the late 1870s increased the proportion to nearly 70%.⁵³ To cope with this influx of foreign wheat, steam-driven roller-mills were built at the ports of entry and, by the time of the great flour-milling exhibition in the Agricultural Hall in London in 1881, an irreversible trend had been established. The death-knell of the little country wind-watermills was ringing.

There was, however, a last flurry of activity at Park Mill. In 1899, a new owner, William Richardson, acquired the mill⁵⁴ and worked it until 1903, when Rudyard Kipling, who had bought the mill from him the previous year, harnessed its power to generate electricity for his house,⁵⁵ 'Bateman's'.

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- 41 A. J. Haselfoot, 'Restoration of the old watermill at Batemans, Burwash', *infra* p.
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The author would like to acknowledge the assistance given by Mrs Judith Brent in locating material in the East Sussex Record Office, by Jeremy Goring who read the MS and by her husband, without whose help and encouragement this article would not have been written.

The Restoration of the Old Watermill (Park Mill) at Batemans, Burwash

By A. J. HASELFOOT

Introduction

Park Mill, Burwash, was built about 1750 with two pairs of stones and was operated continuously until 1902. At this date the mill was shut down by Rudyard Kipling who had bought the Batemans Estate, the water wheel was removed and a small water turbine and generator was installed to light the main house. The history of the mill will not be enlarged on here as it is well described in another article in this journal.¹

The mill as originally built was only one bay wide, about 10' x 20' floor area, and was of two storeys with a pitched roof, with the ridge running East-West, the bin floor being in the roof space. (Figure 1). It was driven by a 10' diameter overshot wheel,

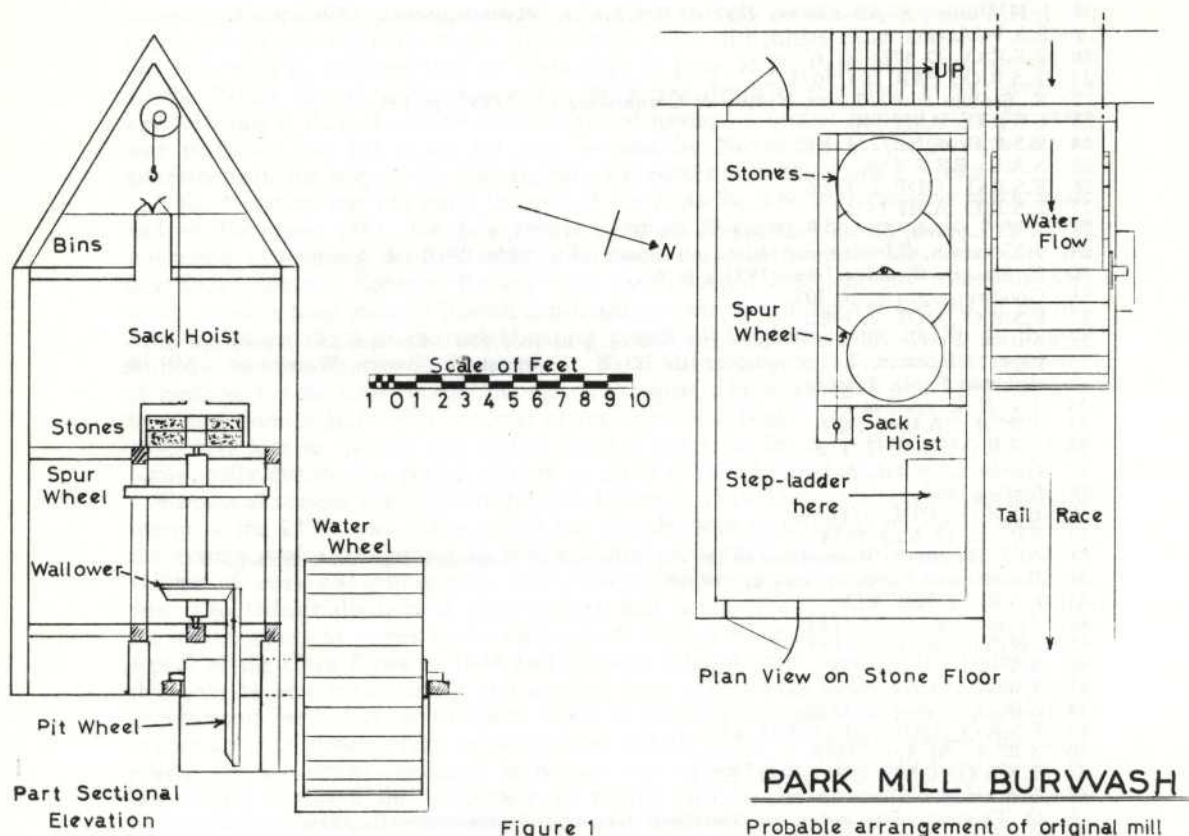


Figure 1 Probable arrangement of original mill.

probably 5' wide, and there was no auxiliary drive or auxiliary machinery, the sack hoist being hand-operated. The building was probably enlarged to its present size in the 1830s when the third pair of stones was installed (the date 1836 is cut in the plaster on the rim of the runner stone). The extension was also of two floors with a pitched roof but the ridge in this case runs North-South and extends over the adjoining mill-cottage which may have been built at the same time or rather earlier. On the cover is a drawing of the East side of the mill, made in 1929, which shows what was presumably the original door to the mill. A wire-machine or dresser (for cleaning and grading the meal) and a smutter (for cleaning the grain) were apparently installed about this time as well as a mechanical drive to the sack hoist, a small crown wheel being fitted below the great spur wheel.

When the water wheel was removed in 1902 the launder feeding the wheel was dismantled and a cast-iron plate containing the sluice-gate for the turbine penstock was installed in its place. A small building to house the generator and switchboard was constructed by the side of the wheel-pit. The mill building and its machinery was abandoned and left derelict, the flooring of the ground floor being removed at some time, presumably for re-use of the timber. In 1940, on Mrs Kipling's death, the mill as part of the Batemans Estate became the property of the National Trust. The buildings and machinery remained untouched until 1969 when the Trust approached the Sussex Industrial Archaeology Society for assistance in the restoration of it. A feasibility study was made by the Society and accepted by the Trust, a volunteer Project Team was formed and work started in the summer of 1970. The first stage

of the restoration, with one pair of stones grinding and the turbine and generator in working order, was completed in 1975, being officially opened on 10th May.

Description of Building and Plant.

The building is of timber-framed construction with weather-boarded sides, supported on low brick walls on the south and east sides, the brickwork being carried up to first-floor level on the north and west sides adjacent to the wheel-pit. The roof is tiled with a ridge board, the rafters supported on a single purlin on each side. Access to the upper floors was originally by fixed step-ladders.

The mill pond is fed by a leat, now badly silted up, arranged to draw water from the River Dudwell about $\frac{1}{2}$ -mile upstream where a weir has been built to raise the water level. The leat is also fed by two small streams the larger of which, entering it about 100 yards above the mill, is the sole source of water supply at present. About 100 yards further up the leat a sluice with flood-gates can discharge into the river to allow control of the water level in the pond. The dam has a brick and stone revetment on its downstream side and a culvert through the dam feeds the waters to the wheel-pit, being closed at the lower end by the plate containing the turbine sluice-gate. A flight of brick steps leads from the top of the dam above the wheel-pit to a door in the west side of the mill. The tail race is stone lined for a short distance below the wheel-pit and discharges into the river about 100 yards downstream.

Nothing is known about the original water wheel or the one removed by Kipling, but it is possible that this latter may have been of composite construction. The wheel-shaft was octagonal, about 18" diameter. The pit-wheel, 7' 6" in diameter, consists of an 8-armed cast-iron spider to which is bolted the cast-iron rim, mortised for 88 wooden cogs. The wallower, of cast-iron 2' 8" in diameter with 31 teeth, is probably a later replacement, being apparently of a stock pattern held by a mill-wright, as there are flanges on the upper surface obviously designed to take the wooden spokes of a 6-armed wheel.² It is mounted on a 10" square vertical wooden shaft, the foot-step bearing of which is carried on a long saddle-beam spanning the pit above the wheel-shaft and supported on two heavy cross-beams, a construction typical of older mill-wrighting technique. The shaft has been packed out on two sides to match the hexagonal centre opening of the wallower; it terminates in a steady bearing at the level of the stone-floor and just below this is mounted the 4-armed wooden great spur wheel, of compass-arm construction 6' in diameter with 92 cogs. At some time, probably when the third pair of stones was added, the cogs of the original spur wheel were cut off and a new rim, of slightly larger diameter, was mounted on top of the original rim. The reason for this is not known but it could have been to increase the speed of the stones slightly as it increased the circumference of the spur wheel by about 6". Below the spur wheel a wooden crown wheel had been mounted, of clasp-arm construction 4' in diameter with 64 cogs on the lower face. Nothing was left of the auxiliary drive from this crown wheel except the lever-mounted slack-belt wheel for the drive to the sack hoist, but it seems as if there were two short horizontal lay-shafts, one either side of the vertical shaft.

Two of the stone nuts were of wood with 20 cogs each, 3 of these being removable (slip cogs) for taking the stone nut out of gear. The third was of cast-iron with 19 teeth, being disengaged by raising it on its shaft by a screw tackle and supporting ring. The tentering gear for all three stones was complete. Two pairs of stones were French burr, the third being peak stones. The hursting (supporting framework) is of heavy oak construction mounted on brick piers. It originally supported two pairs of stones, on the east and west sides, and was later extended to take a third pair on the south side. The wire machine is on the first floor, mounted against the south wall, which is the party-wall to the mill cottage, while the smutter, also on this floor, was hung from a beam in the middle of the mill on the west side. Both appear to have been belt-driven. The bins in the roof space, which is floored, are arranged along the north and west sides and are served by a gangway about 3' above floor level which also passes under the sack hoist.

Condition as found and repairs.

As the mill had been left empty and unused since 1903 it was to be expected that the building and machinery would be in poor condition and this was found to be the case. A preliminary survey showed that the structure of the building needed urgent repairs, the hursting had partially collapsed and was potentially dangerous and most of the wooden parts of the machinery had been severely attacked by wood-worm. The first job was to make the building sound and weatherproof and this work was undertaken by a builder from Hastings who had much experience in the repair of old buildings. The brickwork in the north-west corner of the pit, which was porous, was renewed, rotted beams and studding replaced and new weatherboarding fitted. Both main purlins were broken and had to be replaced and the west side of the roof had to be completely stripped and new rafters supplied. Fortunately the old tiles were generally in good condition and were put back again. About half the beams and floor joists of the first floor had to be replaced and two simple stairways were built leading from the ground floor to the first floor. Ventilating bricks were fitted in the basement and a new party-wall to the mill cottage was built.

While this work was in progress the volunteer team had constructed and laid a new ground floor and repaired the bin floor. A complete electric lighting, power and storage-heating system was also installed by them. The team then removed the mill stones and stored them temporarily on the ground floor with their stone nuts and spindles. When dismantling the stone nut spindles a George IV cartwheel penny of

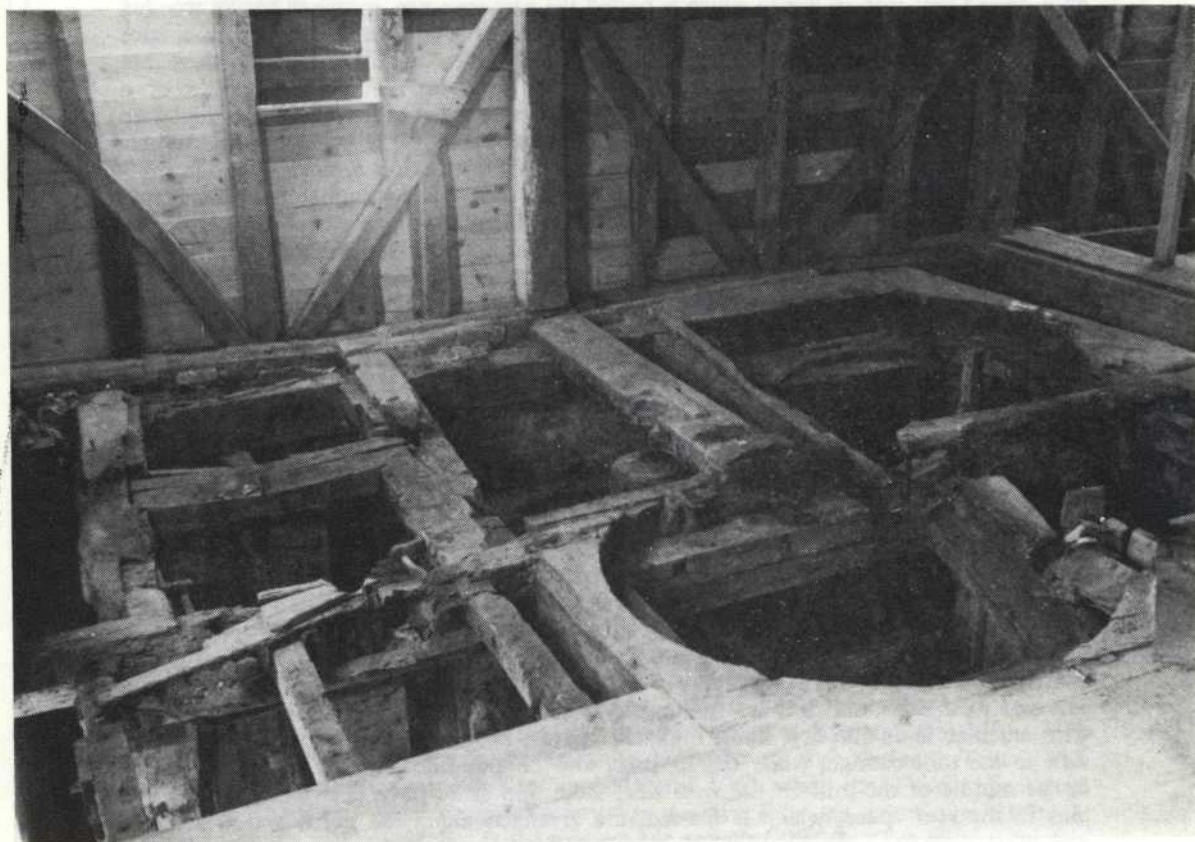


Figure 2. Stone floor showing hursting after removal of stones.

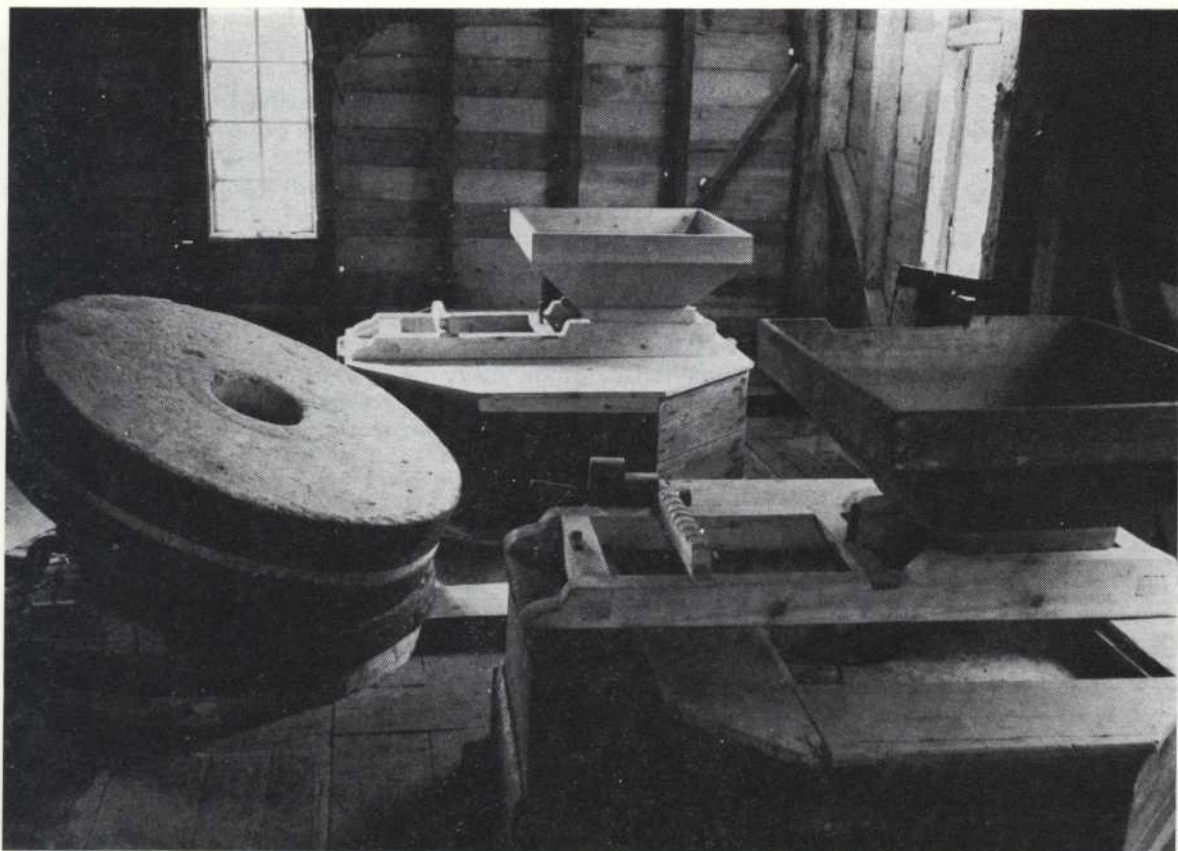


Figure 3. Stone floor complete after restoration.

about 1795-1805 was found under the shaft end in one of the foot-step bearings. It was a common practice among millers, when excessive wear occurred in such bearing, to slip a penny under the end of the shaft to take up the slack. The penny was not put back again but has been displayed in a glass case on the wall. The great spur wheel and crown wheel were then removed from the vertical shaft but were so rotten that they fell to pieces during dismantling. The vertical shaft and wallower could then be taken out and stored.

It was now possible to make a better assessment of the state of the hursting and the repairs that would be necessary. (Figure 2). It proved to be so rotten with damp and wood-worm that not many of the members could be repaired and used again. Wherever possible pieces were inserted or spliced on, the joints being pegged and, for safety, also bolted with the bolt heads concealed. The majority of the members, however, had to be replaced and the oak for this was kindly donated in the form of trees felled three years before on the estate of a local landowner. It was cut to size by a local sawmill and fashioned and erected by a local joiner with assistance from the volunteer team.

A new great spur wheel was designed by the team, based on the construction of the old one, and was made and fitted by a local craftsman, again with assistance from the team. As it had not been possible to establish exact dimensions owing to the bad state of the old wheel and the partially collapsed nature of the hursting, careful calculations and plotting were necessary to ensure that the new wheel meshed properly with the

existing stone nuts and that all shaft centres were properly located. In the event the wheel ran very true and meshed well with all the stone nuts. Pitch pine was used for the spokes of the wheel and elm for the four quadrants and the rim which was mortised to take the 92 cogs. All the cogs, over 200, for the pit-wheel, spur wheel and stone nuts were made from apple wood and fitted by one of the team.

After replacing the vertical shaft, fitting the great spur wheel and mounting the stone nuts and their spindles in position the three pairs of stones were put back again and adjusted for level and true running. The three stone casings were in a somewhat ruinous condition and it was decided to cannibalise the worst one in order to repair the other two, the third pair of stones being left uncovered with the runner stone propped up at an angle on wedges so as to show the way the stones were dressed. New horses were made for the other two stones and a new shoe and hopper, as one hopper was still existing and an old shoe was available from another mill. One pair of stones, the Peak ones, are now used for grinding wholemeal flour, one of the two French pairs, though operable, is not run but is complete and used for demonstration while the other French pair, as mentioned above, has been left exposed. (Figure 3).

The old wheel-shaft proved to be too rotten on the surface and at the ends to be used again so a new one was made by the team from an oak tree trunk presented by a local donor. The iron cross-tailed gudgeons from the old shaft were used again together with the iron bands which are shrunk on to the ends of the shaft to prevent splitting. As the turbine was also scheduled to be preserved and as this and its pipework took up about half the width of the wheel-pit it was only possible to accommodate a 2' 6" wide water wheel but this is sufficient to drive one pair of stones when grinding. The new shaft was therefore made shorter than the old one, the out-board bearing being supported on a concrete block in the wheel-pit. The old bearings were re-lined with Tufnol (a linen-reinforced plastic laminate) and mounted on new oak blocks. The new shaft was made inside the mill and, when man-handling it across the tail race, it was nearly lost owing to a sudden flood. It had been hauled up on the far bank and left overnight, and fortunately it was just above flood level, but one or two railway sleepers that had been used in transporting it were washed away. The shaft was inserted from outside and threaded through the pit-wheel which had been jacked up temporarily. After lining up the shaft the pit-wheel was mounted on it and adjusted with wedges to run true.

As there was no water wheel remaining to repair or copy it was necessary to design a new one. It was decided to make this of wood, basing the design on what was known of existing wheels of about the same date as the mill, and calculations were made of the probable output obtainable to confirm that it would be suitable for driving one pair of stones when grinding. The wheel is of clasp-arm type, 10' in diameter and 2' 6" overall width, with 24 buckets 9" deep, the rims being in eight pieces. It is of oak and was made by the team, partly by hand and partly on joinery machines the use of which was freely given by a local contractor. The brickwork on the dam face of the wheel-pit was rebuilt and backed with concrete, a launder and control sluice were made to bring water to the top of the wheel, a hole was cut in the iron plate closing the end of the culvert and a shut-off sluice-gate fitted to it. (Figure 4).

While work on the mill was proceeding the clearance of the mill pond and waterways was also tackled. The upper part of the brick wall of the pond had been badly broken up by the alder trees which had grown up during the last 70 years to a height of fifteen or twenty feet. The bottom of the pond was heavily silted and covered with undergrowth and rushes and the stream feeding the leat was flowing in the reverse direction, through the overflow sluice into the river. The tail race was 2' deep in silt and buried in a tangle of bushes and undergrowth, and the leat above the pond was also badly silted up and buried in undergrowth mixed with some quite large trees. The tail race was completely cleared of silt and undergrowth and opened up, and the trees on the brick wall of the pond were cut down and the stumps killed; all by volunteer labour. As the lower courses of brickwork round the pond seemed to be in fairly good condition it was decided not to try and extract the stumps for fear of making matters worse. The undergrowth was

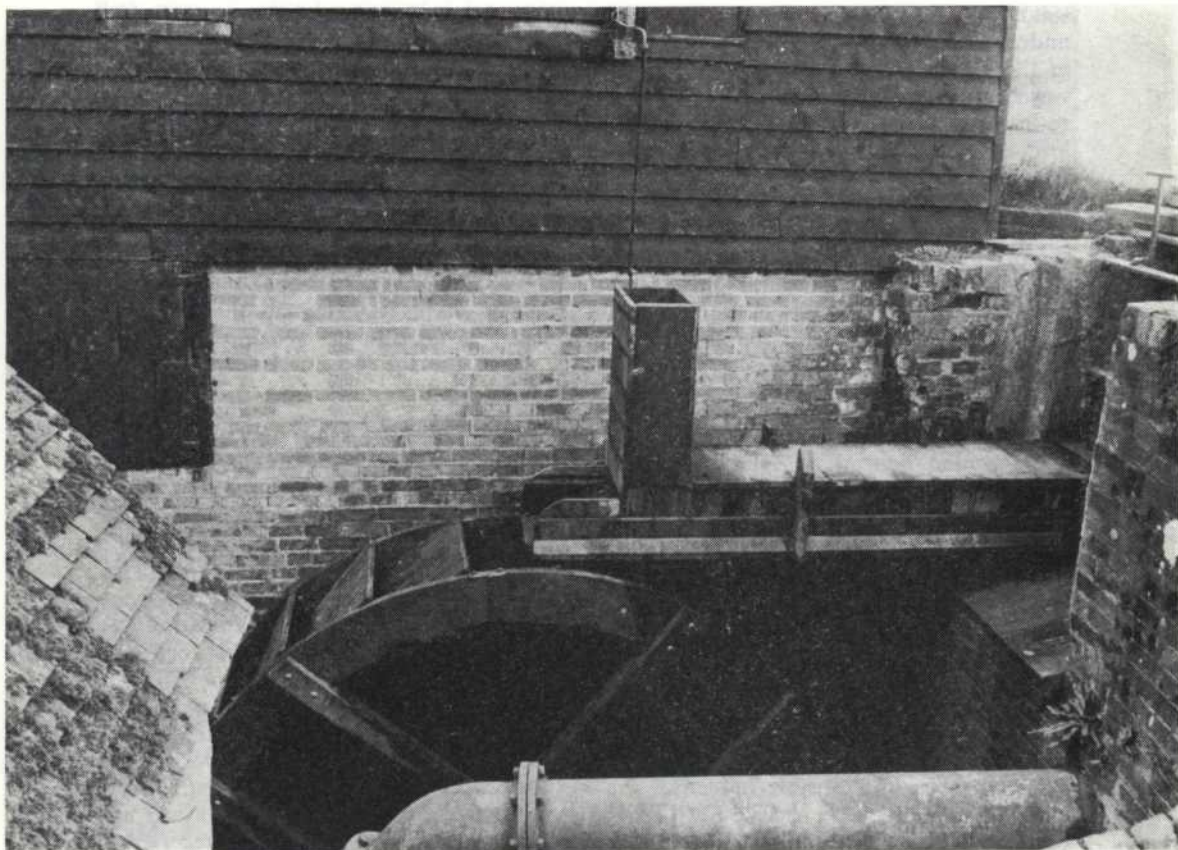


Figure 4. New water wheel, launder and control sluice.

cleared from the bottom of the pond but it was realised that the clearance of silt from the pond, and the opening up of the leat would require professional attention with earth-moving machines. This part of the work was therefore put out to contract and the pond was satisfactorily cleared, leaving the original clay blanket intact.

Work that still remains to be done is the opening up of the bin floor, the design and installation of the auxiliary drive (the sack hoist is still hand-operated), and the clearance of the leat as far as the weir on the river to improve the water supply, particularly during the summer months when a shortage of water can limit the amount of corn that can be ground.

The Turbine and Generator.

The generator and switchboard were installed for Kipling by Christy Bros. & Middleton of Chelmsford in 1903 to light the house. The generator is a Crompton D.C. machine, rated at 105/150 volts, 15 amps., 1000 R.P.M., and was connected to a 110/120 volt battery at the house by a 300 yard cable. It may for a short time have been driven by a toothed ring on the water wheel³ but the final drive was by a 280 R.P.M. horizontal shaft Vortex reaction turbine, with twin draught tubes, made by Gilbert Giles & Co. of Kendal. It was mounted on iron girders above the wheel-pit and the shaft projected into the generator house where it drove the generator by a belt and pulleys with a speed increase of 3.75/1. The whole equipment had been standing idle for nearly 50 years and was damp, rusty and dirty. The turbine was seized up

solid, with a large piece broken out of the casing due to freezing of the water in the undrained turbine. The whole of the equipment was removed by the Mechanical Wing of the Royal School of Military Engineering to their workshops at Chatham where it was completely overhauled and repaired by instructors and students. It has since been re-installed by them and is now in full working order, but working into an artificial load of lamps and resistances. The cable to the house was cut at some time, near the far end, and has not yet been repaired.

It is interesting to note that the generator house and the concrete plinth on which the generator stands have both been doubled in height at some time. Obviously, after the original installation, Kipling found that winter floods could endanger the generator and took steps to guard against this. That the danger is still a real one was shown by the period of heavy rain in February 1975, when flood water, backing up the tail race, rose 5½" over the floor of the mill and stood nearly 3' deep in the generator house.

Conclusion.

Thus after more than 70 years the old mill is now grinding again and whole-meal, stone-ground flour is on sale at the National Trust shop in the house, about 3 tons having been ground between May and October 1975. The mill is open to the public and nearly 15,000 people, in addition to National Trust members, visited the mill during the year, many of these being school parties.

It must be emphasised that this work of restoration was very much a team effort with help being received not only from qualified engineers having wide experience of engineering projects in many countries but also from local individuals and organisations who combined to contribute both labour and materials to the project. Finance was raised by an Appeal Fund and by the efforts of the local centres of the National Trust, who contributed nearly £1,000 to the cost. Grants were received from the East Sussex County Council and from the Dept. of the Environment, who doubled their original grant. An encouraging aspect is the fact that the original estimate, for the work to be undertaken by the Sussex Industrial Archaeology Society to get one pair of stones running, made in 1969 at £3,000 to £3,500, was not exceeded though the work was not completed until early in 1975. It is also pleasing to know that the project received a 1975 Architectural Heritage Year Award from the Civic Trust.

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Acknowledgements

The author gratefully acknowledges the help he has received from the other members of the project team, in particular from Wilfrid Beswick and Jim Smith.

Glossary

clasp-arm — type of wheel construction where the double spokes are clamped round the shaft.
cogs — wooden teeth on a stone-nut (q.v.).
compass-arm — type of wheel construction where the single spokes are mortised into the shaft.
cross-tailed gudgeon — bearing pin with four radial extensions which are let into slots cut in the end of a wooden shaft; iron rings are then shrunk on to the shaft end to prevent splitting.
French burr stone — mill stone made from pieces of a hard quartz, from the Paris basin, which are held together by plaster of Paris and iron bands round the outside.
horse — framework on the top of the stone casing to support the hopper and shoe (q.v.).
hursting — heavy framework supporting the gearing and mill stones.
launder — trough (sometimes covered) bringing water to the top of an overshot wheel.
leat — artificial channel bringing water to the mill pond.
penstock — large pipe bringing water to a turbine.

Peak stone — mill stone quarried in one piece from millstone grit in the Derbyshire Peak District.

pit-wheel — large bevel wheel mounted on the wheel shaft and driving the wallower (q.v.).

shoe — sloping wooden trough receiving grain from the hopper and feeding it into the centre of the runner (upper) stone. Its angle can be adjusted and it is continuously vibrated by a three-sided extension of the stone spindle called the "damsel".

slip-cogs — removable cogs on a stone-nut to enable it to be taken out of gear if it is not desired to drive the corresponding runner stone.

smutter — device for cleaning grain before grinding.

stone-nut — pinion on stone spindle driven by great spur wheel.

tentering gear — device for accurately adjusting the clearance between the bed stone and the runner stone.

wallower — bevel wheel on vertical shaft driven by pit-wheel; the great spur wheel is also mounted on the vertical shaft.

wire machine — device for cleaning and grading the meal after grinding.

Old Weights and Measures

By WILFRID BESWICK

Research into past Sussex industries frequently throws up weights and measures which are troublesome to align with modern units. The records of the Sussex iron industry are particularly confusing in this respect. These notes are intended to provide conversion factors where it has been found possible to check them with reasonable accuracy.

Timber

A cord of wood is a stack of log wood 8 feet long, 4 feet wide and 4 feet high, no piece being less than 3 inches in girth. The volume is 128 ft³ (3.624 m³). The weight of a cord of mixed English hardwood, air dried to 20% moisture, would be about 3300 lb (say 1500 kg). There is a French corde of 4 m³ and containing 1650 kg.

The long cord sometimes referred to in Sussex is substantially the same in capacity as the normal English unit, being longer but narrower. In fact it has a smaller volume at 126 ft³. The term "load" is one of the most confusing and is dealt with later in these notes in respect of other materials. So far as timber is concerned the trade still use the load of 50 ft³ for squared timber and 40 ft³ for logs. Here again the French "voie" is greater at 2 m³ and relates to their corde thus: 4 steres (a stère is equal to 1 m³) = 2 voies = 1 corde. Conversion factors for metrication will be found below.

Charcoal

Bushels, quarters and loads are all volume measures much used in Sussex iron-works accounts and they relate to each other as follows: 8 bushels to one quarter

10 quarters to one last or load.

A bushel may be taken as 1.285 ft³ hence a quarter as 10.280 ft³ and the load as 102.800 ft³. As charcoal has a bulk density of 18 lb per ft³ conversion to weights become simple, a bushel in this case being 23.130 lb.

Metric Conversions

1 cubic foot (ft ³)	=	0.028 cubic metre (m ³);	1 m ³	=	35.314 ft ³
1 pound avoird. (lb)	=	0.453 kilogram (kg);	1 kg	=	2.204 lb
1 lb/ft ³	=	16 kg/m ³ ;	1 kg/m ³	=	0.062 lb/ft ³
1 bushel (bu)	=	36.368 litres (l);	1 l	=	0.0275 bu

We must however note that John Fuller¹ gives 12 quarters of charcoal to a load and Ray² gives 11 quarters. Bearing in mind that it was from France and other parts of the Continent and from French expatriate operators, that English blast furnace practice derived, it is not without interest that this trend towards a generous interpretation of the measures then in common use, does bring the actual quantities involved closer to early French measures.

A load of bagged charcoal is yet again different and Fuller used the term "sack load" with 3 bushels per sack and 60 sacks per load. We thus have two loads to consider and it is obviously of importance to know which is being used when operating economics are under consideration. The smaller unit amounts to 1850 lb and the larger 4163 lb.

Charcoal Burning

The conversion of English hardwoods to charcoal in beehive ovens would never exceed 15% weight of wood to weight of charcoal produced and most likely averaged out at something between 10% to 12%. Experience in Central Africa shows that primitive charcoal burners manage to achieve a conversion rate of but 5% or 6%; however if we may take 12% as a reasonable average for Europe then an English cord of wood should provide very close to 400 lb of charcoal and conversely the "small" load of charcoal would involve the burning of rather more than $4\frac{1}{2}$ cords of wood. The product would probably have a fixed carbon content of between 72% to 75% and an ash content of 8% to 12% the remainder being volatiles and a little moisture.

Iron Ore

References are found for both roasted and untreated ore. Wealden ore being a carbonate of iron is both lightened and has its ferrous content increased by roasting to drive off the carbonic acid gas. In this way the crushing affect of the ore on the charcoal in the furnace was eased and the volumetric efficiency of the reduction process greatly increased. John Fuller carried out some tests in 1738³ which showed that the bulk density of unburnt ore was 119.84 lb/ft³ and that burnt ore was 82.64 lb/ft³. This was a loss per cubic foot of 37.20 lb or 31%. Tests recently carried out on dried samples of good quality wealden ore gave a weight reduction of 26.8% so that Fuller's tests with ore that would be undried were comparable. A bushel of untreated ore would contain a weight of 154 lb and about 106 lb of roasted ore.

Under the same reference³ John Fuller describes a "load" of ore as being 12 bushels and he also details the load carried by horses from which we can infer that a "horse load" was of the order of 580 lb presumably carried in panniers on each side with less than 2 bushels of unburnt ore in each but still a formidable load.

Grain Milling

Not always ready to hand are the following:

Wheat	1 bushel	=	60 lb but sometimes 62 lb is used.
	1 quarter	=	8 bushels.
Flour	1 sack	=	280 lb
	1 barrel	=	228 lb is the usual figure quoted but a barrel of 5 ft ³ would hold only 220 lb.
Grain	1 quintal	=	220 lb.

References

- 1 H. Blackman, 'Gun Founding at Heathfield', *Sussex Archaeological Collections* LXVII p. 34.
- 2 M. A. Lower, 'Ray's Description', *S.A.C.* II p. 200.
- 3 Blackman, *op. cit.*, pp. 30, 31. Note: on p. 30 under 'Sussex Mine and Lancashire Mine' there is a statement "50 hundred of burnt mine to the load", in fact "to the ton of iron" is clearly intended.

East Sussex Milestones — Further Notes

By BRIAN AUSTEN and JOHN UPTON

Since the publication in 1973 of our survey of East Sussex milestones¹ further information has come to light which has prompted us to assemble this article. For the convenience of readers who may wish to relate the information contained here to the previous article the same basic layout has been adopted.

The "Bow Bells" Milestones.

The possible date of these milestones was discussed in the previous article² and a late eighteenth century date postulated. No further evidence has come to light on this point, but support for this dating may perhaps be found in the writings of Humphrey Repton, the landscape designer. In 1791, in connection with a proposal for the alteration of the landscaping of Tatton Park, Cheshire he suggested that milestones should be marked with the arms of the owner of the house. This was in support of Repton's principle of "extent", which advocated the necessity of all the neighbouring countryside, whether part of the estate or not, contributing to the artistic unity of the country house. The suggestion was ridiculed by Richard Payne Knight in his didactic poem *The Landscape* (1794) and Repton was subsequently satirised by Thomas Love Peacock in the novel *Headlong Hall* where he appeared as Mr Milestone.³ The influence of the members of the Pelham family, as trustees to a considerable number of Sussex turnpike trusts, could have ensured the incorporation of the buckle insignia on the mile posts on the Uckfield to Hailsham road, though whether they were following or anticipating Repton's advice is uncertain.

The East Sussex County Council in 1973 received from Foundry & Engineering Ltd of Phoenix Works, Lewes, a replica milestone of the "Bow Bells" type to insert at the entrance of North Street with High Street, Hailsham, to complete this series. Correspondence following the insertion of an article in the local newspaper established that the missing milestone was of the "Bow Bells" type.⁴ At the same time a further series of mile plates from the same foundry, using the small plate marked 56 from outside Hailsham Cemetery as a pattern, were inserted as far as Langney, the last two being within the Eastbourne Corporation area. The following entries should therefore be added to table 1:

55	TQ 590097	Hailsham	C	2	Replacements
57	TQ 590069	Hailsham	C	3	supplied by Foundry
58	TQ 604062	Stone Cross	C	3	& Engineering Ltd.,
59	TQ 613049	Stone Cross	C	3	Phoenix Works, Lewes
60	TQ 622037	Friday Street	C	3	and inserted 1973
61	TQ 630024	Langney	C	3	

As a result of the change in county boundaries, mile posts 29, 30, 31 and 32 (East Grinstead area) are now within West Sussex.

B 2026 Ashdown Forest — Westerham.

A replacement post for the missing 33 was cast by Messrs. Foundry & Engineering Ltd of Lewes and erected in May 1974. At the same time replica posts of the same type were also inserted along the line of the B2026 from King's Standing to the junction with the A22 at Lampool Corner. Although this arrangement makes sense from the point of view of the pattern of road classification today, it is by no means certain if mile posts of this type were ever used from King's Standing to Lampool Corner or that the present posts are in the same positions as those which originally flanked the road. This is because the road from King's Standing was under the control of a different turnpike trust. The powers of the Westerham and Edenbridge Trust

(1797)⁵ terminated at the intersection of the B2026 and B2188. The line of the B2188 continued by the B2026 to Lampool Corner was turnpiked by an act of 1766 (Tunbridge Wells - Maresfield Trust).⁶ One milestone from this trust still survives at Groombridge (TQ 530374) and is a simple sandstone block inscribed "IV" i.e. 4 miles to Tunbridge Wells. It is possible that this type was used throughout.⁷ The line of this turnpike from Lampool Corner to Maresfield ran further to the west than the present A22 through what was to become the grounds of Maresfield Park. The road from Nutley (the present A22) ran even further to the west and did not join the Tunbridge Wells road until Maresfield. It was not until 1831 that Malling and Wych Cross Turnpike adopted the line of the present A22 and the section of the Tunbridge Wells to Maresfield Turnpike from Lampool Corner to Maresfield was abandoned.⁸ The following entries should therefore be added to table 2.

33	TQ 480368	Hartfield	Replacement supplied by Foundry & Engineering Ltd., Lewes and inserted May 1974.
38	TQ 474294	Duddleswell	New mile posts supplied by Messrs. Foundry & Engineering Ltd., and inserted May 1974.
39	TQ 467277	Duddleswell	
40	TQ 475264	Fairwarp	

A268 Flimwell - Rye.

In March 1974 metal plates cast by Messrs. Foundry & Engineering Ltd were fitted to the posts where they were missing.

45	17½	TQ 722310	Flimwell
54	8½	TQ 829256	Northiam

A266 Tunbridge Wells - Wadhurst.

TQ 636321	Wadhurst	Similar to Fig. 10. No inscription.
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References

- 1 Brian Austen & John Upton, "East Sussex Milestones — A Survey", *Sussex Industrial History* 5 (Chichester 1972/3) pp 2-13.
- 2 *Ibid.*, p. 4.
- 3 Derek Clifford, *A History of Garden Design* (1962) p. 172; Dorothy Stroud, *Humphrey Repton* (1962) pp. 79, 83.
- 4 *Sussex Express and County Herald* 23 June 1972.
- 5 7 Geo III c 86.
- 6 6 Geo III c 56.
- 7 Austen & Upton, *op. cit.*, pp. 10-11.
- 8 1 Wm IV c 52. The old line of the roads is clearly marked on Yeakell & Gream (1795), 1" O.S. Old Series (1813) and Greenwood (1825) maps.

The Remarkable Cistern at Rye

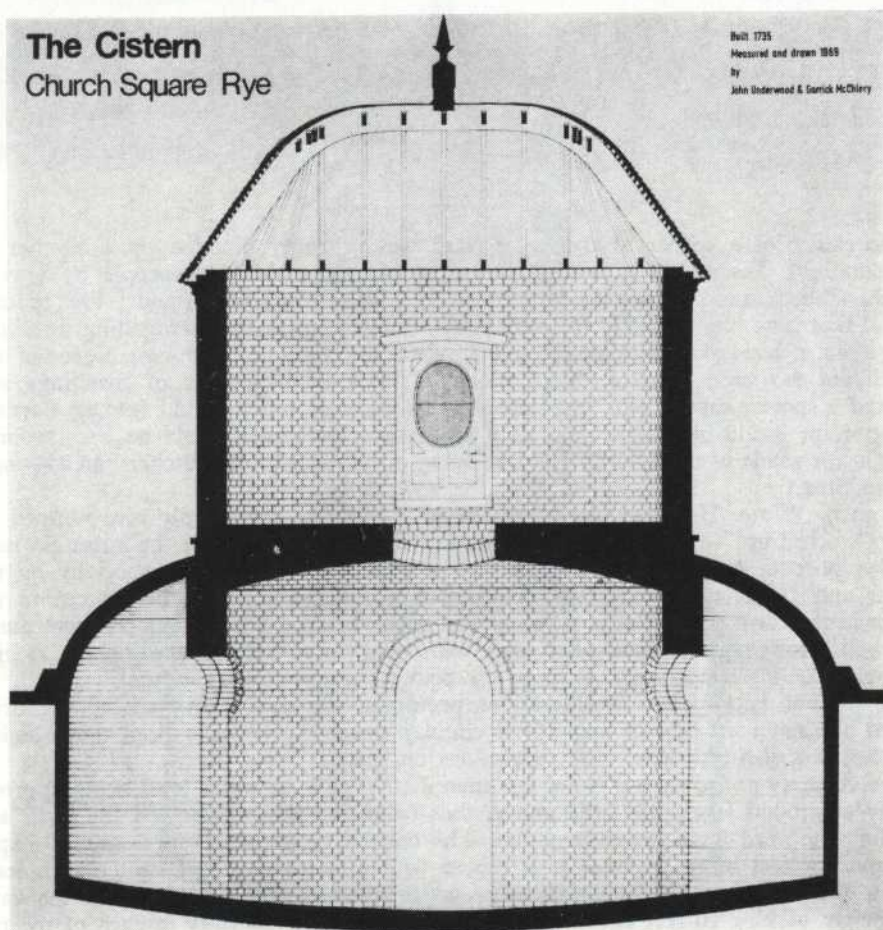
By RALPH WOOD

One of the most astonishing pieces of architectural craftsmanship in Sussex, if not in England, lies almost buried in a churchyard. A small brick building — half underground — is located in the north east corner of St. Mary's Churchyard in Rye; its exterior is often noticed by the many visitors who pass along Pump Street into Church Square and it is admired no less by the town's residents for its curious oval tower with a tiled roof like an upturned boat.

It is the Cistern or Water Tower which was built in 1735 at a time when the small town was enjoying a period of increasing prosperity. What the visitor does not see — and indeed in recent years few people can have seen — is the unique brickwork of the interior. If nothing is known about the builder of the tower at least its obvious quality testifies to a craftsman of skill and ingenuity and who must have been unusual even in the eighteenth century when traditional building techniques were at their most refined.

In 1730 the Mayor and Jurats voted the considerable sum of £600 for the improvement of the town's water supply. During the next few years a new piped supply was brought into the town from the north east where springs emerged from below the cliffs along what later became the Military Road. Here the sandstone beds outcropped and the water travelling through this stratum was clear and fresh. The water was piped to the Water House at the bottom of Conduit Hill, and a supply from here was also extended in new 2" elm pipes to the Strand. It is recorded (the bills still exist) that 500 yards of pipe were laid at one shilling and six-pence per yard, paid for in August 1734.

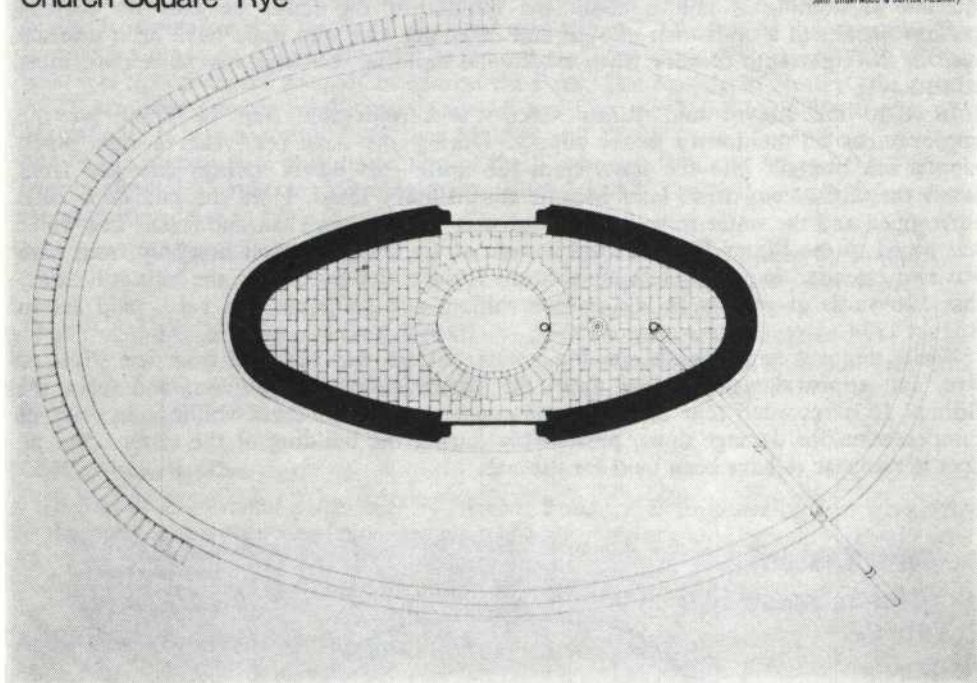
While this was happening a site for a water cistern was acquired from the Vicar of Rye, and approval was obtained from the Patron, Lord Wilmington, and from the Bishop. It is recorded that the Vicar was paid the sum of seven shillings by way of compensation for damage done, presumably during the building of the cistern, but he does not appear to have been paid for the site.



The Cistern

Church Square Rye

Built 1735
Measured and drawn 1969
by
John Underwood & Derrick McIlhenny



The choice of a corner of the churchyard was probably dictated by a number of considerations. Essentially a storage cistern would serve the townspeople by gravity and the Church was built on the summit of the hill on which Rye stands. The churchyard at that time was probably the only available open space, the surrounding dwellings being then at least as dense as now and maybe more so. The north-east corner of the churchyard favoured ease of distribution to the greater number of dwellings and required a shorter supply pipe from the Postern Conduit which would feed it. Possibly as important would be the fact that as a graveyard this corner would be less favoured being in the shade of the Church and also being rather near to the butchers' area — now Market Street.

From the Water House at the foot of Conduit Hill the new supply was pumped up — or “worked up” — to the Cistern by annual tender, and traces of the horse gin used for this purpose remain. It is notable that a committee was set up specially by the Mayor and Jurats to consider the question of piping water from the Cistern to the houses in the town below; hitherto water had been obtained only by bucket from pump and well. However this innovation met with poor response and few people availed themselves of the opportunity. Perhaps the price of progress was too high.

We do not know what considerations prompted the oval plan-form of the brick cistern as shown on pp. 25 and 26; a circular tower would have been more logical and usual — possibly there were restrictions on space.

The capacity of the cistern is not less than 20,000 gallons, water level being approximately at ground level or a little above, thus balancing the pressure on the walls and avoiding the need for a heavy structure. The bottom of the reservoir is saucer-shaped and about 8 feet below ground. It is roofed with a continuous half-vault which leans against the central tight oval brick tower which rises from the bottom past the vault to a height of 9 or 10 feet above it. This tower contains a doorway in each of the two

longer sides giving access to the level brick floor of the upper chamber. In this floor is a central hole through which the water can be seen.

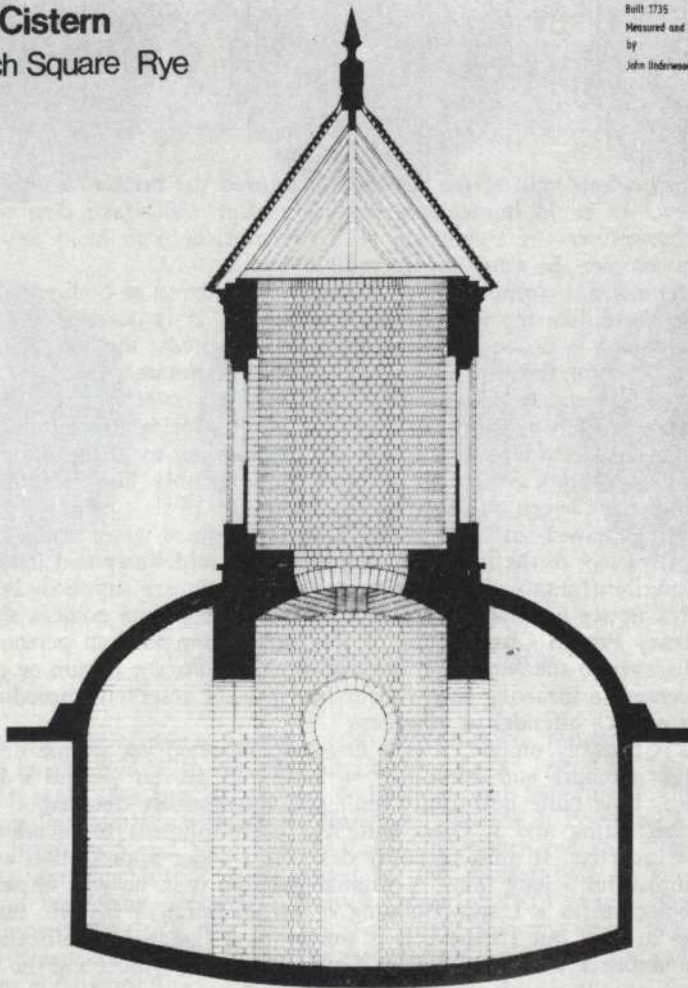
The lower part of the central drum is perforated with four tall openings — two at the ends, two in the middle of the sides — each having an arched top emerging just above water level. Bearing in mind that these openings are in walls of two varying radii on plan the complexity of the arched brickwork can be imagined. To form the necessary centering alone would tax an able carpenter; the bricks then had to be rubbed to form a taper in two directions at once and of varying angle according to their position in the curving wall. The central vault of the reservoir chamber within the inner drum is also curving two ways unequally. The outer brick half-vault is more conventional but nevertheless remarkably even in shape.

In the mid-1960's two architectural students, John Underwood and Garrick McChlery, made a measured survey of the Cistern and produced a set of excellent drawings, the negatives of which sadly perished in a flood later. Happily three sets of dyeline prints were kept (one in Rye Museum) from which the accompanying illustrations are taken, and they demonstrate clearly the intricacy of the brickwork.

I was present with John Underwood when the interior was being measured; the water was as clear as crystal and absolutely still. A light lowered through the central

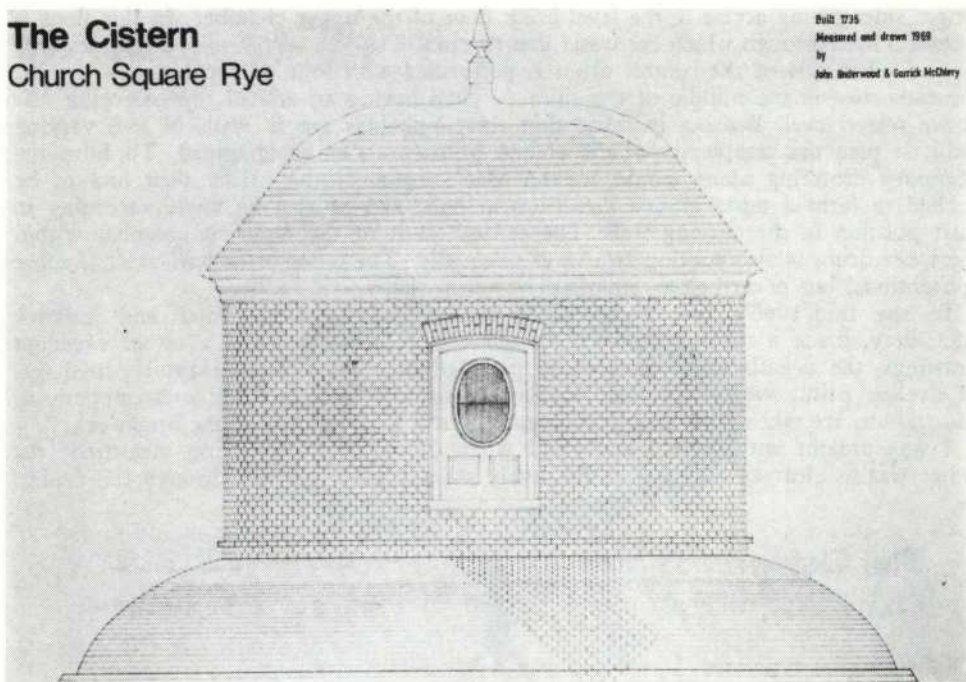
The Cistern Church Square Rye

Built 1735
Measured and drawn 1966
by
John Underwood & Garrick McChlery



The Cistern Church Square Rye

Built 1735
Measured and drawn 1968
by
John Underwood & Garrick McNary



hole illuminated the whole void of the cistern and showed the brickwork both above and below water level to be in immaculate condition after 230 years. The only way to measure the recesses was by swimming with rod and torch in hand and teeth, and although it was summer the water was incredibly cold.

Externally the tower is surmounted by a simple roof curved at both ends and having a central ridge board like the inverted keel of a boat. It is covered with handmade clay peg tiles although it is doubtful if these are the originals; the curved ridge had to be finished with lead for flexibility, and a small finial surmounts the top.

The two doors are nicely detailed with appropriately oval iron grilles let in for ventilation. These must have been significant as the following extract from Geoffrey Bagley's excellent Guide to Rye suggests — after reminding us of the proximity of the butchers trading in Market Street he refers to the Assembly Book of 1754 less than twenty years after the Cistern was built:

"Whereas there have been lately found in the reservoir of water in the Church yard Several Calves feet to the spoil and damage of the said water and indangering the health of the inhabitants of this Town most of whom are supplied. It is Ordered that publick notice be therefore given that a reward of two guineas shall be paid by Mr Henry Pearch Chamberlain of this corporation to such person or persons as shall discover to the Mayor or any one of the Jurats the person or persons who were concerned in throwing such Calves feet into the reservoir immediately on the conviction of such offender or offenders."

Rye Cistern is possibly unique; it is a most sophisticated yet simple design having qualities of great strength and durability — both well proven — and a low liability for maintenance. It is quite beautifully built and thoughtfully detailed in every way; the shape is fascinating and it bears sufficient embellishment to increase its visual interest at close quarters. It most certainly deserves a wider appreciation and whilst it has not been in use for a long time its original function is in no way impaired.

It enjoys protection as a Listed Building of architectural or historic interest as do many buildings in Rye, but I believe it is worthy of a Grade I classification reserved for national monuments, and hopefully the County Planning Officer and the Department of the Environment will consider this in time.

Tokens of Sussex

By JIM NEWMARK

The number of Sussex tokens in comparison with the rest of the country may be small but, nevertheless, they form an illuminating commentary on the life of its people. Tokens were the people's answer to the pressing need for small change — a want neglected by the authorities over prolonged periods.

The earliest known Sussex token of 1650 is from Rye having the sign of the Mermaid. Nearly 200 other tokens of the 17th century are recorded giving names of the issuers, their place of origin and some indication of the trade or profession they followed. This forms an invaluable directory of the calling of the principal inhabitants and of prime interest in the study of local history.



Figure 1. Typical Sussex Tokens.

From the number of tokens issued by the various towns we can assess their relative importance in the mid 17th century. Chichester has 37, Arundel 12, Midhurst and Petworth 11 each, Horsham 10, Lewes 7, Battle 6 and Steyning 5. The coast towns had much smaller numbers with Rye 6, Hastings 1, Bexhill 1, Pevensey 1, Eastbourne 2, Seaford 1, Brighton 5 and Shoreham 1. Caldecott¹ points out that "many more half-pennys than farthing tokens were issued in the second half of the 17th century indicating an increasing prosperity. Harvest wages in 1632 were sixpence a day and rose to eightpence in 1688. But the price of small beer rose from twopence a gallon in 1650 to threepence in 1675, while the stronger ale doubled in the same period from fourpence to eightpence."

The range of the occupations of the issuers show a wide diversity from blacksmiths and cordwainers to weavers, pewterers and stocking makers. There is also a needle-maker, Robert Hitchcock, who was a member of the London Needlemakers' Company in 1674. This is of relevance to the important needlemaking industry in Chichester, which, before the Civil War, employed 40 to 50 people and supported almost 20 families.

Francis Steer² mentions that in 1642 in the eastern suburb of St. Pancras almost every house in the parish was occupied by a needlemaker. Chichester was said to have monopolised the trade of England during the early part of the 17th century giving way later to the cheaper mass produced inferior articles made in Sheffield and Birmingham and produced for less than a third of the price. There were, however, still traces of needlemaking in Chichester as late as 1788. James Dollman was recorded as a needlemaker then and William Scale, the parish clerk of St. Pancras was an active needler in 1783. It is a pity E. Wyndham Hulme³ never lived to complete his paper on the remarkable story of this Chichester industry.

Many of the 17th century Sussex tokens reflect the troubled history of the period. The Cliffe, Lewes token records Mary Akehurst who was imprisoned in Horsham Gaol for her Quaker beliefs. There is a Brighton token of Henry Foster, a distiller. He was witness to the will of Capt. Nicholas Tetttersell in whose vessel Charles II escaped to the Continent in 1651. An Arundel token of 1667 records Alice Charmayne and another of James Morris who was Mayor during the siege of 1642. They both received substantial compensation under the Commonwealth for sufferings from Royal expulsion. A connection with America is shown in the Petworth token of John Washington, whose cousin emigrated in 1657 and was the ancestor of George Washington. In 1670 the last tokens of the century were issued when a Bill was passed suppressing them and a regal coinage of farthings and halfpennies put into circulation.

Not until 1787 did the dam of popular demand for more small change burst through to produce a flood of tokens. These were mainly issued by industrialists at the onset of a new surge of economic expansion. Many thousands of different tokens appeared in localities throughout the country, especially from mining areas, factories, foundries and trading houses. They form a striking source of material indicating the aspirations and thoughts of the new age.

Although Sussex was not as remote as in the 17th century, with its lack of adequate roads, yet the Industrial Revolution had but little impact on its settled existence. About forty recorded tokens of the 18th century are noted in Dalton & Hamer⁴ with Brighton having 11, Chichester 8, Horsham 6, Rye and Winchelsea 3 each, Northiam 2, and Battle, East Grinstead, Eastbourne, Frant and Hastings one each.

The Brighthelmstone halfpenny token of 1796 was issued by W. Mighell, a grocer of 97 North St.,⁵ with the inscription HONOUR THE KING on the obverse. The Mighells were an influential family in Brighton at that period. Phillip Mighell was listed as one of the 17 principal inhabitants and helped form the Volunteer movement. He was founder of the Society for the Protection of Liberty and Property which had among its objects resistance to the ideas of Republicans and Levellers. This was the response to the teachings of Tom Paine, then so influential, and against popular sympathy for the sentiments of the French Revolution. Brighton at that time was ringed by troops — the first contingent arrived in August 1793 and consisted of about 7000 men.⁶ In 1794 this number increased to 15,000 after the harvest was safely gathered in. A year later the grim episode of the Mutiny at Blatchington, near Seaford occurred, with its aftermath of hanging and floggings.

The Camp is recorded in some of the tokens with one showing on the reverse the dreaded Bastille. Mighell is further remembered with the leasing in 1803 to the Prince Regent of part of the land comprising the western lawn of the Royal Pavilion.⁷ He was wealthy enough to entertain over 2000 of the poorest inhabitants of Brighton on the occasion of George III's Jubilee at the Royal Stables (now the Dome) on the 25th October 1809. A recent link with the past was the reported death in Australia in 1955

of Sir Norman Mighell CMG, former Acting High Commissioner for Australia. He was a great grandson of Phillip Mighell.⁸

R. Lashmar, another prominent resident of Brighton is the issuer of a London & Brighton halfpenny token in 1795. This has a view of St. Paul's on the obverse with the arms of the family of Lashmar on the reverse. The insignia is possibly taken from the town seal of Brighton, which was not, however, incorporated until 1854. The issuer was a grocer and draper living at 15 Middle St. Baxters Directory lists a number of the Lashmars including Lashmar, Lashmar & Mugridge of the Brighton & Sussex Bank of 9 St. James St. This bank, preceded in 1805 by the Union Bank was closed in the panic of 1825. Another record of the Brighton Camp is the Winchelsea token of Richard Maplesden. He was a grocer and draper of that town and also caterer for the soldiers in the Camp.

There is a fine painting at the Brighton Art Gallery of the Camp by Francis Wheatley R.A. This nearly went to America but was refused an export license on the grounds of its national importance. £24,000 was paid for the picture in 1973, part of the money by the Treasury Fund and part by personal gifts.

Chichester has a fine halfpenny token of 1794 with the portrait of Queen Elizabeth and on the reverse the Chichester Cross. This was issued by Dally's. Thomas Dally was a lawyer and alderman of the city and wrote several guide books of the locality. The Dally's were a firm of drapers in East St. and five cwts (about 25,000 tokens) were issued — the engraver, Thomas Wyon.

Thomas Chaldecott issued in 1794 a Chichester token conjointly with Sharps of Portsmouth. He was a silversmith and cutler and a member of the Common Council of Chichester in 1803. His benefactions included the donation of a chalice to the Chichester Workhouse in 1796. The token has a portrait of John Howard, FRS, Philanthropist and on the reverse the sun and moon over a castle. A number of other counties honoured Howard in its tokens including Middlesex, Hants, Somerset and Warwickshire. As an ardent prison reformer he was held in high esteem and was frequently consulted when new prisons were being replaced for the old abysmal dungeons. A reference to Horsham⁹ mentions that it "being then an Assize town, it was found necessary to erect a new and more substantial Gaol, and in 1775 one was built on a convenient site east of the town, on a plan approved by Howard the philanthropist." The House of Correction at Lewes was built in 1794 on the plan recommended by Howard and contained 32 cells.¹⁰

Hastings has a token depicting a sloop sailing and the Shield of the town on the reverse side. The issuer was James Tebays, a prominent tradesman who was an auctioneer, appraiser, ironmonger and agent for the Phoenix Office. He may have been the owner of the vessel depicted but this is not verified. We learn from the local records that he and his wife Jane had seven children who were baptised at St. Clement's between 1786 and 1799. Strangely, it is commented, he does not appear to have been admitted to the freedom.

Frant's token of 1794 was issued by G. Ring with a cypher G.R., a crest and a lamb and the inscription 'For the Public Good' on the obverse. The reverse has a shield of arms and Sussex Token Halfpenny 1794. G. Ring appears in the Land Tax Register of 1793, paying rents of £8 p.a. for shops, a field and two houses. Frant in 1803¹¹ had a population of 1090, comprising 532 males and 558 females. In that year they were much concerned with the threatened invasion from across the Channel and 100 men were clothed and armed and took the Oath of Allegiance.

Information about other issuers of 18th century tokens still needs unearthing and would form, no doubt, a useful commentary of the times. It is with the 19th century tokens that more information can readily be found and the names of the issuers are even perpetuated in modern times as those of Caffin, Shipham and Feaist.

Benjamin and James Caffin were hatters, tailors and woollen drapers of East St., Chichester, and they issued a shilling token in 1811 together with J. Redman, W. Halstead and C. Shipham. A number of finely engraved silver tokens were issued by Brighton, Chichester, Rowfant, Shoreham and Steyning around 1811. The Brighton

issuer was J. B. Phillipson, a chemist of 128 St. James St. His brother R. Phillipson is mentioned on the reverse as Druggist of Chichester.

The 5/- silver token of Chichester issued by Hy Comper and B. Charges shows two hands clenched with the inscription UNION TOKEN. Henry Comper was a draper and Charges a harness maker in the town. Shoreham depicts its Church with tower and vane on its shilling token issued by Clayton and Hide. They were grocers and the business was located at the S.W. corner of John St. This was afterwards Tillstones and more recently Aylings.¹² W. Ayling was the issuer of a Midhurst token and he describes himself as a linen and woollen draper, tailor, hatter, tea dealer and agent to the Sun Fire Office. His premises were at West St.

There are three Brighton tokens with views of the Chain Pier. This is shown by the issuer, John B. Walker of Buckingham House, St. James St., a Drapery merchant and owner of a Thread and Lace Warehouse. Another was issued by Saml Francis of 21 St. James St., who had a Drapery and Clothier Warehouse. The Chain Pier was erected in 1823 and blown down in a gale on Dec. 3rd, 1896. The Royal Pavilion is shown on a halfpenny token of 1825, the issuer being Thomas Roff Tamplin, linen, woollen draper and clothier of 28 New Rd.

A shilling token of 1811 was issued by S. Gates and I. Cheeseman of Steyning. There was a Gates' Brewery in Jarvis Lane and the Three Tuns, a tied house belonged to them. R. Gates owned Nos. 40 and 42 High St., in 1835 and Henry Gates lived at No. 38 where the Town Hall was built in his back garden.¹³ The Bill passed by Parliament in 1817 forbade the issue of further copper tokens and those appearing afterwards were mainly of an advertising nature. Many of them are of interest as social commentaries.

Those from Brighton are most numerous. The six recorded Transport tokens depict a pleasure boat, Tilley's Brighton Bussess, (sic) the Brighton & Hove General Gas Co. and Brighton Corporation Tramways tokens for the use of Post Office Staff in uniform of the value of 1d. and ½d. A zinc ticket token is inscribed Directors and Guardians of the Poor — Parish of Brighthelmstone, with 12d. in the centre, whilst others were for the value of 6d. and 1d. These were probably used for value of bread in Parish Relief. Many commemoration medals record musical festivals, exhibitions, the Jubilee and Coronation, Scholastic and anglers awards, amusements and political events.

A number of Continental bronze coins countermarked in England were circulated during the latter end of the 19th century and about ten of them are connected with Sussex. J. Gavin Scott¹⁴ has recorded these series and mentions the names of H. E. Mitchell, saw and tool maker of 12 High St., Brighton, Tilley Bros. corn, flour, seed and coal merchants at various addresses in Brighton, G. Moody — Good Beds at 33 Upper St. James St., M. B. Clift of the Music Warehouse at 4 Gildredge Rd., Eastbourne, and John Feaist of Hastings. Many of these tokens are at the Brighton Museum awaiting display. A reminder of the advertising methods of the Victorian age is the imitation Spade Guinea of Willings. They presented the Clock Tower to Brighton in 1887 to commemorate Queen Victoria's Jubilee. The Company still bears the name of the founder prominent on poster hoardings today.

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Goldstone Pumping Station, Brighton

By JONATHAN MINNS

In the early part of the 19th century Brighton, then a small town, suffered considerably from the lack of a constant pure water supply. This meant that the basic needs for drinking water, sewage disposal, fire protection and baths were simply not being catered for. Between 1800 and 1840 vast social changes were brought about by the Industrial Revolution and the population of Brighton, like that of many other towns, more than doubled in a large range of housing.

Early Proposals

In 1848 the Public Health Act was passed empowering the General Board of Health to investigate conditions throughout the country and to enforce recommendations. In 1849 Mr Edward Cresy, as Superintendent Inspector under the Board of Health visited Brighton and condemned the existing system. At that time this comprised three beam pumping engines, one being built on the Cornish system. These engines totalled 80 horse power and delivered an average of 700,000 gallons daily into a reservoir with a capacity of 2,000,000 gallons. However, the supply was not constant because of leakage and engine failures.

As a result of this, Brighton and District Water Company engaged W. J. M. Rankine, C.E., F.R.S.E., whose scheme, although brilliant, did not attract sufficient support to make it a reality. Another group of promoters engaged James Easton, senior partner in the firm of Easton and Amos, millwrights, engineers and lead pipe manufacturers of the Old Grove Works, Southwark.*

*In 1835 Charles Amos, who was then 30 and engaged at Wandsworth converting iron rolling mills into paper mills, took over the contract to supply another large engine for a further mill in Battersea. This was a rotative engine on the Woolf compound principle and attracted considerable praise and interest at the time. James Easton was very impressed by the technical skill and ingenuity of Mr Amos and this led to their famous partnership and the foundation in 1836 of the firm of Easton and Amos. By 1850 they had gained international prestige designing and installing Woolf compounds in major cities both in England and abroad, work which was to continue for 30 years.

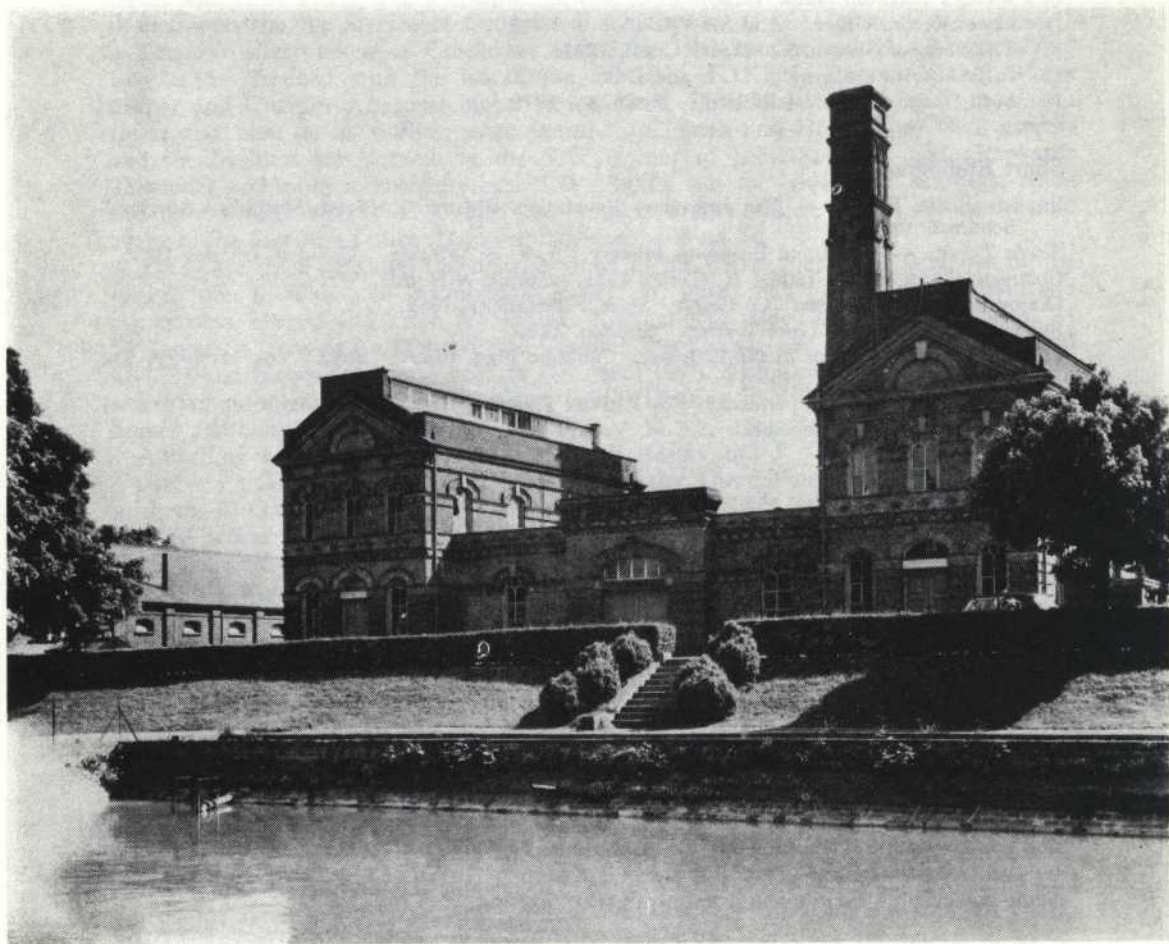


Figure 1. Goldstone Pumping Station.

In 1852 dissension among the Directors of the Brighton Water Company, whose authorised capital of £47,000 had already been expended, led to the formation of the new Brighton, Hove and Preston Constant Service Water Company with an authorised share capital of £60,000.

The new works proposed by Easton and Amos were designed to extend the supply throughout the area, particularly towards the ever increasing residential area of Hove. To achieve this they proposed to increase the pumping capacity at Lewes Road and to build further reservoirs and extend piping.

It was, however, yet another body of gentlemen who, wishing to promote an independent and increased supply, engaged the services of Thomas Hawksley to seek out a new site for a further pumping station. Hawksley, at the age of 51, was already noted for his extension schemes to many existing city supplies. He selected a natural basin in the chalk between Dyke Road and Portslade and, after test bores, recommended Goldstone Bottom. His plans were submitted at Lewes on 30th November, 1858. However, it was not until 1862 that the Water Company finally purchased the $3\frac{1}{2}$ acre site recommended by Hawksley. Edward Easton, who was by that time playing a very active role in his father's firm, put forward the plans for a pumping station with cooling

pond and low service reservoir. In addition two further sites for reservoirs were purchased.

These plans were submitted by Easton, Amos and Sons in 1864 and the Water Company was empowered to raise further capital amounting to £80,000 and a mortgage loan of an additional £20,000.

The Pumping Engines

The design for the No. 1 beam engine of 1866 was the last to be directed by Charles Amos who retired in that year. It has a nominal horse power of 130 at 12 revolutions per minute and lifts water from an oval well 12 feet by 9 feet by 160 feet deep by means of two 33-inch bore by 30-inch stroke bucket pumps producing 150,000 gallons per hour. A high service double-acting plunger and bucket pump delivered the output to the Dyke Road reservoir and a disc-crank-driven middle service pump, added in 1871, delivered water to the new middle service reservoir at the nearby convent and known as the Nunnery reservoir.

The population of Brighton continued to rise and in 1871 the Water Company was taken over by the Corporation with powers to extend the supply to the parishes of Rottingdean, Patcham, Falmer and Hangleton; by 1872 Portslade and Aldrington had also been taken over.

It was therefore decided to double the Goldstone Works and in 1875 the No. 2 beam engine of 150,000 horse power and three new boilers were installed at a cost of £35,000. In this case the middle service pump, driven off the end of the crank shaft, was a vertical plunger and bucket pump mounted in a small pump house adjacent to the main building.

Although similar, there is a marked 'generation' difference in design between the No. 1 and No. 2 engines, the former being much more delicately built and decorated and also using a vacuum governor. No. 2 is not only more powerful but has twin-eccentric Meyer expansion valve gear with a hand cut-off adjustment wheel and a Porter governor. The massive 25 ton flywheel has separate spokes keyed into the knave and the segments forming the rim are bolted to the spokes over load pads which enabled the engine erectors to tone the wheel up during final assembly on site.

Both engines are unique in the South of England.

The Future of Goldstone

The pair of 200 feet high engines at the Goldstone Pumping Station with so rich an engineering pedigree are to be preserved and steamed for generations of future engineers and the increasingly interested general public. Restoration of the building, machinery, boilers and the original steam-driven workshop has begun and by the end of May 1976 will be opened as a permanent museum of science and steam engineering.

The original coal cellars of 1866 will be used for firing the boilers and the 1876 coal store, to which a gallery is being added, will contain some hundreds of 19th century full-size and model engines. These include works by Trevithick, Maudsley, both Stephenson's, Lamb, Restler, Faraday and many other of our famous engineers and they will be displayed to illustrate the incredible story of our prolific engineering heritage.

Full size engines will be steamed and, in order to broaden the spectrum of engineering history, the horizontal Corliss engine with Garnier-Faure, Beaulieu trip which won the 1st Prize at the 1889 Paris Exhibition is to be installed. This engine was found by Jean Paul Delaby near Paris and, like the Goldstone engines, was threatened with immediate destruction by the cutter's torch; it was carefully dismantled and brought to England in December 1975 and will be re-erected in the Exhibition Hall.

Engineering, as begun in this country, quickly became international and the facilities at Goldstone will include not only a centre for the use of local clubs and societies but a base for study and learning available to every level on an international basis.

As an amenity it will be quite unlike anything else in the area and the workshop will be available for the expert renovation of National as well as privately-owned mechanical antiquities.

Field Projects

The carrying out of the surveying, recording and preserving of industrial sites and equipment of industrial archaeological interest is a major activity of an industrial archaeological society, much of the labour being voluntary and making use of the skills and experience of members. The work is, however, extremely interesting and rewarding and the Sussex Industrial Archaeology Society will welcome any assistance, skilled or unskilled, in this field. Financial assistance is also, of course, essential for the purchase of materials and the occasional employment of specialised craftsmen.

PROJECTS COMPLETED SINCE 1974

Park Mill (Bateman's)

This was completed and opened to the public in May 1975. Details are given elsewhere in this issue of the History of the mill (p. 7) and of the work of Restoration (p. 13). The work won a Heritage Year Award in 1975 under the 'Restoration' section.

Newhaven Bridge

The old swing bridge at Newhaven, which carried both road and rail traffic, is due for demolition in the near future. The bridge was opened on the 22nd December, 1866, and continued in use until 1974 when it was superseded by the new swing bridge for road



Fig. 1. Old Newhaven Swing Bridge in Open (access to shipping) Position.

traffic only. The old bridge has been left in the fully open position, i.e. open for river traffic as shown in Fig 1.

The bridge was hand-operated from a capstan in the middle of the roadway which turned a pinion working on a fixed tooth ring. The normal operating team was eight men, four on the locking devices on the east and west ends of the movable part of the bridge, and four on the capstan itself. The usual opening time was seven minutes.

In view of its imminent demolition, the Sussex Industrial Archaeology Society decided to make a detailed photographic record of the old bridge, including its approaches and operating gear, and to supplement these with copies of the early engineering drawings when these can be found in the British Rail Archives.

The photographic survey was made during the spring and summer of 1975 and a print is reproduced here. When making the survey all possible help was received from Mr R. S. J. Martin, the Resident Civil Engineer of British Rail, who supplied a great deal of interesting information about the bridge and arranged access to all parts of it.

It is hoped to publish a detailed article on the history and construction of the bridge in a future number of *Sussex Industrial History*.

East Grinstead Goods Shed

A full survey has recently been carried out of a Victorian Goods Shed and Stables at East Grinstead (TQ 393 384). The town's first railway station, alongside the goods shed, was built in 1855 and still exists as a dwelling house but without the awning and platform. The goods shed and its adjacent stable were built in 1866 and form a fine

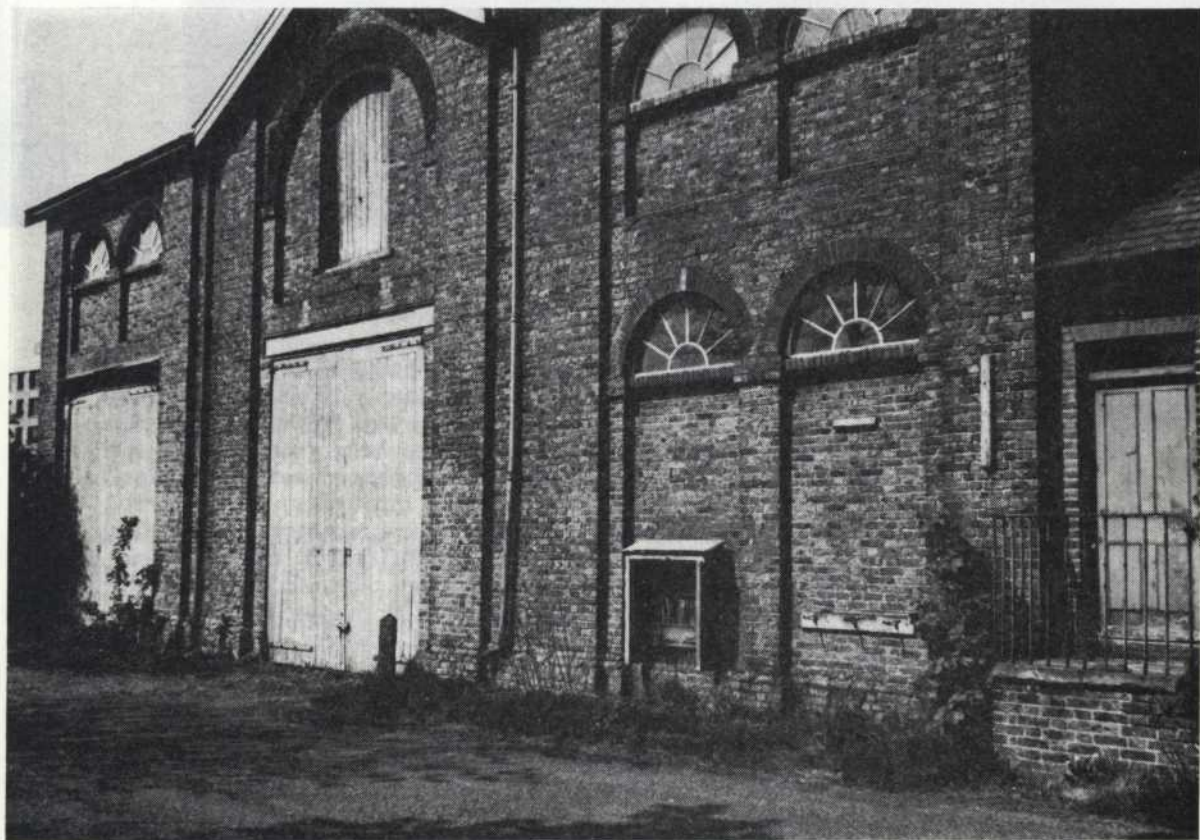


Fig. 3. Exterior of Goods Shed.

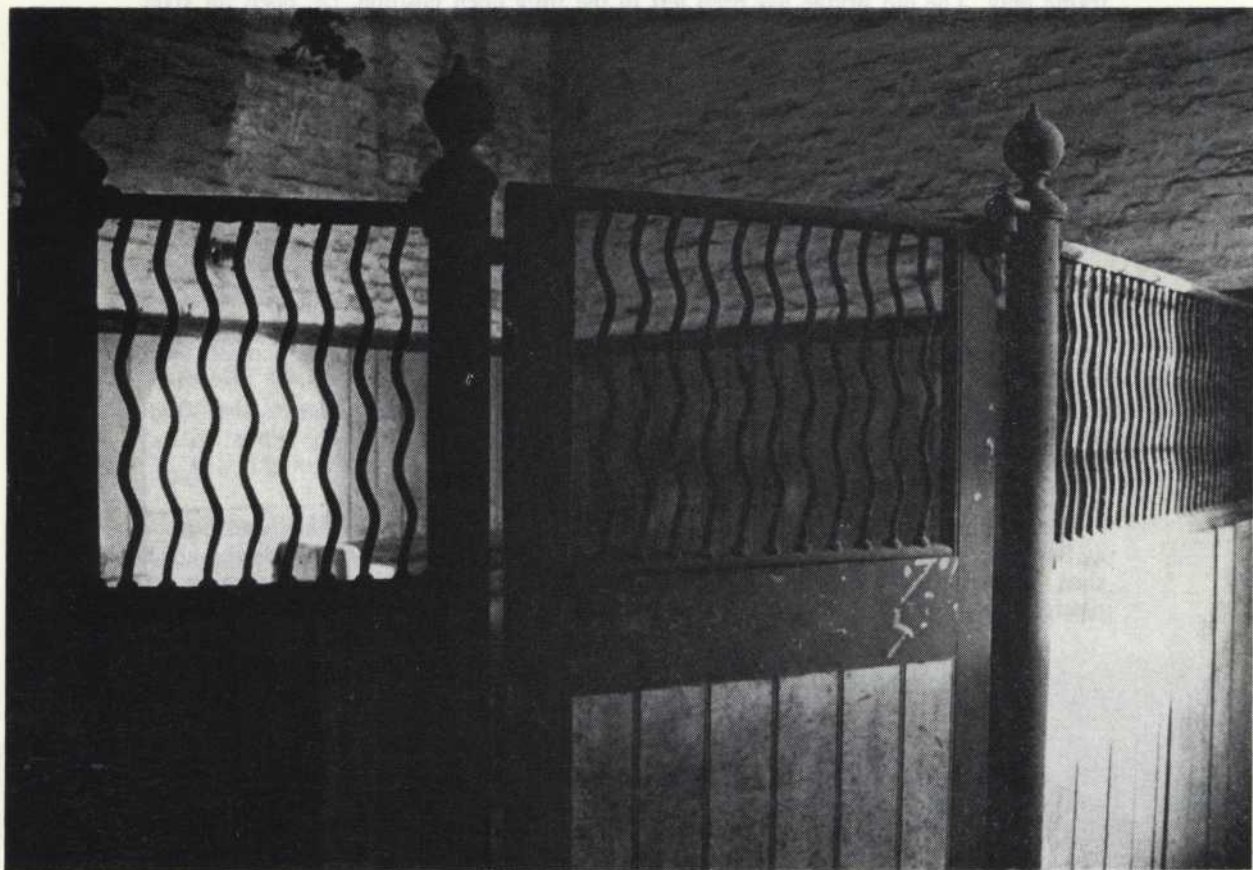


Fig. 4. Iron Grille around Loose Box in Stables.

example of a well-proportioned design (Fig. 3). Brick-built, of two storeys with internal loading bay and through track with double doors, the building typifies Mid-Victorian stock-brick construction. The stable has a very attractive iron grille round the loose-box (Fig. 4) and an interesting wooden lantern on the roof for ventilation. Both buildings would have been well worthy of preservation but unfortunately a slip road to the town's proposed Inner Relief Road impinges on the them and, although it was quite feasible from an engineering point of view to amend the lay-out of the slip road, this was stated to cost a considerable amount and the money was not forthcoming. A full measured and photographic survey has therefore been made by two members of the Sussex Industrial Archaeology Society, A. J. Haselfoot and R. D. Wood, with the object of producing complete architectural drawings which are being prepared by Mr Wood. Copies of the record, when completed, will be deposited with the East Grinstead Society and the West Sussex Record Office.

Dunster's Watermill, Ticehurst (TQ 690323)

A cast-iron pit wheel, a spur wheel and a cast-iron shaft have been salvaged from the mill prior to the submersion of the site in the new Bewl Bridge reservoir. These items have been stored for possible use in future mill restorations.

Hammond's Watermill (TQ 300177)

Prior to the demolition of the mill the pentrough and sluice, the cast-iron hursting, pit wheel, wallower and vertical shaft were removed to nearby Ifield Mill (see below) for storage. Unfortunately the water wheel, which it was intended to remove for storage, was smashed by the demolition contractor before it could be taken away.

PROJECTS IN HAND

Ifield Watermill (TQ 245365)

This mill is being fully restored as an amenity centre to be run by the Crawley District Council. Extensive repairs to the building, including the roof and the reconstruction of the two upper floors, have been completed. Machinery from Hammond's Mill has now been installed and the reconstruction of the waterwheel and launder is in hand.

Coultershaw Bridge Water Pump (SU972194)

Petworth must have been one of the first towns to have a water supply pumped to it. Prior to 1789 a water-wheel driven pump was installed at Coultershaw Bridge on the River Rother with a main to the town, which continued in operation until the 1960s.

The Sussex Industrial Archaeology Society have permission from Lord Egremont to restore the installation to working order and an examination of the machinery has shown that this is feasible. If it can be done economically he will restore the pump house. It is hoped eventually to open the site to the public and this proposal has Lord Egremont's approval in principle.

Restoration will be by voluntary labour recruited from members of the Sussex Industrial Archaeology Society (which has had considerable experience in the restoration of old mills), but it will be necessary to spend about £500 on the purchase of materials, of which £300 is required for timber for the sluice gate and the paddles of the water-wheel.

The machinery consists of a 12' diameter breast-shot water-wheel, 4' 6" wide, the shaft of which is direct coupled to a 3-throw cast-iron crankshaft actuating three long timber beams (pivoted at one end) by means of three wrought-iron connecting rods. Vertical piston rods connected to the outer ends of the beams operate plunger-type pistons working in a triple-barrel cast-iron pump body. The outlet from the pump is provided with stop-valve, non-return valve and air-chamber.

Some 20,000 gallons per day were delivered to Petworth through a 3" diameter cast-iron pipe nearly 1½ miles long which rises 150' to a brick cistern holding 23,000 gallons on Lawn Hill in Petworth Park, also to a cistern and filter in Grove Street, Petworth. From these cisterns water was fed by gravity to Petworth House and Gardens and to various points in the town.

Estate Sawmill, Brightling Park (TQ 686201)

The mill, dating from about 1891 is a good example of Victorian workshop and was originally driven by a 16-foot diameter waterwheel. The mill is still occasionally operated with the saw-bench driven by a tractor. Mr R. H. Wood, assisted by Mr A. J. Haselfoot, has made a survey of the mill in order to produce detailed drawings and assess the possibility of restoration.

Water Pump, Sutton Hall (TQ 440186)

A water pump of unusual design has been located at Sutton Hall, north of Barcombe. The water supply was taken from a lock on the River Ouse and the pump supplied water to the Hall. Although in a bad state of repair it is hoped to restore the machinery and install it in an open-air museum. It has already been dismantled and is awaiting transport to a place of storage.

Cobb's Mill (TQ 275190)

It is hoped to be able to restore to working order this unusual installation of a watermill with a gas engine as an auxiliary drive. The latter is a Tangye single-cylinder horizontal unit of about 25 h.p. fed by a suction gas producer, probably one of the few remaining in the southern counties. Most of the machinery, apart from the waterwheel, is in good repair. The iron waterwheel will, however, need completely new paddles.

Upper Mill, Plumpton (TQ 363148)

Built originally about 1550, Upper Mill is one of three corn mills in this part of its valley and it was completely rebuilt in 1740 which was a time of agricultural improvement leading to greater rural prosperity. The mill is driven by an overshot waterwheel 10 ft diameter and 5 ft wide of cast-iron and sheet-iron construction. There are two pairs of stones, one of which is a Peak stone and the other a French burr. The internal machinery, which is of fairly late construction, is in good condition and, subject to arrangement being concluded for a water supply to be re-directed to the pentrough, it is possible to look forward to another corn mill being brought back to life and activity.

Industrial Archaeology Centre for S.E. England

The Southern Industrial History Centre, a Charitable Trust, hopes shortly to acquire a suitable site for its future activities. The objects of the Trust include the provision and maintenance of a centre in the South East of England for the exhibition to the public of specimens of machinery, equipment, processes and buildings of historical or educational interest. The formation of such a Centre will, it is hoped, provide an organisation and facilities to save threatened examples of our industrial heritage.

A considerable amount of machinery and equipment has already been acquired and is in temporary storage. This includes oil engines, gas engines and gas production plant, 19th Century steam engines, early dynamos and electric motors and the complete equipment of a small 19th Century jobbing iron-foundry. A diesel-driven railway engine and a water-driven water pump are also promised.

The Trust is negotiating with the W. Sussex County Council for a lease of the greater part of Amberley Chalk Quarries, which were recently bought by the County Council to prevent further industrial development in this predominantly rural area. The quarry contains a series of early 20th Century lime kilns which it is intended to restore and which will then form the nucleus of an exhibition covering the quarrying and processing of chalk. There are also the remains of the old railway sidings which served the quarries and which, if restored, could form an interesting and useful transport system inside the Centre, although they are no longer connected to the main line track. Some buildings also remain which can usefully be converted for storage, workshop and office accommodation.

The Sussex Industrial Archaeology Society, the Weald & Downland Open Air Museum and the Worthing & Southern Counties Historical Vehicles Group are all supporting the Trust and working in close co-operation with it.

- A few copies of the above issues are available from the Hon. General Secretary, price £1.00, including postage. Copies are also available in the Reference Sections of the chief Sussex Public Libraries.

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