SUSSEX MILLS

Windmill Sweeps in Sussex and Kent
Alfriston Tower Mill
Earnley Mill
Isfield Water Mills
Duncton Mill

Price £4.25

2009

SUSSEX MILLS

The Sussex Mills Group

CONTENTS

Cover illustration—Earnley Windmill c.1905 (Peter Hill Collection)

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FOREWORD

It was in 1998 that the feasibility of the formation of a group of enthusiasts entirely devoted to the study, restoration and preservation of the mills of Sussex was first mooted. Now, as we approach the 21st anniversary of the formation of that Group, the invitation to write a foreword for this Journal gives me an opportunity to acknowledge the successes and achievements that have been made.

It was the 'patriarch' of our Sussex mills, Frank Gregory, who was to inspire others to form a group that could halt the insidious process of decay that was rapidly causing so many of these monuments to our industrial heritage to disappear from the landscape. In conjunction with the already well-established Sussex Industrial Archaeology Society, the 'blue print' was drawn up and with Frank at the helm as our Chairman the group was inaugurated. Already several of the mills had formed their own volunteer group and were endeavouring to return their mill to her former glory. Now came the opportunity to seek advice and to share knowledge and expertise with other members at regular meetings.

Gradually, with much attention to detail and many hours of dedicated volunteer work, both water and windmills began once more to enhance the landscape. Some have been restored to working order, producing flour whenever conditions are suitable and volunteers available, whilst others have been restored as static museums, displaying a wide variety of milling related artefacts which otherwise would have long been relegated to the scrap yard. Leaflets have been published and doors opened, encouraging the public to visit and step back in time to marvel at the ingenuity of our forefathers and enjoy the experience of seeing how stone-ground flour for our daily bread was produced. Schoolteachers, amongst those visitors, realised that here was an opportunity for their pupils to see at first hand how cogs and gears, forces and motions and the power of water and wind could be harnessed to turn the enormous millstones and other essential machinery. Many features of milling fit well with the National Curriculum and demonstrate the early technology that was in use for over 1,800 years before the advent of the Industrial Revolution. And so, thanks to the tremendous enthusiasm of our volunteers, the art and skills of milling have been brought back to life once more for all to enjoy.

However, not all the work has been hands-on and following the example set in the first half of the twentieth century by H. E. S. Simmons, a mills researcher 'extraordinaire', some of the members have carried out their own research into the history and location of those mills which have long since disappeared into obscurity, remembered only on local maps as 'Mill Lane', 'Mill Field', etc. One such is Bob Bonnett to whom we owe a deep debt of gratitude, for it was he who pursued the possibility of publishing the results of these researches as a Journal. Now thanks to sponsorship by S.I.A.S. that possibility has become reality. Twenty-one years ago, under Frank Gregory's chairmanship, members of the group were encouraged and enthused to preserve our mills for posterity, I am honoured and proud to follow in his footsteps and I sincerely hope that those who read this publication will be similarly inspired.

Peter Hill
Chairman, Sussex Mills Group

WINDMILL SWEEPS IN SUSSEX AND KENT

Michael Yates

Introduction

The windmill was once a very common sight in Sussex and Kent and over three hundred of them are recorded in photographs covering the period from the mid nineteenth century to the 1920s. We are all very aware that the sweeps of these were an extremely important part of the mill machinery and that a mill working with its full complement of sweeps is an object of great beauty and a potent reminder of a past now long gone.

Perhaps we are not so aware of the large variety of sweep designs that occur across the South East of England, a subject that is usually treated briefly in the published literature. For example, Martin Brunnarius, in his book *The Windmills of Sussex*, mentions variations such as common, single and double shutter spring and patent sweeps but rarely ventures into giving any details about their design. Rev. Peter Hemming, in *Windmills in Sussex*, gives only a brief mention of sweep types and William Coles Finch, in *Watermills and Windmills*, in his survey of Kent windmills, follows a similar pattern.

A detailed study of the 250 or so photographs that record the mills of Sussex and Kent as they were at the end of their working life shows many variations in sweep design and it is probable that over twenty different types existed. This paper attempts to detail these design features and considers the distribution of sweep types and compares and contrasts these on the three mill types, post, smock and tower, within and between the two counties. For interest, brief comparisons are made with windmills in Surrey and Norfolk. Consideration is also given as to whether local pockets of similar sweep design can be found indicating the influence of a local millwright.

Distribution of Mill and Sweep Types

Before considering the variations in sweep design in detail, it is perhaps of benefit to mention the distribution of mill types across the two counties. Based on the photographic records of the working mills, the following patterns are noted:

Mill type	% distribution	
	Sussex	Kent
Post	48.2	12.2
Smock	34.8	78.9
Tower	17.0	8.9

Table 1—Distribution of Mill Types

It is immediately obvious that, whereas in Sussex the post mill tended to be the favoured type, Kent was very much a county in which the smock mill dominated. Neither county contained many tower mills unlike Norfolk, for example, where 80% of its corn windmills were tower.

If we now extend the comparison to the sweeps found in the two counties, using the five main variations noted in design, the table below can be postulated:

Sweep type	% distribution	
	Sussex	Kent
Common	12.0	14.1
Common/Spring	5.6	5.7
Common/Patent	0.9	4.1
Spring	30.6	29.5
Patent	50.9	56.6

Table 2—Distribution of Sweep Types

This table shows that some small differences are apparent. Kent millers tended to favour patent sweeps whilst Sussex millers still had quite a marked preference for the common type. However, the differences are so small that their significance is, perhaps, questionable. Again for comparison 97.5% of sweeps on Norfolk corn windmills were of the patent type.

Sweep Construction.

Let us now consider the construction of sweeps in general terms. The oldest sweep found on windmills is the common or cloth type. This consists of sail bars set across the sweep and mortised into or through the whip. These bars are fixed to a hemlath, a timber length that runs up the sweep at its driving side. Additionally, one or two uplongs are fitted behind the sail bars on the driving side and divide the sweep into two or three sets of lattice sections.

The sail bars can pass through the whip to give a narrow lattice framework with a further hemlath on the leading edge. There is an iron rod at the inner end of this lattice and the canvas cloth used to cover the sail bars is fitted onto this. The lattice framework on the leading edge either runs along the length of the sweep or it has part leading boards or full leading boards covering it. On all common sweeps, the sail bars are mortised through the whip at varying angles from tip to inner end to give the required angle of weather.

Shuttered sweeps are of a more complex construction. They too have sail bars mortised through the whip at varying angles as on the common type, thus creating the desired angle of weather. There is a hemlath on the driving side and if the sail bars pass through the whip, there is one on the leading edge. There are no uplongs on shuttered sweeps. The sail bars divide the sweep into bays and each bay carries pivoted or hinged shutters that automatically open or close depending on wind speed. Each bay carries two, three or four shutters. Each shutter is connected to a shutter bar by an iron crank and the shutter bar itself is connected to the spring on a spring sweep or to the spider on a patent one.

The number of bays can vary from as low as six to as high as fourteen. Shuttered sweeps are either single, when they have bays on the driving side only or double when there are bays on both the leading edge and driving side. Single shuttered sweeps are found both without leading boards and with full length leading boards along the whip. Double shuttered sweeps can have sail bars along the complete leading edge or can have a variable number of bays covered with leading boards. A mill like Rock Mill, Washington had double shuttered patents with fourteen bays of three shutters each on either side of the whip, giving a total of three hundred and thirty-six shutters.

For the majority of mills in Sussex and Kent with double shuttered spring or patent sweeps, the bays are much narrower on the leading edge than on the driving side. However, two Kent mills, Keston and Prospect Hill Mill, Frindsbury, had double shuttered patents with almost equal sized bays on both sides of the whips. This latter type of sweep is widely found on Surrey mills and almost universally on the corn mills of Norfolk.

Sweep Types in Sussex and Kent

The previous section gives a general introduction to the variations noted in sweep construction. Here a more detailed survey of types is given. Figures 1 and 2 show the main construction techniques noted during this survey. It must be emphasised that these drawings are only intended to show sweep differences and they are not drawn to scale nor do they show the angle of weather. They are schematic only.

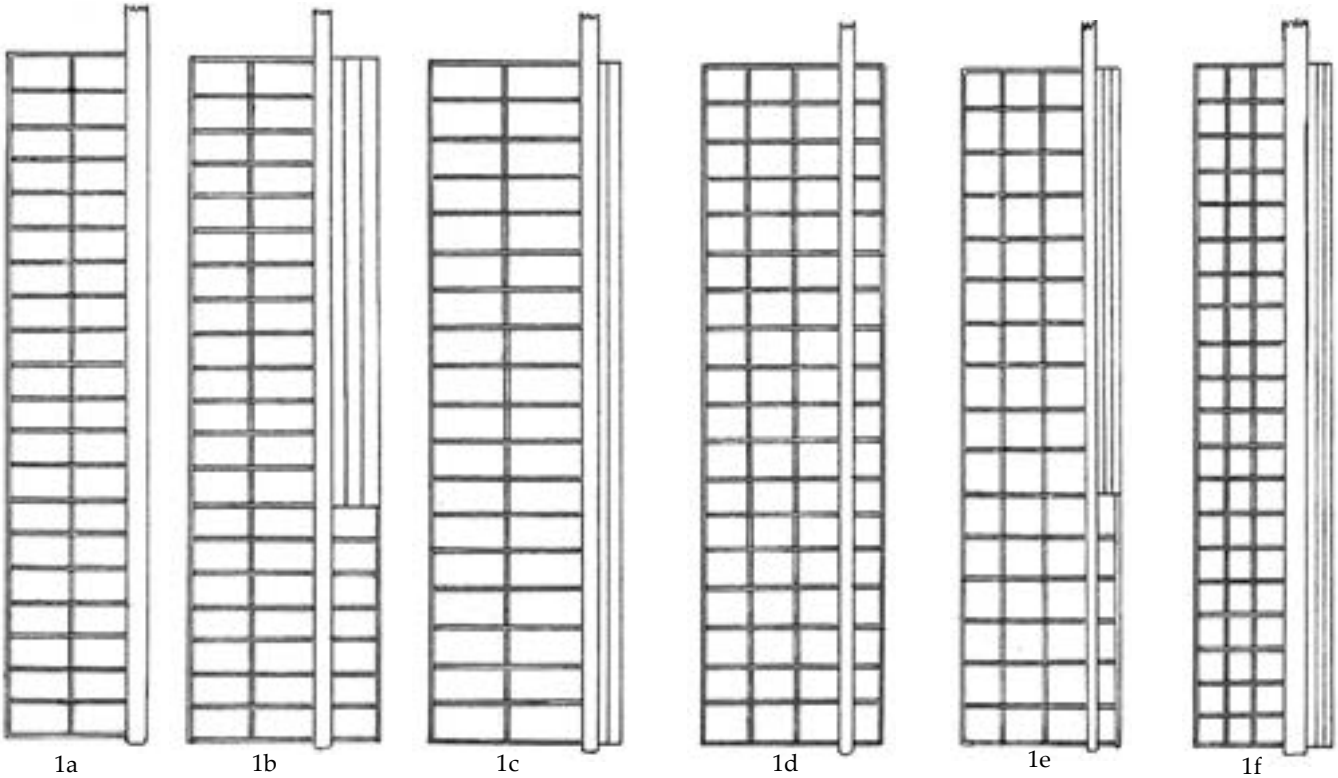

Fig. 1 Common Sweeps

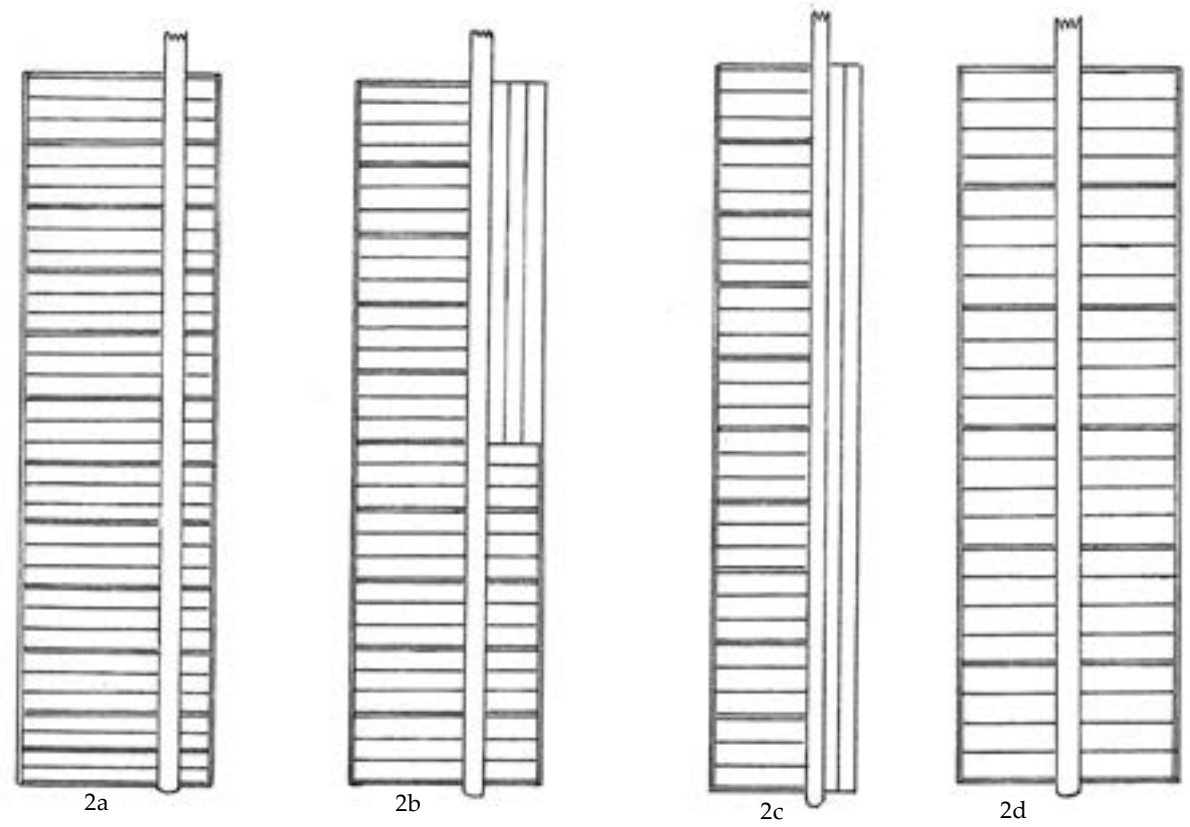

Fig. 2 Shuttered Sweeps

Figure 1 shows common sweeps. In 1a, the sweep has sail bars, a hemlath and one uplong on the driving side. There is no extension of the sail bars onto the leading edge. A c.1910 photograph of Throwley smock mill in Kent shows it had sweeps of this type. 1b shows sail bars and hemlath on both the trailing and leading edges. Again there is only one uplong and the leading edge is boarded as far as the fourteenth sail bar and is then open bayed. Winchelsea post mill had sweeps of this type in the early 1900s. The common sweep in 1c has sail bars, a hemlath and one uplong on the driving side whilst the leading edge is fully boarded. The post mill at Brenzett in Kent had one pair of sweeps of this type in about 1905-10. A slightly larger common sweep is shown in 1d. Here there are two uplongs on the driving side and full sail bars and a hemlath on the leading edge. High Salvington post mill carried one pair of this design at the end of its working life. 1e again shows a sweep with two uplongs on its driving side whilst the leading edge is boarded as far as the eleventh sail bar and is then open bayed. A photograph from the late nineteenth century shows East Grinstead post mill had one pair of sweeps of this type. The smock mill at Earnley had a pair of common sweeps with sail bars, a hemlath and two uplongs on the driving side and full leading boards on the leading edge and this type is shown in 1f.

Figure 2 depicts shuttered sweeps, either spring or patent. 2a shows the first of the double shuttered sweep types found in Sussex and Kent. There are ten bays with three shutters per bay and two bays with two shutters per bay on both the trailing and leading edges. The post mill at Kingston, Lewes had two pairs of spring sweeps of this type in about 1900-1905. 2b shows a double shuttered sweep with boards on the leading edge over the first five bays. There are three shutters per bay except on the inner bay where there are four. This pattern is found on Bodle Street Green post mill in c.1900 and was again of the spring type. 2c depicts what is probably more correctly called a single shuttered sweep with boarded leading edges. A pair of this type was in use on Blackboys post mill, c.1905-10 and was of the spring type. A rare type of sweep in the south east is shown in 2d. It is double shuttered with bays of equal width on either side of the whip and stock. This six bay design was almost certainly in use on Keston post mill, Kent in the late nineteenth century. One of the pair of mills that stood at Prospect Hill, Frindsbury also had this type of double shuttered sweeps with nine bays. Keston and Frindsbury both had patent sweeps.

Common Sweeps

Table 2 showed that 12% of Sussex windmills and 4.1% of those in Kent had two pairs of common sweeps. In general these were matching pairs and therefore these would have presented no major problems with balancing them to minimise the transmission of stress to the windshaft. These mills are listed in Appendix 1. For some, however, each pair was different to such an extent that there would have been difficulties in balance (Appendix 2). North End Mill at East Grinstead had one pair with nine bays whilst the second had sixteen and Arundel Cement Mill had one pair with fourteen and one pair with seventeen bays.

When the combinations, common/spring and common/patent are considered, 9.8% of Kent mills were of these types against 6.5% in Sussex (Appendix 3). Again balance problems must have resulted that needed to be corrected.

Variations in the Number of Bays on Shuttered Sweeps

It was mentioned above that the number of shutter bays per sweep could vary from six to fourteen. Table 3 shows the percentage distribution of the number of bays per sweep for the two counties, Sussex and Kent:

Number of Bays per Sweep	% distribution	
	Sussex	Kent
6	-	2.8
7	2.6	6.1
8	16.1	14.8
9	15.2	25.9
10	19.1	22.7
11	23.3	18.5
12	16.1	7.4
13	4.1	1.9
14	3.6	-

Table 3—Distribution of Shutter Bays

This distribution results in an average number of bays per sweep of 10.3 for all Sussex windmills and 9.5 for all Kent windmills.

If now the number of bays per sweep is further broken down and the three types of mill are considered, the following average values are recorded:

Type of Mill	Average number of bays per sweep	
	Sussex	Kent
Post	10.1	8.9
Smock	10.4	9.8
Tower	10.9	9.4

Table 4—Average number of bays per sweep by Mill Type

When these values are subjected to a statistical analysis, the conclusions below can be drawn:-

(i) The following average values for the number of bays per sweep are statistically significantly different:

(a) All Sussex mills (10.3 bays) and all Kent mills (9.5 bays)
(b) Sussex post mills (10.1 bays) and Sussex tower mills (10.9 bays)
(c) Kent post mills (8.9 bays) and Kent smock mills (9.8 bays)
(d) Sussex post mills (10.1 bays) and Kent post mills (8.9 bays)
(e) Sussex smock mills (10.4 bays) and Kent smock mills (9.8 bays)
(f) Sussex tower mills (10.9 bays) and Kent tower mills (9.4 bays).

(ii) The following average values for the number of bays per sweep are not statistically significantly different:

(a) Sussex smock mills (10.4 bays) and Sussex tower mills (10.9 bays)
(b) Sussex smock mills (10.4 bays) and Sussex post mills (10.1 bays)
(c) Kent post mills (8.9 bays) and Kent tower mills (9.4 bays)
(d) Kent smock mills (9.8 bays) and Kent tower mills (9.4 bays).

This suggests that there was little contact or exchange of ideas between Sussex and Kent millwrights and that sweep design and improvement continued independently in the two counties. It also suggests that while in Sussex there was a gradual increase in sweep size from post to smock to tower mill, in Kent it was the smock mill that had the largest sweeps with the post and tower mills being very similar.

It is worth pointing out, at this stage, that Norfolk corn windmills averaged 8.3 bays per sweep, a much lower value than either Sussex or Kent.

Some Anomalies in Shuttered Sweep Combinations

In general, for shuttered sweeps, it was usual for both pairs on a mill to be identical. Among the Sussex mills, there are probably fourteen anomalies (12.5%) in design such that the weight distribution and thus the balance varies significantly between the two sweeps (Appendix 4). Typical of this is Jill at Clayton who, in about 1895-1900, had one pair of patents with ten bays and thirty-one shutters whilst the other had twelve bays with twenty-four shutters. Under circumstances such as this, there would be a need to ensure that the sweeps were balanced so that undue stresses were not transmitted to the windshaft. Another classic example is Ballard's Mill, Patcham, where two totally different pairs of sweeps can be seen (see Major and Watts, *Victorian and Edwardian Windmills and Watermills*). One can only speculate about the reasons for these anomalies as it seems unlikely that any good millwright would have deliberately made such large differences between pairs of sweeps in view of the associated balance problems. A possible explanation is that one of the pairs came from another mill no longer in use when a replacement was necessary.

The number of sweep anomalies in Kent is smaller, with only ten (8%) being recorded. Black Mill at Headcorn is one of the most notable of the Kent mill anomalies. This mill had one pair of double shuttered patents with leading boards and eleven bays of three shutters and one pair of double shuttered patents with eight bays of three shutters. The post mill at High Halden had one pair of sweeps with eight bays and twenty-four shutters whilst the second pair was made up of one sweep of eleven bays and thirty-three shutters and one of eight bays and twenty-four shutters, It is suggested that this is firm evidence that sweep replacement using one or two sweeps from a disused mill was practised.

Discussion

Richard de Little, in his *Windmills of England*, comments "There is a great deal of tradition involved in sail design and it is possible to place a sail accurately to a given area after a careful study of its layout and proportions". This implies that given areas of the country have traditional styles of sails (sweeps).

This detailed study of the windmills of Sussex and Kent has shown that there is a very large variation in the design of sweeps in these counties, but does indicate that in certain small areas the influence of a local millwright can be seen. One such area in Sussex shows this type of influence and the mills here include :-

Wicken's Mill, The Dicker, Golden Cross,
Hoad's Mill, Bexhill,
Punnetts Town Corn Mill,
Baldstow,
Staplecross,
Stone Cross,
Cowbeech,
Summerhill Mill, Warbleton,
Polegate,
Windmill Hill, Herstmonceux (possibly).

These all have double shuttered patent sweeps with part leading boards, eleven bays and three shutters per bay. The nine mills lie in an area of about 22.5km west to east and 18.5km south to north, an area of a sufficiently small size to suggest the work of one local millwright. However, it should be emphasised that other mills in this area have different sweep configurations suggesting that other millwrights were at work as well.

Further, in West Sussex there is a group of five post mills all with common sweeps with two uplongs and leading boards that stood in close proximity, namely:-

Storrington,
Sullington,
Heene Mill, Worthing,
Broadwater Mill, Worthing,
High Salvington.

This grouping again suggests the presence of a local millwright.

It is difficult to find further large groups of this sort in Sussex because of the very large variations noted across the county in sweep types and the number of bays per sweep. For Kent, no distinctive groupings of mills have been noted.

In general, with common sweeps, the type with two uplongs and boarded leading edges is mainly restricted to West Sussex whilst in East Sussex and Kent, only one uplong is used on all mills with the exception of Nutley and Chillenden. Single shuttered spring and patent sweeps are rare throughout Sussex and Kent, but double shuttered spring and patent sweeps with part boarded narrow leading edges are common, the latter style, I suggest,

being best described as one and a half shuttered.

The true double shuttered sweeps are only found in Kent at Keston and at Prospect Hill, Frindsbury and there are none recorded in Sussex. Interestingly, if the mills of Surrey are considered then the true double shuttered sweeps were present on:-

Coulsdon post mill,
Outwood post mill,
Reigate Heath post mill,
Shellwood post mill, Leigh,
Tadworth post mill,
Wimbledon Common hollow post mill,
Cranleigh smock mill,
Ockley smock mill,
Shirley tower mill,
Ewhurst tower mill.

As was said before, 97.5% of the sweeps in Norfolk were of the double shuttered patent type.

Perhaps one could argue, as de Little does, that it is possible to place a sail (or sweep) accurately but it appears from the evidence presented here that the area in which it can be placed with any degree of certainty is probably as large as that of Kent and Sussex.

Conclusions

The main outcome of this study has been to show how varied the design of windmill sweeps was in Sussex and Kent at the end of their working life. Some twenty types of basic sweep design have been noted and this number increases significantly if the number of bays per sweep is taken into account. In spite of their proximity, the mills of the two counties show significant differences in shuttered sweep design with those in Kent tending to be smaller than in Sussex. If the number of shutter bays is taken as indicating the length of the sweep then in Sussex the post mills had the shortest with those of the tower mill being the longest. In Kent, however, although the post mill still had the shortest sweeps, those of the smock mills were longest. Also the shuttered sweeps of all three mill types, post, smock and tower, were significantly longer in Sussex than they were in Kent. For the mills with common sweeps, there tended to be a division (with some exceptions) between West Sussex on the one hand and East Sussex and Kent on the other. These primary conclusions suggest that there was little communication or exchange of technical details between the millwrights of Sussex and Kent.

Small pockets of mills with similar sweep design are noted around Worthing and in an area of East Sussex covering the coastal strip stretching from just west of Eastbourne to Hastings and inland from Golden Cross to Staplehurst. These groups are evidence that support the possibility of the influence of a local millwright. Generally though, there are such major variations in design that it is difficult to assign them to a single millwright.

Richard de Little's contention that "it is possible to place a sail accurately to a given area after a careful study of its layout and proportions" is not a reality confirmed by the findings of this study . In general, it is possible to define a sweep from Sussex and Kent as being predominantly one and a half shuttered patent or spring but they do show a wide variation in the number of shutter bays and length of leading boards. Perhaps these could be described as typical of the South East, but to narrow the area down further is a near impossibility. The mills of Norfolk, used for comparative purposes in this paper, can be said to be predominantly double shuttered patents and this could be the defining sail for this county. Even so, double shuttered patents are predominant in Suffolk and Lincolnshire as well and de Little's contention is not borne out here, unless, for example, the way the sail is attached to the windshaft is taken into consideration.

Whatever final conclusions are drawn about sweep design in Sussex and Kent, one cannot but have considerable admiration for the millwrights without whose skill and ingenuity the windmill sweeps would not have continued for so many years as one of the two main power sources driving the machinery that was used to produce flour for our bread.

Appendix 1—Sussex and Kent Windmills with Balanced Common Sweeps

(a)	Felpham, Black Mill	?
(b)	Storrington	17 bays, 2 uplongs, leading boards
(c)	Sullington	18 bays, 2 uplongs, leading boards
(d)	Walberton, Mark Luxford's Mill	?
(e)	Worthing, Heene Mill	19 bays, 2 uplongs, leading boards
(f)	Bolney	18 bays, 2 uplongs, leading boards
(g)	Brighton, Hodson's Mill	?
(h)	Bognor, Black Mill	15 bays, 1 uplong, leading boards
(i)	Halnaker	18 bays, 1 uplong, leading boards
(j)	Rolvenden	19 bays, 1 uplong, leading boards
(k)	Bluebell Hill	19 bays, 1 uplong, leading boards
(l)	Cranbrook Common	20 bays, 1 uplong, leading boards
(m)	Doddington	17 bays, 1 uplong, leading boards
(n)	Hildenborough	19 bays, 1 uplong, leading boards

Appendix 2—Sussex and Kent Windmills with Unbalanced Common Sweeps.

(a)	East Grinstead, North End	9 and 16 bays, 2 uplongs, leading boards
(b)	Nutley	17 bays with 1 uplong, 21 bays with 2 uplongs, leading boards
(c)	Arundel Cement Mill	14 and 17 bays, 2 uplongs, leading boards

Appendix 3 Sussex and Kent Windmills with Common/Shuttered Sweeps.

(a)	Coolham	16 bays, 2 uplongs, leading boards, spring
(b)	High Salvington	17 bays, 2 uplongs, leading boards, spring
(c)	Winchelsea	20 bays, 1 uplong, leading boards, spring
(d)	Worthing, Broadwater	16 bays, 2 uplongs, leading boards, spring
(e)	Earnley	19 bays, 2 uplongs, leading boards, spring
(f)	Heathfield, Broad Oak	20 bays, 1 uplong, leading boards, spring
(g)	Punnetts Town Corn Mill	17 bays, 2 uplongs, leading boards, patent
(h)	East Wittering	20 bays, 2 uplongs, leading boards, spring
(i)	Ash	17 bays, 1 uplong, leading boards, spring
(j)	Biddenden, Paul Sharpes	19 bays, 1 uplong, leading boards, spring
(k)	Brenzett	18 bays, 1 uplong, leading boards, spring
(l)	Chillenden	14 bays, 2 uplongs, leading boards, spring
(m)	West Kingsdown, Old Mill	19? bays, 1 uplong, leading boards, spring
(n)	Elham	7 bays, no uplongs, leading boards, patent
(o)	Folkestone, Ashley Mill	17 bays, 1 uplong, no leading boards, spring
(p)	Lymynge, Black Mill	? /patent
(q)	Meopham	19 bays, 1 uplong, leading boards, patent
(r)	Northfleet, Five Ash	22 bays, 1 uplong, leading boards, patent
(s)	Throwley	20 bays, 1 uplong, no leading boards, spring
(t)	West Kingsdown Smock	23 bays, 1 uplong, leading boards, patent

Appendix 4 Shuttered Sweep Anomalies for Sussex and Kent Windmills.

(a)	Burwash, Rockhill Mill	10 bays/30 shutters and 9 bays/27 shutters
(b)	West Blatchington	11 bays/32 shutters and 10 bays/30 shutters
(c)	Chailey	9 bays/36 shutters and 10 bays/35 shutters
(d)	Ore, Black Mill	10 bays/29 shutters and 8 bays/23 shutters
(e)	Peasmarsh	7 bays/28 shutters and 9 bays/36 shutters

(f)	Rye	8 bays/32 shutters and 9 bays/27 shutters
(g)	Polegate	10 bays/29 shutters and 11 bays/33 shutters
(h)	Stone Cross	10 bays/30 shutters and 11 bays/33 shutters
(i)	Clayton, Jill	10 bays/31 shutters and 12 bays/24 shutters
(j)	Dallington	12 bays/36 shutters and 9 bays/36 shutters
(k)	Littlehampton, Arun Mill	12 bays/24 shutters and 10 bays/29 shutters
(l)	Eastbourne, Hurst's Mill	11 bays/33 shutters and 11 bays/44 shutters
(m)	Patcham, Ballards Mill	1 sweep with18 shutters and 9 bays/25 shutters
(n)	Warbleton, Summerhill Mill	10 bays/30 shutters and 11 bays/33 shutters
(o)	Lydd	8 bays/32 shutters and 7 bays/28 shutters
(p)	Eastry	8 bays/23 shutters and 8 bays/24 shutters
(q)	Egerton	8 bays/24 shutters and 10 bays/30 shutters
(r)	Harbledown	9 bays/27 shutters and 9 bays/27 shutters
(s)	Headcorn, Black Mill	11 bays/33 shutters and 8 bays/24 shutters
(t)	High Halden	1 pair 8 bays 24 shutters and one unmatched pair of 11 bays/33 shutters and 8 bays/24 shutters
(u)	Wittersham, Stocks Mill	10 bays/30 shutters and 9 bays/34 shutters
(v)	Rodmersham	8 bays/24 shutters and 9 bays/27 shutters
(w)	Ospringe	9 bays/27 shutters and 10 bays/30 shutters
(x)	Westwell, Tutt Hill Mill	8 bays/24 shutters and 6 bays/24 shutters

The Sussex mills at Rye, Polegate, Stone Cross, Dallington and Warbleton, Summerhill Mill all had different lengths of leading boards on the two pairs of sweeps.

Punnetts Town Sawmill had narrow leading boards on the inner end of the sweeps and four wider bays of four shutters on the leading edge. The driving side had six bays of three shutters per bay and one bay of two shutters at each of the inner and outer ends.

On the Kent mills at Eastry, Egerton, Headcorn, White Mill, Harbledown, Ospringe and Westwell, Tutt Hill Mill, there were different length leading boards on each of the two pairs of sweeps.

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3. William Coles Finch, *Watermills and Windmills*, (C. W. Daniel 1933)
4. J. K. Major and M. Watts, *Victorian and Edwardian Windmills and Watermills* (Batsford 1977)
5. Richard de Little, *The Windmills of England* (Colwood Press 1977)

The illustrations used in this article are all taken from postcards or photographs in the author's collection.

Fig. 3 North End Mill, East Grinstead, from a c.1890 photograph. The common sweeps are of an unbalanced design.

Fig. 4 Clayton Mills from a c.1900 photograph. Jill has unbalanced sweeps.

Fig. 5 High Halden Mill, Kent from a c1915 Wells Series postcard. Three of the spring sweeps are identical but the fourth is a later replacement.

Fig. 6 Hoad's Mill, Bexhill from an undated postcard published by Wisemann Homer. Hoad's Mill was one of the group of mills with identical patent sweeps that stood in the Eastbourne/Hastings area.

Fig. 7 Sullington Mill from a c1905 postcard showing the common sweeps typical of the area around Worthing.

Fig. 8 Winchelsea Mill from a c1905 postcard published by A. H. Homewood, Burgess Hill. This shows one pair of common and one pair of spring sweeps.

Fig. 9 Broad Oak Mill, Heathfield, pre 1890, from a c1905 postcard published by Isaac Mockford, Broad Oak showing a common and shuttered sweep combination.

Fig. 10 West Chiltington Mill from a c1910 postcard published by F. Douglas Miller. This was a smock mill with balanced double shuttered spring sweeps.

Fig. 11 Barnham Mill from a pre 1905 postcard with no publisher's name. Barnham tower mill had two pairs of balanced double shuttered sweeps.

ALFRISTON TOWER MILL

Bob Bonnett

In the past Alfriston had two windmills. A post mill on the outskirts of the village is shown on the 1845 Tithe Map as is Alfriston Tower Mill, situated a quarter of a mile to the south west of Alfriston, which still remains. Two post mills, often mistaken for Alfriston mills, have stood on a site one mile to the south west of Alfriston: Berwick 'old' Mill blown down in a gale on 8 January 1735, and Berwick 'new' Mill destroyed by fire during a violent gale on 8 March 1881.

The photograph below (fig. 1) shows Alfriston Tower Mill today. It was converted in 1910 to residential use and now has a modern extension.

In 1834 land called 'Rabbit Bank', owned by John Bell and John Tilson, was leased to Richard Saxby for 99 years at a ground rent of £5 per annum for the purpose of building a mill. A tower mill was soon built (Alfriston Tower Mill) as *The Sussex Advertiser* of 27 October records:

> "To be let and entered upon immediately, a newly erected fan-tailed Windmill, working two pairs of stones, close to the town of Alfriston, Sussex. For further particulars and to view mill apply to Mr. W Dray, Alfriston."

It appears that no one took up the let and from the tone of the advertisement in *The Sussex Advertiser* of 19 January, 1835, the lease holder was becoming a little anxious:

> "To be let or sold and entered upon immediately. A newly erected fan-tailed Windmill, working two pairs of stones, with gear etc. complete, most eligible situated for business, close to the town of Alfriston, Sussex. For further particulars and to view mill apply to Mr. W Dray, Alfriston."

A sale notice for the mill was placed fifteen months later than the original advertisement in the 10 January 1836 issue of *The Sussex Advertiser*:

> "Mr. Delcour begs to announce that he is instructed by the Mortgagee, and with consent of the official Assignee, under a Commission of Bankruptcy to submit to public auction at the Star Inn, Lewes, on 26 January, 1836, a newly erected Windmill situated at Alfriston, Sussex, Now in the occupation of a respectable tenant at a rental of £50 per annum. It is a superior built Smock Mill and now at full work."

I am sure that either the *Advertiser*, or Mr Delcour, incorrectly described the type of mill.

In 1845 Daniel Sudbury was the miller and following millers included: James Woodhams, 1845-55, William Shoesmith, 1855-57, Charles Carpenter around 1864, James Harvey, 1866-74 and then Thomas Fennel until 1881.

During this period the mill was for sale as *The Sussex Advertiser* of 30 August 1864 records:

> "To be sold by auction at the Anchor Hotel, Alfriston, on September 20, 1864, by order of the Mortgagee. A Tower Fantail Wind Corn Mill, with the stones and landlord's running gear, situated opposite Dean's Place House, in the parish of Alfriston. In the occupation of Mr. Charles Carpenter, a yearly tenant at the rent of £18 per annum."

Fig 1 Alfriston Tower Mill c.1930

In addition:

> "The property is leasehold, 69 years of which are unexpired. Further particulars from Mr. Jonathan Worsley, Ryde, Isle of Wight, or the auctioneer."

Charles Carpenter's father was also a miller who may have worked Wilmington Post Mill, blown down during a storm in March, 1817.

In 1881 a Harriett Frances Munns, a widow in the Isle of Wight, leased the mill to Mr. George Hewett, a miller of Lullington Court Farm. It is probable that Harriet, or another member of the Munns family, leased the mill to Charles Carpenter.

George Hewett used a number of millers to work the mill including John Fearse, nicknamed 'Nosey' because, being an asthmatic, he wore 'tan leather' over his nose and mouth to keep out the flour dust. As a consequence, when he walked down the street still wearing it, he was mocked by small boys. This story was told to Simmons in 1935 by one of Hewett's sons, Ernest, who was probably one of those boys. Other millers included Jim Brooks, from Stone Cross, and Jack Osborne from Sutton. The sons, Ernest and Harold Hewett, also worked the mill up until 1905 when one of the sweeps was broken by a cow. It was never repaired and the mill never worked again. What happened to the cow is not recorded. For some time the mill had only been grinding for feedstuffs.

The mill has always, to my knowledge, been recorded as being fitted with spring sweeps working two pairs of stones, one Peak and one burr. The mill having spring sweeps is based on a photograph reproduced on a Judges' postcard. This shows both stocks but only two sweeps; the other sweeps are missing. The fitted sweeps have shutters and there appears to be no striking mechanism. The photograph was, presumably, taken after the unfortunate accident with the cow. However, a photograph, taken c.1895 (fig. 2), shows the mill fitted with one pair of shuttered sweeps and one pair of commons. Being built in 1835 it could have been fitted with commons, shuttered sweeps or, as seen in the photograph, both types. This leaves the question: did the mill start its working life, as it ended it, with different sweeps? I believe it did.

In 1907 a Mr Kerley bought the land and in the same year Mr Hewett surrendered the lease. Millwright Luther Pearce of Dicker assisted by Ephraim Ovenden of Dicker New Mill dismantled the machinery. The remaining pair of sweeps was put on the Dicker Mill.

Selected Sources

The Simmons Collection

East Sussex Record Office

Photographs from the Bob Bonnett collection

Fig. 2 Alfriston Mill c.1895

EARNLEY (SOMERLEY) WINDMILL

Michael J Karn

Earnley Mill, also known as Somerley Mill, lies within the hamlet of Somerley in Bell Lane (the B2198), at the northern end of the parish of Earnley at a point about five miles to the south-west of Chichester.

The mill is a smock mill, typical of those constructed in and around the Manhood Peninsula a few years either side of 1800. Climping and Hunston mills were of generally similar type. The locality where Somerley's mill was about to be built was still known as Somerley Green, the open green representing an ancient area of unenclosed common land with a scatter of houses and cottages around its periphery. Yeakell & Gardner's splendidly detailed map of western Sussex, published in 1778, clearly shows Somerley Green still in existence as a continuous open space and no mill. The whole of the land on which the mill's yard and outbuildings were later built had been part of this irregular-shaped, completely open and undeveloped common land with Bell Lane running through it roughly from north to south. The mill itself was built after the enclosure and subdivision of Somerley Green at a point straddling the hedge boundary between the former Green and the field to the rear. This is on the east side of Bell Lane, a short distance to the south of its junction with Somerley Lane.

A very detailed map produced in 1850 by Cluttons for the Ecclesiastical Commissioners, and stated to have been copied from the Tithe Map of 1845, refers to the green, by then enclosed and subdivided, as 'formerly Common now inclosed'. The first edition of the one-inch Ordnance Survey of the area, surveyed in 1805-6, does show 'Earnley Mill' .

Some years ago, in an attempt to discover more exactly when Somerley Green was enclosed and when the mill was built, I went through the Land Tax returns held at West Sussex Record Office. These were compiled for each parish annually and survive for West Sussex in an unbroken run from 1780 to 1832. They list all land holdings in each parish, together with the names of all owners and occupiers (excluding any sub-tenants) and how much of the tax they were liable for. From a study of these lists it became clear that the enclosure and parcelling-up of Somerley Green took place at some time between the summer of 1795 (the time of year when the annual Land Tax schedules were drawn up) and the summer of 1796. This was two or three years after the adjoining, much larger, Birdham Common had been enclosed following a specific Act of Parliament. The apparently more informal enclosure of Somerley Green provided the possibilitiy for development opportunities in Somerley including space for the mill, yard and associated buildings.

The first tax return to list the mill is that for 1797. Although this return is not more precisely dated, all those for the years either side of 1797 are dated in July. It is clear, therefore, that the mill was built between the summers of 1796 and 1797 very soon after the land became available for building on. This date fits closely with published estimations of when the mill was built, judged by its form of construction and general appearance. For example, English Heritage, in their schedule of listed buildings (the mill was listed Grade II in 1958) date it as 'probably 1799-1803'. Martin Brunnarius, in his 1979 book, *The Windmills of Sussex*, notes that Earnley/Somerley mill is very similar to those at Climping and Hunston and so was probably by the same millwright. Hunston was built in 1801 and Climping is believed to have been built in 1799. The first reference to Earnley mill that Brunnarius knew of was a mention in a defence schedule (held at East Sussex Record Office) drawn up between 1801 and 1803. The mill was built completely in wood with, probably, all cloth sweeps, fan-tail and one pair of Peak and one pair of burr millstones.

Two later books (*The Standing Windmills of West Sussex* by Richard & Richard McDermott, 1978, and *Windmills at Work in West Sussex*, 2006, the latter compiled from the researches of Maurice Lawson Finch) both refer to the story I have heard that Earnley (Somerley) mill replaced an earlier one. I have also heard locally that boats used to travel up and down Earnley Rife, the nearby stream/drainage ditch, to the mill. All available evidence, including map evidence, suggests strongly to me that this was not so. Yeakell & Gardner's map, for example, shows no mill or any other structure where the mill was later built, and does not show Earnley Rife commencing its flow within a mile of the mill. Above that point the water course draining down from Somerley was, it would seem, no more significant than are the drainage ditches of today.

I also used the annual Land Tax returns to establish some land ownerships in the area, including those for the mill. The first owner and occupier of the mill, from 1797 to 1805, was James Sparks (no relation to the well-known contemporaneous farming family of the area named Sparkes). This James Sparks had been born in East Lavant, near Chichester in 1757, had married in Singleton in 1785 and later lived in Birdham for a number of years before moving to Somerley. At the same time that he acquired the mill he became the occupier, but not the owner, of the thatched cottage that was the predecessor of the building now known as Somerley Green House. This building is remembered by many locals as Earnley Stores and, before that, as 'Stevens' general stores. The premises are on the west side of Bell Lane a short distance to the north of the mill. Until 1800, James Sparks occupied the thatched cottage under the ownership of Joseph Godman. By July 1801, however, James and his elder brother John Sparks were joint owner/occupiers of the cottage, James being listed thereafter until 1808 as sole owner/occupier.

According to the recent Somerley Conservation Area document prepared for Chichester District Council by private consultants, the money for constructing the mill was put up by the Duke of Norfolk. To date, I have found no justification for this statement and I know of no land holdings by the Duke in the Manhood at that time as is also implied in the document. Perhaps there has been confusion resulting from the fact that until about 1877 the Dukes of Norfolk had long held the advowson of the Earnley church living (for one turn in three) as a hang-over from their ownership much earlier of the Manor of Almodington within the parish of Earnley. Nevertheless, if it was in fact the Duke who had funded the construction of the mill, the reason could be that James Sparks' family had been tenants of the Duke during the time they lived in East Lavant and Singleton. The Duke possessed substantial land holdings in both parishes.

Between 1805 and 1806 James Sparks sold the mill to Robert Symonds, who was also the owner/occupier of the neighbouring Mill Farm, the former farmhouse of which is now known as Mill House. By 1810 James had also sold his above-mentioned thatched cottage to Robert Symonds. After James Sparks left the mill, its occupier in 1806 and 1807, who was presumably the miller, was Robert Woodman. In 1808 and 1809 Robert Symonds senior remained the owner of the mill, but now with Robert Symonds junior as occupier. From 1810 to 1819 Robert Symonds (probably junior) was listed as owner and occupier. Either he did his own milling or employed someone to carry out the milling who was not considered an 'occupier' for the purposes of the Land Tax. From 1820 to 1827 Peter Towes was occupier; in 1828 and 1829 it was Joseph Welch and from 1830 Robert Wakeford. Almost certainly, these three were successive millers at Earnley Mill. It was perhaps when Joseph Welch took over occupation from Peter Towes that the height of the mill was raised by jacking up the timber structure (see Brunnarius and also McDermott and Finch) and building a brick base under it. This work is commemorated by a stone dated 1827 bearing the initials 'F.B.' (who, as he was not the owner or occupier, must have been the millwright who carried out the work). In the last surviving Land Tax return, the one for 1832, Robert Symonds was still owner of the mill and Robert Wakeford continued as occupier. By 1831 Robert Wakeford was also the occupier of Mill Farm under Robert Symonds continued ownership. Peter Towes, Joseph Welch and Robert Wakeford all also occupied in turn the thatched cottage (also owned by Robert Symonds) where James Sparks had lived while he was at the mill. They may also have run the shop within the thatched cottage that certainly existed by 1845 and to which there are apparent references in the Land Tax returns for those premises in 1785 and 1786. It is possible though that these mentions in the schedules for 1785 and 1786 referred to some sort of workshop rather than a retail shop.

By the 1841 census, but not before 1837, the mill, together with the thatched cottage long occupied by successive millers, was being occupied by Phoebe Stevens and her sons George and Richard, all three of them described as millers. Phoebe also employed a baker, demonstrating that they used some of the flour that they produced for baking bread on a commercial basis (as may have been carried out by earlier millers and was certainly carried on by successive generations of the Stevens family for a further century or so). The Stevens family were not in Somerley before 1837 as in May of that year they were still living in neighbouring Birdham where Phoebe's husband, William Stevens, was the miller at the water mill by Birdham Pool. He died there in that month and was still remembered a century later as haunting the premises as 'the ghost of Miller

Stevens'.

After Phoebe's death in 1849, the milling and retail business was continued by Richard Stevens, the youngest of her six sons. As soon as the business became his, Richard entered prominently into local affairs by becoming a member of the East Wittering Parish Vestry, the forerunner of the Parish Council. Unlike his mill within Earnley parish, his nearby house and shop were in that part of Somerley then within the parish of East Wittering. He remained a prominent member of the East Wittering Vestry until his death. For much of his time as a member he was appointed as an Overseer and as the parish's Waywarden and Surveyor of the Highways. Richard also significantly extended his business by buying Clayton's Farm near Bracklesham so that he could also grind his own grain. In 1862 he was acting for the creditors in the case of a local bankrupt estate. The *London Gazette* of 6 June 1862 reported: "Richard Stevens, of the parish of Earnley, Co. of Sussex, Miller, one of the assignees of a Birdham baker, bankrupt." By 1875 Richard had extended his local land holding further by taking a lease on Longlands Farm, East Wittering. Richard also enlarged the shop business into a true general stores that operated as a grocer's, butcher's, baker's and draper's. From it, he also sold goods as varied as malt, hops, agricultural seed and implements, beer, thatching spars and yarn, paint, etc. From the mill he also sold coal. After about thirty years of tenancy by his mother, and then himself, Richard acquired the freehold of his house and shop in 1869. In about 1875 he almost totally rebuilt the domestic and retail premises to form the building that is now the private house known as Somerley Green House. Following the closure of the shop in 1972, its outbuildings were gradually converted so as to create the two houses known as Earnleys Cottage and The Old Coach House.

It is not known if the Stevens family acquired the freehold of the mill when they took over the business at some time between 1837 and 1841 or whether they leased it until they also acquired the freehold of the house and shop in 1869. Published books on Sussex windmills give the year 1845 for their acquisition of the mill business, but this is wrong. It is clear from the 1841 census that Phoebe Stevens and her sons were already the millers by then and that they were living in the house at Somerley that had long been occupied by successive millers. The date 1845 may well have been derived from the earliest known commercial directory to mention the business: the 1845 edition of *Kelly's Directory*, wherein is listed, under Earnley, "Mrs Phoebe Stevens, Miller & Shopkeeper".

By 1861 at the latest, Richard Stevens was employing a miller to work the mill, he himself concentrating on running his overall business in Somerley. Successive censuses show that in 1851 he had an 18 year-old apprentice miller named George Brown who lived in at the house and shop. In 1861 Richard was employing Robert Crowhurst as miller and, in 1871, Henry Langtry, both of whom lived elsewhere in Somerley. By 1891 the miller was John Combes who had lived as a boy in one half of nearby Somerley House, his father WaIter having been Richard Stevens' farm bailiff at Clayton's Farm, north of Bracklesham. In 1891 John Combes was living with his wife and children almost opposite the mill in one half of Mill Cottage, the whole now known as Sparrow Cottage. This cottage was also owned by Richard Stevens, he having refronted it in 1857, as shown by an initialled date-stone on the building. John Combes and his family were still living in their half of Mill Cottage at the time of the 1901 census, John described as a 'corn miller' and as an employee. By the 1920s, John had moved away to set up his own grocery and bakery business in Sidlesham.

Richard Stevens, although quite a wealthy man locally, clearly did not believe in spending money unnecessarily. On 3 April 1893 he was advertising in *The Miller* as follows: "Wanted Eureka Smutter, cheap, for cash. R. Stevens, Earnley, Chichester." The mill business must have been thriving in 1901 as John Combes was not the only miller at Earnley Mill. Listed in that year's census as living with his widowed mother and brothers in one of the cottages in Somerley Lane was 31 year-old Charles Smith, described as "journeyman flour miller". Soon after he married in 1902 Charles became the landlord of the Blacksmith's Arms on the road between Birdham and West Wittering (long since demolished). After a few years he returned to employment with the Stevens family at the mill and the shop. Accommodation was soon found for him and his family at Mill Cottage, the home vacated by John Combes, the growing Smith family moving to the much larger Somerley House (both houses then owned by the Stevens family) in 1918, where he lived until his death in 1943.

Richard Stevens died in 1895 from heart failure.

Fig. 1 Earnley Mill c1910 (Bob Bonnett Collection)

Following his death, his sons and eldest daughter as his executors itemised the mill premises as follows:

> "Freehold Tower *(sic)* Windmill with auxiliary Steam power Engine Shed with Eight horse power Engine and Cornish Boiler. Store with two Floors. Bakehouse. 3 Stalled Stable. Coal House. Pig pens. Cart House and Croft the whole containing 3 roods and 9 perches situate at Earnley Sussex occupied by the Testator at his death valued as above at £353."

Richard's two younger sons, Julius and Harry, took over all aspects of the business after their father's death, including the mill, their elder brother Richard William having died in 1884. During Julius and Harry's ownership, 'Earnley Farm', later known as Red House Farm, in Bookers Lane, Earnley, was also acquired. The mill continued in operation, latterly as Sussex's last working windmill fitted with canvas sweeps.

In 1910 the steam engine was replaced by a Hornsby paraffin engine. Two pairs of burr millstones were fitted in 1915 to meet demand for white bread. S. Freese visited the mill in 1935 and his report on the machinery installed is recorded by Simons:

> "The common sweeps, together with a single shuttered spring spar, are secured to a tapered octagonal iron wind-shaft, on which a large square iron boss carrying an 8ft. 3in. 108-tooth wooden clasp-arm brake-wheel, with wooden brake controlled by an unusual large wooden lever and weight.
>
> The 4ft. 6in. Wallower is of 4-arm wooden construction with six iron stiffeners, driving a cylindrical (not bevelled) wooden friction drum on the sack bollard from its under face when engagement is made by the usual lever and rope.
>
> On the second floor, where the short wooded upright shaft terminates, is a large wooden clasp-arm great spur wheel driving two pairs of overdrift stones by means of iron nuts on square spindles with removable half-bearings and wing nuts at their upper extremities, whilst a bevelled cog-ring is provided upon its upper face, and on this cog, now disused, a pivoted bell-alarm, actuated by a cord and pulleys, used to operate.
>
> On the same floor is a Patent Improved Purifier by W.R. Dell & Sons; and on the floor beneath, a pair of stones underdrift by power below, an Eureka Special closed scourer, a Bamford Grinding Mill, and a one and half sheet centrifugal dresser by Dell, all of course driven by a line-shaft and belts from the engine. The tentering gear for the overdrift stones above is also in this floor, the drive being from wooden drums on the stone spindle extensions, the steelyard being adjusted by means of a peg and a range of holes instead of the usual screw.
>
> The ground floor, walled with dressed stone blocks, contains the main line-shaft, belt--driven from the engine room: and on this is a wooden tooth bevel, driving an iron stone nut; a wooden drum operates a wooden sack bollard above it (the belt drive being taughtened for action by a weighted lever and roller upon a pivoted vertical arm, whilst the chain passes to the upper floors and returns over a pulley); and a small iron belt drum drives a worm feed to even out the barley meal, which Mr. Ellis explained would otherwise tend to deposit in the middle of the sacks, with the 'shuck' outside.
>
> A one sheet centrifugal is also installed on this floor, from which is reached the engine house

containing a large single cylinder Hornsby oil engine, and a fly wheel etc. The latter replaced the old Cornish boiler and steam engine, the shaft for which is dated 1890.

The wooden framed ogee cap of the mill travels on rather small rollers upon an iron curb [unusually, a wooden curb was placed on the top of the original iron one] with six 4--spoked centering wheels of l6ins. diameter, two at the rear, two at the front and one each end of the sprattle beam, running against the inner surface of the curb, beneath a projecting flange.

From the fly an iron bevel wheel drives a wooden toothed wheel of iron upon the iron worm-shaft; and the worm engages with a series of widely spaced wooden cogs of 6in. pitch and I in. face, set into the brickwork of the curb.

The common sweeps, or sails, are secured to a rather short sail-stock, and the frequently renewed cloths are ringed to one of the sail-bars; whilst the spring sweeps with thirty shutters apiece have an unusually long stock."

In about the early inter-war period the bread baked at the mill was delivered in a horse--drawn van by Mr Cate. General groceries were later delivered by Bill Smith (one of the sons of the above-mentioned Charles Smith) driving a motor van. The last miller at Earnley (Somerley Mill) was W. Ellis, who retired during the Second World War and who also lived in Mill Cottage, now known as Sparrow Cottage.

Having outlived his two brothers and three sisters, Julius Stevens, when well into his eighties, eventually sold both the mill and the shop with its house. The house, much later named Somerley Green House, had not been his home since his marriage in 1895. He had lived in Highleigh, near Sidlesham, and then in Stockbridge, Donnington. The sale of both mill and shop premises took place in about 1946. The occupation together of house, shop and mill, which had continued virtually unbroken since the mill was built in c1796/7, then ceased. The mill was sold to Bartholomew's of Chichester, corn, seed and agricultural merchants, for about £2,000.

According to former Somerley resident Reg Smith, another of the sons of Charles Smith, the journeyman miller, whom I asked about the mill in 1979, Bartholomew's, for whom Reg had worked, intended using the mill premises for storage purposes but, for some reason, were unable to. Reg said that the very last person to work in the mill, who had been employed there by Julius Stevens and then by Bartholomew's, was his brother Bill Smith.

Bartholomew's soon sold the mill to a Mr Dalton who built for himself the bungalow named Millside that was constructed on part of the land acquired with the mill. During Mr Dalton's ownership, Charles Reed, a photographer and artist who had been living in a temporary structure at Little Croft in nearby Somerley Lane, was permitted to live in the upper part of the old unconverted bakery building.

In the early 1950s, Mr Dalton sold the mill and the bungalow Millside to Mr G. Shorland, who established a tearoom in the building nearest the

Fig. 2 Earnley Mill in 2008 (Bob Bonnett Collection)

road and also sold bric-a-brac from it. In 1957 the mill was sold off separately from Millside, the new purchaser of the mill being businessman Colin Darby. Initially, he and his family lived in the tearoom building while the old bakery was converted to a house for them. Charles Reed the photographer found alternative accommodation elsewhere in Somerley. For a few years from 1979, Colin Darby's daughter Serena ran a shop selling tack from the old tearoom. During Colin Darby's time, quite a lot of restoration work was carried out on the mill by his son Peter and a friend, 'Gus' Pollard, who later went on to become millwrights. Unfortunately, by the time that Colin Darby sold the mill, the restoration was far from complete. Apart from the demolition of a substantial lean-to structure at the base of the mill, a succession of subsequent owners seem to have done little further work. A survey report on the windmill (given here as an appendix) was made in February 2003 by millwright Anthony Hole of Dorothea Restorations Limited. His survey demonstrates by just how much the mill had deteriorated. Another recent change of ownership, however, has led to high hopes locally that the decline of recent years is soon to be reversed. The current owners, Mr and Mrs C. Charter, who bought the mill at the end of 2007, have already carried out initial remedial work by making the roof watertight, fitting external doors and installing Acro props under the large wooden beam supporting the massive upright shaft.

Acknowledgements

My thanks go to Bob Bonnett of the Society's Mills Group for some of the technical information including the reports from S. Freese, (1935) and Dorothea Restorations Limited (Anthony Hole, Millwright) (2003).

APPENDIX

A Survey Report of Earnley Windmill

Anthony Hole, Millwrights Dorothea Restorations Limited. February, 2003

1.0 Introduction

The mill was surveyed by Anthony Hole, Millwright of Dorothea Restorations Limited. Mr. Hole has worked on the mill on two occasions, in 1954 and 1990.

The smock mill dating from 1804 was a fine example of a Sussex style mill with a ogee weatherboarded cap. It was fitted with one pair of spring shuttered sweeps and one pair of common (canvas) sails. Earnley was the last smock mill working commercially in the County, ceasing work in 1942.

2.0 External

Externally the weatherboarding is in fair condition. It is untreated and is therefore porous, with some fifty boards having splits or knot holes allowing the ingress of water. The existing weatherboarding is of unusual section being 225 x 20 x 10 set at 150 gauge. Reference to old photographs suggest that this has been the case since 1928, when the mill was repaired by Holloway's of Portslade.

3.0 Brick Base

The brick base is in poor condition with a failed lintel over the doorway to the South-West and a slot cut in the West elevation, and no lintel. Cracks in the South-East face have been the subject of a surveyor's report. A new sleeper lintel lays over the North – East doorway.

4.0 Ground Floor

The concrete floor appears to be sound as are its four timber supports although these require new wedges at the top to replace the existing ones which are affected by woodworm.

There were many items stored in the base:-

One pair of French Burr millstones 47 inches Dia. Makers Hughes & Son, London.

Bedstone 8 inches thick, Runner Stone 10 inches thick, both with good dress and complete with glut box and wedges.

One pair Composite Stones 46 inches Dia.

Bedstone 6 inches thick, Runner Stone 10½ inches thick.

Both stones need re-banding. Both stones have good dress and are complete with glut box, wedges and stone spindle which has an unusual three legged governor.

One Composition Runner Stone in poor condition 46 inches Dia. 5½ inches thick.

One wrought iron crane 52 inches inside.

Truckle Wheels (from the cap) 10 inches Dia., and 15½ inches Dia.

The remains of a smutter and the top section of a bucket elevator.

There were six new fantail blades with stocks, which appear to be well made and serviceable.

The ladder to the first floor was rotten at the bottom.

5.0 First Floor

Many joists and most of the flooring was missing. The cant posts did not appear to be tied into the wall plates. The wall plate was incomplete in the South West elevation. A main support beam was rotten at the West end.

There was much auxiliary machinery on this floor:-

A meal ark with chutes feeding into it.

A modern wire machine (flour grader).

A modern bolter (for fine sifting).

A Eureka grain cleaner.

All of these are badly affected by woodworm and exposure to the elements for many years.

There are two line shafts with many cast iron pulleys.

The grain cleaner was subsiding through the floor.

The door to the reefing stage was poorly made (not from tongue and groove boarding) and is not weathertight.

6.0 Second Floor (Stone Floor)

The stones have been removed to the ground floor but this still supports a large wooden vertical shaft with parts of a great spur wheel. On one side the hurstings or stone supports are still in place, the exact position of the stones could be deduced from the stone nuts and quants which remain on the site. Some replacement joists are in place but new ones are required on both sides of the main timbers.

There was a window opening at this level but no window was fitted, and to the West a metal window with broken panes exists.

There was a pair of doors at this level (probably for ventilation), which are also poorly made and are not weathertight.

7.0 Third Floor (Bin Floor)

All that remains of this floor was two main timbers which were notched to take floor joints. A window to the South East is a later type Crittal metal window.

8.0 Fourth Floor (Dust Floor)

There were no remains of this floor which would have contained the sack joist and would have given access to the bins and the cap for maintenance.

9.0 Curb and Cap

The curb was not inspected at this time but was some years ago and was found to be reasonably sound. A second curb has been built on top of the original and was levelled by means of wedges between the two. A 1958 survey quotes the cap as being a "live" cap, in other words a cap rotating on castors which run on the curb. Unfortunately none of these castors appear to have survived.

Many good photographs exist showing the cap and its construction which should allow a good replica cap to be made incorporating the wind shaft and worm shaft which are on site. The truckle wheels which located the cap within the curb are also recoverable.

10.0 Conclusions

The smock tower was in generally sound order, all the cant posts and studwork appears to be serviceable. It will be important to render the mill watertight as soon as possible and attend to the brick base as a matter of urgency.

ISFIELD WATER MILLS

Bob Bonnett

Isfield is first mentioned in Domesday as Sifelle, although, a settlement was here before the Romans built their road from London to Lewes early in the second century. Perhaps a new hamlet grew at the place where the road crossed the River Ouse. The church is twelfth century and Isfield Place c.1600; therefore, with the Rivers Ouse and the Uck flowing through the parish, it is most probable that a corn mill was built here in the Middle Ages. A fulling mill is recorded in Isfield in 1558 (*Sussex Archaeological Collections* 116 (1978) 41).

Isfield 'Old Mill'

On Christopher and John Greenwood's Sussex map of 1825 a reference is made to 'Old Mill', although a symbol for a watermill is not shown. This is probably an old site because, although similarly no mill is shown on the Budgen large-scale map issued in 1723, a map symbol showing the highest point of navigation appears at this reference. This could indicate a weir providing a head of water for a waterwheel. 'Old Mill' could refer to the site of the fulling mill mentioned above.

Neither a map drawn by Tho. Bainbridge of Gray's Inn, London for Lady Penelope Radcliffe, dated 1798, nor the Tithe Map of 1843, both in the East Sussex Record Office, show a site of a water mill.

The 25 inch Ordnance Survey map, issued in 1874, appears to show a leat running from the river upstream of 'Old Mill Bridge' and a tail race rejoining the Ouse further downstream. This is most probably the remnants of the original course of the river. The site of the mill is, therefore, thought to be close to the highest point of navigation as shown on Budgen's map.

Isfield Corn Mill

This mill was probably built in the last quarter of the 18th century. It is shown on Yeakell and Gardner's 1783 large scale map of Sussex and a miller, Adam Caselden, is recorded in Sussex Marriage Licences as living in Isfield in 1779.

In 1801 for the Defence Schedule, the then miller, Benjamin Heaver, said that he could supply eight sacks of flour daily in the time of invasion, the wheat to be provided. He had no cloth at the mill. (The term 'no cloth', I believe, means that Heaver could supply eight sacks daily of wholemeal flour, i.e., the meal would not be dressed through the bolting cloth to remove the bran.) The mill remained in the family for another 73 years, with George Heaver helping to run the mill with his father from around 1866.

The mill was advertised for sale in the *The Sussex Advertiser* on August 30, 1874:

> "To be sold. That desirable Water Corn Mill, with a good house, Barn, Stable, sheds and 26 acres of land, situated in the parish of Isfield, Sussex. Edward Heaver the tenant will show the premises. For particulars to purchase apply to Mr. Edward Heaver, Forest Row."

The mill must have been very desirable for it was very soon sold as announced by *The Sussex Advertiser* dated September 22, 1874:

> "Isfield Mill. Messrs Blake & Verrall having succeeded to the business hitherto conducted by Benjamin Heaver, at the above Mill, begs to announce that they will continue the same from the 29th of September: when they will be happy to receive the patronage of all who may be disposed to favour them with their orders."

Two weeks later, in the October 6 issue, *The Sussex Advertiser* records:

> "Benjamin Heaver in retiring from business, at Isfield, thanks his friends for the support given him so many years, and begs a continuance of their favours to his son, George Heaver."

And:

> "George Heaver begs to inform his friends he has taken Upton's Mill, Framfield, and solicits a continuance of their patronage."

Within four years the Heaver family were back; Edward Heaver now ran the mill but not for long because it changed hands again in 1882 when William Medhurst took over. He worked with his son, Frank, until 1890 when the latter took over.

In 1903 the mill was bought by another local miller, William Hemsley. William Hemsley was born at Framfield in 1858. In the 1881 census he is shown living in Mill Cottage, Framfield, working as a miller's grinder. He married the daughter of a Mr. Kenward from Cross-in-Hand Windmill, and their son, Frank, was born in 1884. The family moved to Lewes Town Windmill, also known as Shelly's or Smart's Mill, possibly in 1891 when the mill was up

for sale. William was the last miller when it ceased working around 1900. In 1900/01 William moved to Isfield Watermill and in 1903 he was also milling at Barcombe Oil Mills. These were capable, with both steam and water power, of working 80 tons of oil cake and 200 quarters (700lbs) of wheat per week.

In 1905 William Hemsley moved to Aldingbourne Watermill in West Sussex with Frank and his wife. Their son, Vic, was born at Aldingbourne Mill. William and Frank worked the mill for ten years before returning to Isfield Watermill.

In 1905, at the start of Hemsley's ten-year absence, it was the proprietor of Isfield Milling & Baking Co., Edward Sinden, a brewer by trade, who bought Isfield Mill. He possibly extended the mill from the original central section to house a new double horizontal British Empire turbine, manufactured by Joseph J. Armfield & Co. A large painted sign at the entrance proclaimed:

> THE ISFIELD
> WATER TURBINE &
> STEAM MILL & BAKERY
> E. J. SINDEN, PROPRIETOR
> PUPPY BISCUITS, TERRIER BISCUITS, CHICKEN MEAL.

The Miller, in July 1912, advertised the mill:

> "To be sold as a going concern with immediate possession. The Isfield Turbine Water Mill and bakery attached, together with the mill house, buildings and land."

The mill was purchased by James Lusted who ran the mill for three years.

In 1915 the Hemsleys returned to Isfield and father and son continued to work together. Frank took over as sole owner around 1930 and ran the business with his son, Vic. Frank last worked in a steam mill adjacent to the site of Stone Cross Post Mill near Heathfield. He died in 1935. Vic Hemsley later became the manager of Uckfield Watermill.

In 1938 the mill was sold to Dickson and Church who ran it in conjunction with Brambletye Watermill at Forest Row. In 1946 Mr. Dadswell, from Uckfield, fitted a replacement turbine. The Dadswell family were well known local millwrights and general engineers. The father, James, who installed the turbine in Uckfield Mill, died in 1923. A son, Albert, helped his father; his brother ran a cycle business in Uckfield.

In its last working years the mill, as proclaimed in large letters painted on the front, was known for its

Fig. 1 William and Frank Hemsley outside the Bell Hotel, Uckfield in 1916, with gas-powered van

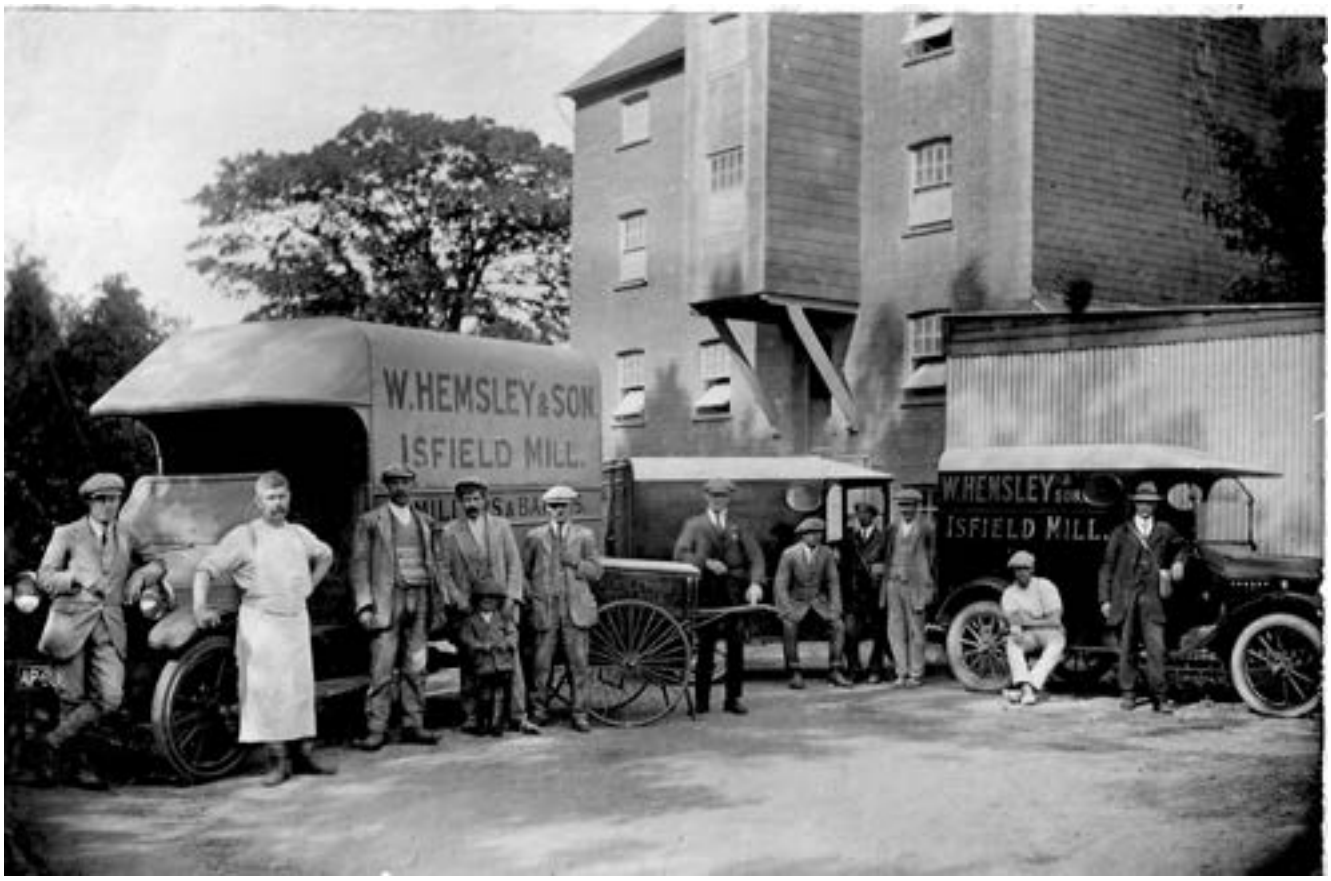


Fig. 2 Isfield Mill in the early 1920s with staff and transport fleet

'SUSSEX GROUND OATS' and 'BALANCED POULTRY PIG MEAL'.

In 1995 three pairs of stones, worked in line by a layshaft arrangement, were virtually intact.

Sadly, in 1996, the milling machinery, the complete sack hoist system and the grain cleaner were all removed from the mill. This was a large mill working 7-pairs of stones originally powered by a large breastshot waterwheel. The turbine and control system were also still in situ and might have been able to work again. Only the external installed turbine, associated drive mechanism and sluice gates now survive. The current owner hopes to use the turbine to generate electricity.

Isfield Paper Mill

Paper was first thought to have been made in China around 100 BC. However, modern technology has shown the 'paper' under an electron microscope is probably only wadding. T'sai Lun was, by tradition, the man who, in 105, presented sheets of paper to his Emperor as a substitute for silk and other cloth used as a writing surface. Using Chinese papermakers captured at the battle of Talos near Samarkand in 751, Arabs are supposed to have set up factories in the Near East. The craft then spread westwards to Morocco, then to Spain where paper was made as early as 1056. In Italy paper was made from 1109 and in France a paper mill is mentioned in 1338 at Troyes.

Paper imported from the continent was used in England. The oldest surviving piece of paper in the Public Record Office dates from about 1220, but it was another 270 years before an English paper mill was built. The first, built in the 1490s by John Tate, was on the river Beane near Hertford. Paper made by Tate and claimed to be the oldest English made paper is dated 1494. However, the mill only worked for 10, perhaps 15, years and it was not until the late 16th century that paper making was fully established in England.

In 1650 there were forty mills working in England and by the end of the century over one hundred. The early mills produced a coarse brown paper; better quality writing paper was still imported from the continent. In the late seventeenth century French and Dutch papermakers came to England and better quality paper was produced. Paper was first made

from rags. Poor quality rags, canvas and netting made the more common brown and blue papers for packing and wrapping; fine linen and cotton rags were used for white printing and writing papers. The rags were first cut into small pieces, washed and left to ferment in vats of clean water. Then water-powered stampers broke down the rags into a creamy pulp known as stuff.

Later, in the 18th century, more efficient machines (beating engines) for making pulp were introduced from Holland and known as Hollenders. They comprised a trough about 3 metres long around which the rags and water were churned, the rags macerated by an adjustable iron roller with projecting blades.

The stuff was then transferred to a vat, warmed and agitated to keep the fibres held in suspension. A vatman then made individual sheets of paper by dipping into the stuff a rectangular wooden framed mould covered with wire mesh. The mould was then carefully lifted out to avoid suction with the liquid and deftly shaken to remove water, leaving a layer of matted fibre on the mesh. A wooden frame called a deckle was placed around the mould before it was dipped into the vat to form the edge of the paper sheet. A second workman, known as a coucher, then turned over the mould, gently dropping the sheet of wet paper onto a piece of felt. A stack, or post, of 144 sheets of paper with pieces of felt in between was built up and then placed in a press to squeeze out as much water as possible. A third man, the layer, then separated out the sheets of paper and hung them over ropes in a ventilated loft to dry. A dry press flattened the paper sheets which were then polished in the finishing room called the sol, or sale. For writing paper, size was either applied by dipping the dry sheets into a vat of size, or the size was mixed into the stuff.

By the end of the eighteenth century the demand for paper for newspapers etc. was growing rapidly. To increase production, some mills supplemented water power with steam to drive the beating engines. Entrepreneurs of the day seeing the commercial opportunity built new paper mills.

Four paper mills were built at this time in Sussex close to the Ouse Navigation at Lewes, Isfield, Barcombe and Newick.

Following completion, in 1795, of the lock at Isfield the proprietors of the Navigation, to promote

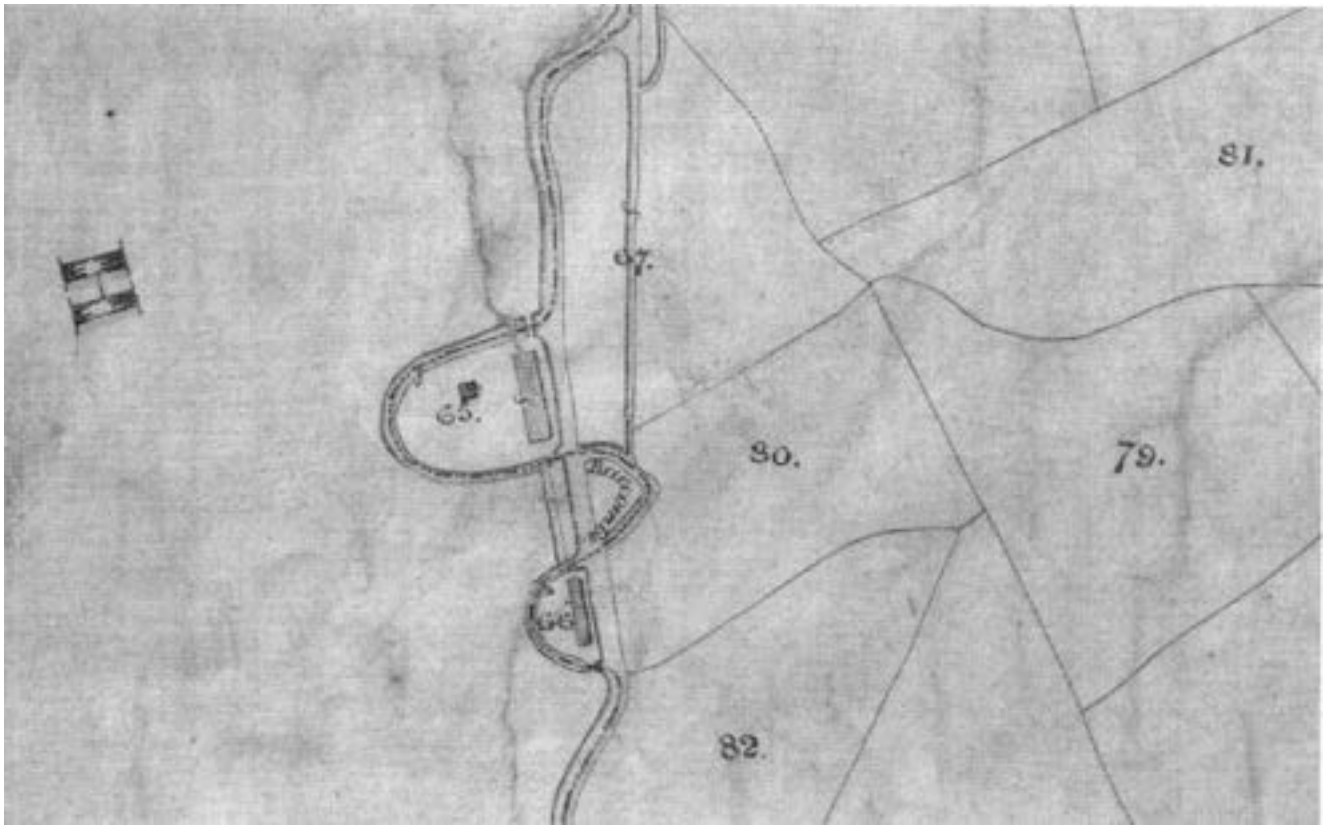


Fig. 3 Tithe Map of 1840. The mill manager's house is shown at 65 with the mill to the right, and 66 marks a row of assorted workers' cottages

business, offered for sale two acres of land next to the lock as a suitable location for a mill having a fall of nearly 3.3m. (10 feet). Messrs Molineux and Johnson bought the land to build a second paper mill to complement their larger mill at Lewes, built in 1802.

Isfield Paper Mill was built on the Ouse just upstream from the confluence with the Uck immediately upstream of the lock. Manufacture commenced in 1809 as *The Sussex Weekly Advertiser* of the 24th July states:

> "The proprietors of the Paper Manufactory at this place (Lewes), on Tuesday last, started a very powerful and spacious new mill, for the manufacture of white paper, at Isfield, about eight miles higher up the river than their mill here; on which occasion a great number of Gentlemen in the town and neighbourhood accompanied them, in a light barge belonging to the concern, and two pleasure boats attended by an excellent band of music, to Isfield where, after inspecting the manufactory, and enjoying in divers ways the beauties of its rural situation, upwards of 70 sat down, under the "umbrageous foliage of spreading oaks", to an excellent Pic-Nic dinner, consisting of almost every variety of cold viands which the season produces…"

Building the mill was an expensive undertaking for not only was cost incurred in building the mill; machinery, including a steam engine, had to be purchased; a foreman's house and nine cottages were also erected. A very small mill with only one vat needed over 50 expensive moulds, each costing over £6.

The Fourdrinier paper-making machine, which produced continuous rolls of paper at a speed of 0.13 m/s (25 feet per minute), had just been invented. This was patented in France by Louis-Nicholus Roberts in 1799. Roberts could not develop the machine owing to lack of funds and sold the patent to Leger Didcot, the owner of the mill where he worked. Didcot had an English brother-in-law, John Gamble, who then patented the machine in England in 1801. These machines with their associated automatic cutting machines were very expensive. It is not known if they were installed at Isfield. However, two articles in *The Sussex Weekly Advertiser* give a clue to the machinery installed.

The first report, dated 19 November 1810, is of two accidents on consecutive days:

> "On Thursday morning two women employed at the Paper Manufactory at Isfield fell into the river when going from the village to the mill, but they were got out without further harm."

This was followed by:

> "On Friday last Mr. Boyer, a mould maker, of Maidstone, in going to the above Paper Mill to Lewes, also got into the river, but with difficulty saved himself. The horse swam to the river bank."

The second report, dated 6 July 1812, is again another accident, but this time at the mill:

> "A paper maker in the employ of Messrs. Molineux & Co., at Isfield, met with an accident on Saturday (when a heavy paper press broke) which had nearly been attended with the most serious consequences."

As a Fourdrinier machine makes paper in a continuous process and does not use moulds or a press, we can, therefore, perhaps, assume that at least in the early years paper was made by hand.

Another accident is recorded in *The Sussex Weekly Advertiser* of the 23 September 1816, although this time the outcome was not a happy one:

> "On Friday, a fine boy, four years old, son of a paper maker, at Isfield, fell into the river and was unfortunately drowned."

The Uckfield miller's son, also four years old, died by drowning. This was an all too frequent accident.

The need for paper continued to grow and good quality rags became harder to find. Bleaches were discovered, enabling poorer rags to be used, and china clay started to be used to make paper whiter and heavier. Larger and even more expensive machines were made and new mills built to cope with the scale of demand. Smaller country mills could not compete.

Isfield Mill, according to Horsfield's *History and Antiquities of Lewes and its Vicinity* (Lewes 1827), had "recently undergone much improvement and the finest paper is there manufactured" and the same writer, in his *History, Antiquities and Topography of Sussex* (Lewes 1835), reported "some excellent paper was produced". In the census of 1841 eleven people are recorded as working in the paper mill.

Further investment was needed if the mill was to be competitive. Sadly this did not happen. In *Sussex Industrial History*, Winter 1970/71, in an article on the Upper Ouse Navigation, the mill is reputed to have closed in 1844. This may or may not be correct. Simmons records an Excise Letter dated 16 May, 1850, which states that the occupier of Mill No. 391

has 'left off business'. In the 1851 census only one man, John Daviss, is recorded having an occupation associated to the mill. All those living in the paper mill cottages record their occupations as farm labourers. What is certain is that the mill had ceased work by 1855, for in *The Sussex Advertiser* for 9 October 1855 both the paper mill at Isfield and Lewes were to be auctioned not as going concerns:

> "Paper Mills, Lewes and Isfield. Messrs. Craneter will sell by auction at Garraways Coffee House, Change Alley, Cornhill, London, on 12 October, 1855. The spacious mills and other property, comprising the substantial and well arranged mill and appendages, situated close to the town of Lewes.
>
> Also the spacious and convenient mill situated at Isfield, only five miles from Lewes, with foreman's house and nine cottages. Both mills possess ample water power, also spring water, steam engine fixtures and fittings, and were formerly used for the manufacture of paper upon an extensive scale. Being both on the River Ouse Navigation they could conveniently be adapted to other purposes."

A second auction was advertised in *The Sussex Advertiser* on 15 September 1857, where the remains of Isfield Mill were:

> "To be sold on the premises at Isfield Paper Mill on 28 September, 1857. The whole of the materials of the Foreman's Cottage, nine cottages, bricks, together with the valuable stone of the water courses of the late Paper Mill, two large cast iron waterfalls [waterwheels?] etc."

With rags in short supply new materials were found. At first esparto grass, from Spain and North Africa, was used from around 1860 and made excellent paper. Timber was then tried, ground to make pulp for cheap newsprint or treated chemically to produce fibrous pulp for a better quality paper. Today almost all paper is produced from wood pulp. The last water-powered papermaking mill in Sussex was Iping Mill on the River Rother which was destroyed by fire in 1925 and never rebuilt.

The lock adjacent to the mill has been excavated, but nothing of the mill has, so far, been found. However, brickwork on one side above the lock would indicate a wharf for the mill. A one-foot square timber-framed inlet to take water from the navigation, and a 12 inch cast iron pipe to discharge water into the river, appear to be associated with the paper mill or a hydraulic ram. Further excavation may expose the inlet to the water wheel.

Selected Sources

The Simmons Collection.

Richard L. Hills, *Papermaking in Britain 1488 – 1988* (The Athlone Press 1988).

Alfred A. Shorter, *Papermaking in the British Isles* (David & Charles (Publishers) 1971)

Derek Stidder & Colin Smith, *Watermills of Sussex, Vol 1—East Sussex* (Baron Birch for Quotes Ltd 1997)

Richard Hemsley for information on his family history and for the early photograph of Isfield Mill.

East Sussex Records Office.

Uckfield and District Preservation Society Archive.

DUNCTON MILL

Ron Martin

Duncton Mill is located at SU 9641 1662 in the parish of Duncton within a complex known as Duncton Mill Farm and owned by the Barlavington Estate. The farm comprises a farmhouse, a barn, a row of pig sties, an apple press and various other buildings as well as the mill. It is currently used as a conference centre and fish farm. Water to operate the mill comes from a small spring at the foot of the Downs, which flows northwards to meet the stream which runs from Lavington Park into Chingford Pond and thence into Burton Mill Pond, eventually to meet the western River Rother. This then turns southwards to Coultershaw (see sketch map, Fig.1) and then meets the River Arun, passing Arundel *en route* to the sea at Littlehampton. The stream had been dammed to create a small mill pond and the mill is built at the east side of this dam over which runs a road for access to the farm. The mill is three storeys high, the top storey—the bin floor—being some 0.9 m (3'0") above road level, with the stone floor and the spout floor below that and an attic storey above. The outlet from the mill pond is through a culvert which passes under the road, then through an iron launder to power an iron overshot wheel. The tail race passes underground through a short tunnel. The flow is controlled by an iron penstock operated from inside the mill. There is also a spillway from the mill pond with a culvert passing to the south of the mill to meet the tail race underground.

Construction

The mill building is five bays long, 11.68 m (38'4") x 7.26 m (23'10") wide. The west front of the mill faces the road and this orientation has been used throughout. It is constructed with walls 620 mm (1'10½") thick, mainly of random squared Upper Greensand stonework with red brick quoins and dressings. The lower part of the north and south walls are built of brick in English garden wall bond but unusually laid with one header course to two stretcher courses (see Glossary). The west side of the spout floor has been strengthened with hollow concrete blockwork infilled with concrete and reinforced with steel rods.

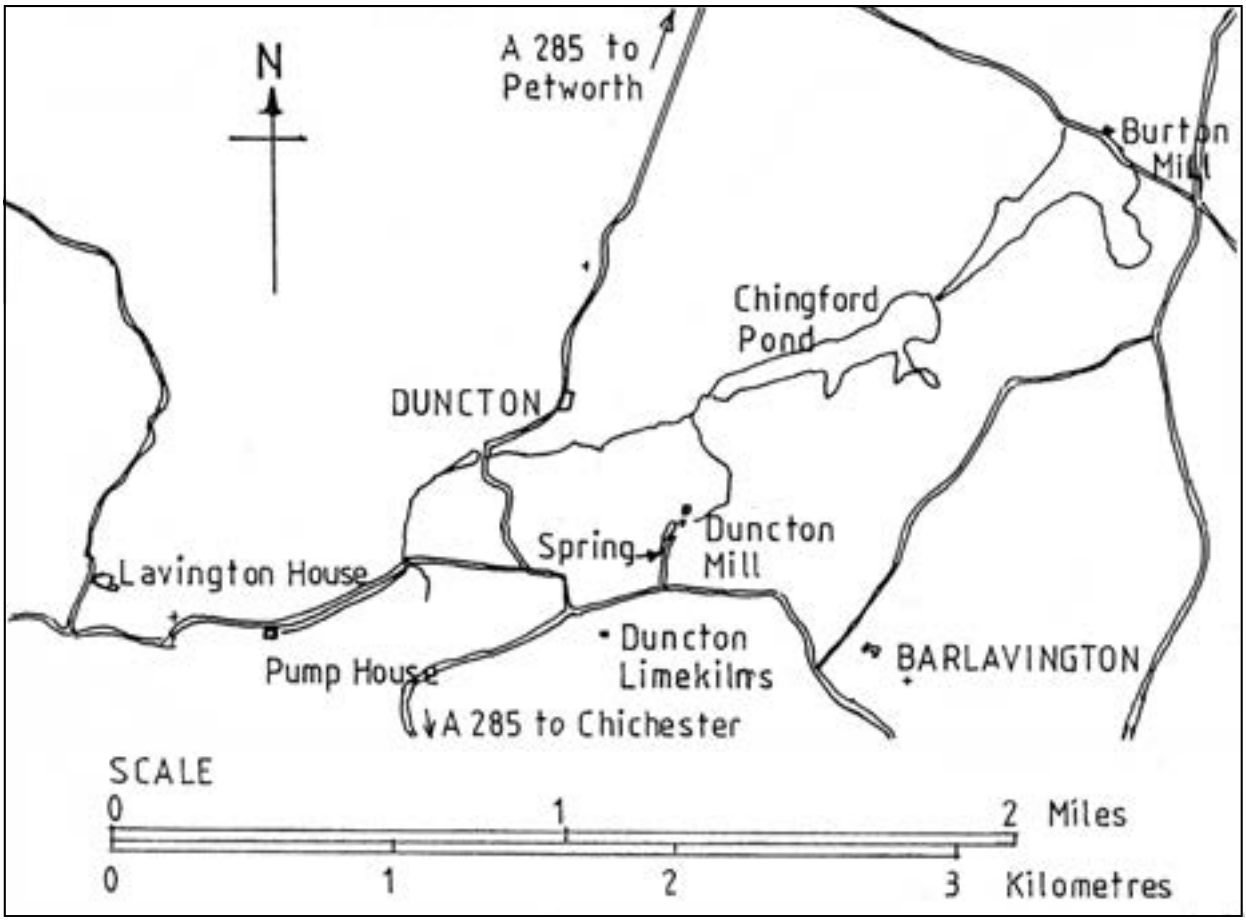


Fig. 1 Map of area around Duncton

Fig. 2 Duncton Mill , 2007 (photo: Ron Martin)

All internal structural timber is of softwood with transverse beams at each bay division supported at about their centre by octagonal wooden posts. The floor joists are 75 x 100 mm (3″ x 4″) at 380 mm (15″) centres with 25 mm (1″) plain-edged boarding in 225 mm (9″) widths. The attic floor joists are carried on 175 x 125 mm (7″ x 5″) plates. An additional beam has been inserted to carry the south end of the floor joists of the stone floor. There are wooden flights of stairs longitudinally between the stone floor and the bin floor and laterally between the bin floor and the attic. The lowest flight down to the spout floor is no longer extant.

The roof comprises trusses at each bay division with 10 x 100 mm (4″ x 4″) principal rafters and 75mm (3″) tapered struts strutted down to the floor beams. There is one 100 x 100 mm (4″ x 4″) purlin in each roof slope in the same plane as the principal rafters, supporting the common rafters at 38 mm (15″) centres and carrying plain-edged boarding covered with countess-sized Welsh slates.

The bin floor contains five bins, two with doors and three with hatches and two hoppers, all with access from the attic floor. The external walls of the bins are lined with boarding and the divisions between the bins are framed in 75 x 100 (3″ x 4″) wooden studs covered one side with boarding. At the south-west corner the walls are plastered, this area presumably having being used as the office.

Machinery and fittings

Note: On the drawings, the machinery, where collapsed, has been drawn as it would have been before deterioration.

The overshot waterwheel is cast iron, 4.5 m (14′9″) diameter and 1.54 m (5′ 1″) wide with eight cast iron tee-section spokes, 280 mm (11″) wide shrouds and shaped buckets. The iron launder is 1.04 m (3′5″) wide and 380 mm (1′3″) high. The flow is controlled by an iron penstock actuated by a rack and pinion, operated by a four-spoked handle internally. The wooden wheel shaft is octagonal 430 mm (1′5″) wide across the flats. The inner bearing is encased in a cast iron sprattle arch (see Glossary) which rests on a 380 x 300 mm (1′3″ x 1′0″) wooden plate.

The cast iron pit wheel is 3.08 m (10′1½″) diameter with eight tee-section spokes and a square nave and engages with the iron wallower 1.22 m (4′0″) diameter on the upright shaft.

The hursting comprises a wooden framework on a dwarf brick wall with 300 x 215mm (12″ x 9″) plates, 200 x 200 mm (8″ x 8″) posts and with 200 x 125 mm (8″ x 5″) stone beams for the west and east pair of stones.

The softwood vertical shaft is 4.6 m (15'1") high and 380 mm (1'3)" diameter but reducing to 255 mm (10") diameter at the top with a square section where the crown wheel occurs and octagonal for the bottom 0.94 m (3'0") . The section exposed in the stone floor, below the crown wheel is faced with wooden fillets, nailed on, to create a circular shaft increasing from 420 mm (1' 4½") diameter just below the crown wheel to 480 mm (1'7") diameter at floor level. The pintle at the bottom bears onto the cast iron sprattle arch and at the top in a sprattle box which is bolted to the side of a floor beam.

The wooden crown wheel is 1.45 m (4' 7½") diameter and 127 mm (5") deep with four morticed arms and two concentric rows of wooden teeth in the upper surface. There are three drive shafts; to the north, west and south. The ones to the north and west have 50 mm (2") diameter iron shafts with 280 mm (11") diameter wooden pinions engaging with the outer set of teeth. The bearings of the inner ends of the shafts are carried on pivoted wooden levers supported on wooden hangers, to enable the pinions to disengage and are held in place by wooden wedges.

The south drive shaft is wooden, octagonal, 125 mm (5") wide across the flats, engaging with the inner set of teeth on the crown wheel. The inner bearing is carried on a pivoted wooden lever supported on wooden hangers, which connects at right angles with a dog iron to another pivoted wooden lever. When the pinion is engaged it is held in position by a pivoted iron hanger with a lug and pin. There is a triangular projection from the hanger to which was attached a rope. To disengage the pinion the hanger is swung aside, either by being hit with a hammer or by pulling on the rope. Another rope is fastened to the end of the lever and these two ropes go up through the bin floor and attic floor and pass over a double sheaf pulley located in the roof. Thus the operation of the sack hoist can be controlled either from the stone floor or from the attic floor. (Fig. 3).

The northern drive shaft has a bearing at the outer end supported on a wooden beam spanning the adjacent window opening . There are two wooden belt pulleys; one 726 mm (2'6") diameter which connects to the line shafting and one 406 mm (1'4") diameter which drove the silk dressing machine located in the north-east corner of the stone floor.

The shaft at the west side of the crown wheel is supported by a plummer block in the west wall. This shaft is fitted with a flanged wooden pulley 790 mm (2' 7") diameter, which drove the wire dressing machine located at the west side of the stone floor. This has two small wooden belt pulley wheels, one vertical and one oblique. It is noted that the stairs between the stone floor and the bin floor have been kept some distance from the west wall to enable this belt to be clear of the stairs.

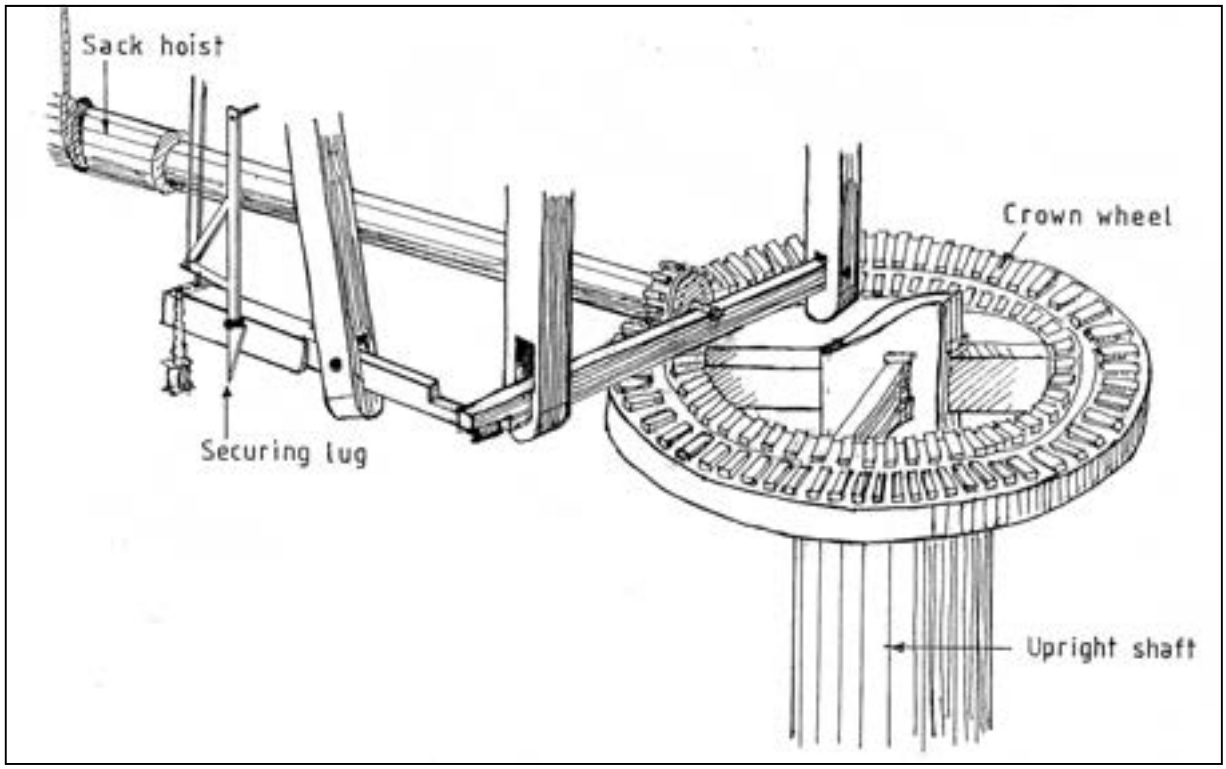


Fig. 3 Sack Hoist Drive, Duncton Mill

The shaft running to the south is wooden, partly octagonal and partly circular 190 mm (7½″) diameter, supported at the south end on a built-up timber hanger from the floor beam, and with wooden slats nailed to create a hoist drum. This formerly carried a rope, the upper end of which passed round the sack hoist drive pulley in the roof. There is also, at the south end, a wooden wheel 355 mm (1′2″) diameter on the shaft, with a splayed edge.

A main run of line shafting extends the full length of the mill. The shaft for the northern two bays is 50 mm (2″) square and the southern section is circular, 40 mm (1½″) diameter, the two sections being connected with a dog clutch. The shaft to the southern bay is missing, although the plummer block in the south wall is still extant. The north end bearing is carried on a wooden post. The shafting is supported at each floor beam with bearings carried on wrought iron hangers. There are two wooden pulleys; one 726 mm (2′6″) diameter which drove the smutter located at the east side of the stone floor, and one 510 mm (1′8″) diameter which was later adapted to drive an irrigation pump. This is a hand-operated reciprocating pump, a *Demo* patent sprayer manufactured by Herod's of Wisbech and has been installed at the east side of the stone floor. The belt drive from the line shafting is connected through two-wheel reduction gearing by a crank with a wooden connecting rod fastened to the handle of the pump. This was extant in 1936.[1]

There were originally three pairs of stones, although by 1946 one had been removed. These had circular stone cases and low wooden horses and hoppers, wooden stone nuts with slip cogs and wooden bridge trees.[2] Now there are no stones, although there is half a runner stone in an adjoining garden. Two stone nuts, one stone spindle and a quant are extant but no longer in situ. There are two iron ratcheted twist pegs fastened to the posts of the hursting which formerly controlled the grain feed into the shoe by way of a crook string. The bridge trees of the east and west stones and the brayer of the east stone together with its tentering gear are extant.

In the roof, the sack hoist comprises a wooden shaft, part circular, 180 mm (7″) diameter and part octagonal on which are nailed wooden slats to create the winding drum for the sack hoist. Sack flaps are provided at each floor level. The drive to the shaft is by a wooden pulley 915 mm (3′0″) diameter and 215 mm (9″) wide with built up sides and spacers, which took the drive from the stone floor.

Beneath the smutter there is a winnower which has a 150 mm (6″) diameter pulley which took the drive from the line shaft by way of the pulley wheel, later adapted to drive the crop sprayer. (See above) The belt to this drive was protected by boarding.

Beside the hopper, at the west side, at bin floor level there are two gear wheels. It is not known what drove these, but it is presumed they drove a jiggler in the bottom of the hopper.

There are two large hoppers from attic level; one at the north-east corner of Bin A, which has an outlet discharging into the wire machine and another at the west side discharging into the silk machine. There is also a small double hopper at the north side of the entrance door at bin floor level. The outlet from these does not appear to have connection to any machine.

At high level beneath the bin floor there is a wooden duct 280 x 215 mm (11″ x 9″) externally, a total length of 8.2 m (27 ft). running across the mill from a point adjacent to the smutter, turning through 90^0 and finishing over the west stones. There are no end caps and no evidence of any machinery therein. The fall from end to end is 175 mm (7″) and there are three 175 mm (7″) square apertures in the soffit. The function of this is unknown.

There is a wooden spout from the attic floor to discharge grain to the south pair of stones but there is no hopper associated with this spout.

There is a small zinc-lined spout from the north-west corner Bin E discharging into the stone floor, but there is no machine associated with this.

The stone floor formerly contained three pairs of stones, no longer extant, with a wire machine at the north-east corner, a silk dressing machine at the west side and a winnower along the east wall. There is one bin in the south-east corner.

The grain would have been delivered at bin floor level and hoisted up to the attic level and distributed down to the stone floor for processing. It would then have been hoisted back up to the attic for distribution to the stones for grinding. The finished flour would have been lifted up to the bin floor where it would have been stored prior to being delivered into carts.

The mill is an interesting example of an eighteenth century water mill surviving in largely its original

condition. Its condition is reasonably sound. The structural walls are stable and although there is some rot this is not irreparable. The plate supporting the bearing of the upright shaft has rotted, so this has dropped some 200 mm (8″), together with the great spur wheel and crown wheel.

One strange anomaly is that the brickwork to the north and side ends appears to have been inserted but when and why this was done is unclear. The disconnecting mechanism for the sack hoist drive is unusual and raises interesting question about the efficacy of reconnecting the drive when the wheel was turning.

History

In the Domesday Book there is a reference to the "hold of Earl Roger, in Donechitone - four mills yielding 38 shillings ....."[3] A mill was recorded as having been on this site between 1347 and 1373, when the tenancy of the new mill is recorded, because the previous mill and mudwork "had been shattered and swept away by the flooding of the water".[4] On 25 July 1694, Guy Woods, Miller of Duncton, Bondsman was married.[5]

During the eighteenth century the mill was owned by the Hammond family. The existing mill dates from the 1770s, the previous one having been destroyed by fire, according to Frank Turner, a former miller [6.] In 1776 it was described as "a newly built water corn mill..."[7] In 1795, a dispute about the price of flour induced a threat to destroy this mill and another at Petworh unless the price of flour was lowered.[8] A watermill at Duncton was listed in the Defence Schedules of 1801. The miller, unnamed, says that he could supply five sacks of flour daily in time of invasion, the wheat to be provided.[9] Henry Hammond died in 1876 and the tenancy was taken over by Leonard Eames, who later moved to Hardham, near Pulborough and then by William Drewitt. The wheel and trough were replaced by iron ones in March 1882, as recorded on some graffiti to be seen on the boarding outside Bin E.

Frank Turner became the next occupier in 1887 and he died in 1936.[10] Milling ceased in 1920.[11] The water wheel was subsequently used to power a pump for irrigation, which was operating thus in 1936.[12]

The mill is currently being used as part of a fish farm with fish tanks in the spout floor of the mill and on the land immediately to the east.

My thanks are due to Sebastian Anstruther for allowing access to the site and giving me much help and encouragement.

A full report on this site has been prepared and is available on request from the author. This was submitted to the Association for Industrial Archaeology and won an Initiative and Recording Award in 2008.

Glossary

Garden wall bonds

These were originally devised to build garden walls 9″ thick, where both sides were required to be fair faced and the headers would have been exposed on both faces where their length might vary. It was therefore convenient to avoid using more headers than necessary. Flemish garden wall bond has three stretchers to one header in each course and English garden wall bond had normally three courses of stretchers with one course of headers. The odd thing about the use of this bond at Duncton is that there are only two courses of stretchers to one of headers giving an overall bond pattern of three courses. This anomaly is evident at the quoins which are built in English bond and a strange incongruity occurs.

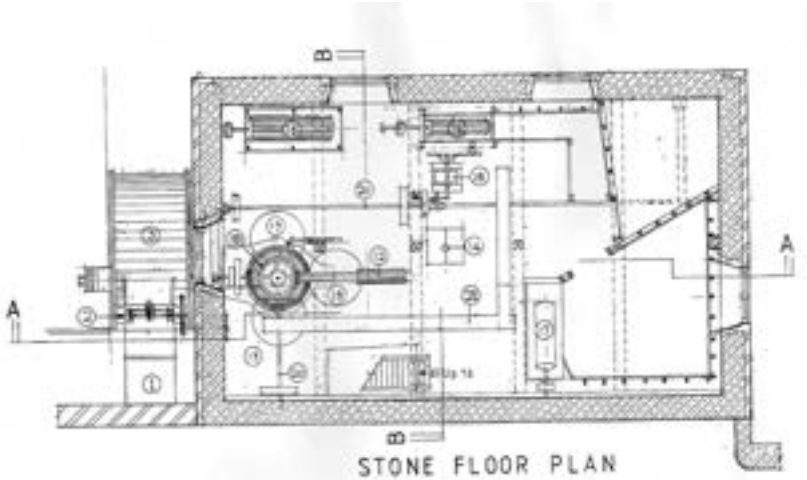
Sprattle arch.

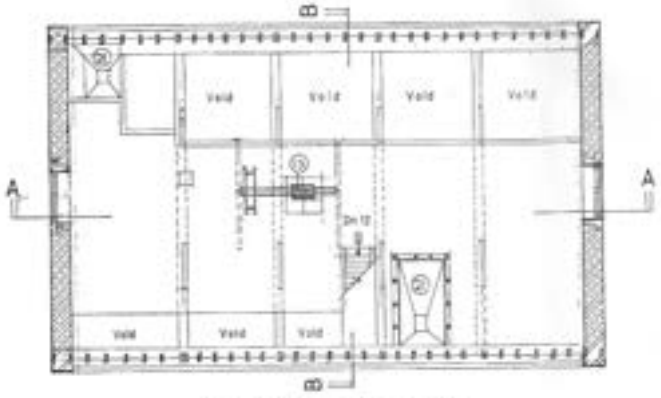
This is a cast iron arch which is placed over the end of the wheel shaft to carry the footstep bearing of the upright shaft.[13]

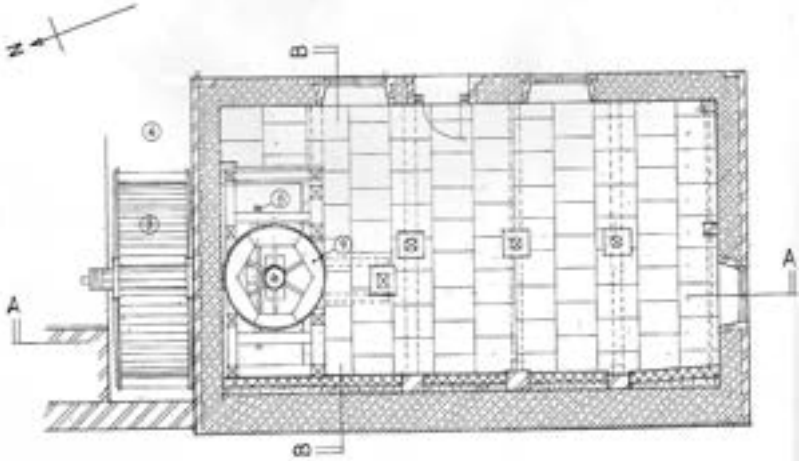
References

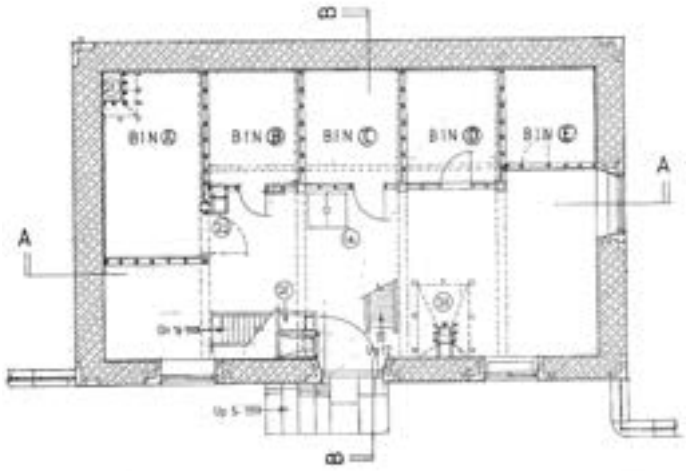
1. Frank Gregory and Ron Martin. *Sussex Watermills* (1997), p.34
2. H. E. S. Simmons Collection, p.170
3. *Ibid* p.169
4. Petworth Ministers' Account
5. Sussex Marriage Licences, SRS 9
6. Derek Stidder and Colin Smith, *Watermills of Sussex, Vol.II - West Sussex* (2001), p. 74
7. Sussex Weekly Advertiser, 16 March 1776
8. Stidder and Smith *op. cit.*
9. ESRO Defence Schedules
10. Stidder and Smith, *op. cit.*
11. *Ibid.*
12. Frank Gregory and Ron Martin, *op. cit.*
13. Tony Yoward, *A Consolidated Glossary of British Mill Terms* (1996), p.35

DUNCTON WATERMILL









KEY TO MACHINERY

1. Launder
2. Penstock
3. Overshot waterwheel
4. Tail race
5. Pit wheel
6. Upright shaft
7. Footstep and wheel bearing
8. Wallower
9. Great spur wheel
10. Crown wheel
12. Sack hoist drive
13. Sack hoist
14. Sack flaps
15. Silk dressing machine
16. Smutter and winnower
17. Wire dressing machine
18. Crop spraying pump
19. Location of stones
20. Line shafting
21. Grain hopper
22. Grain duct

KEY TO MATERIALS

- Brickwork
- Stonework
- Concrete blockwork
- In situ concrete
- Timber sections

NOTES

Plans show high level machinery

Broken lines show principal structural members of floor above

DUNCTON

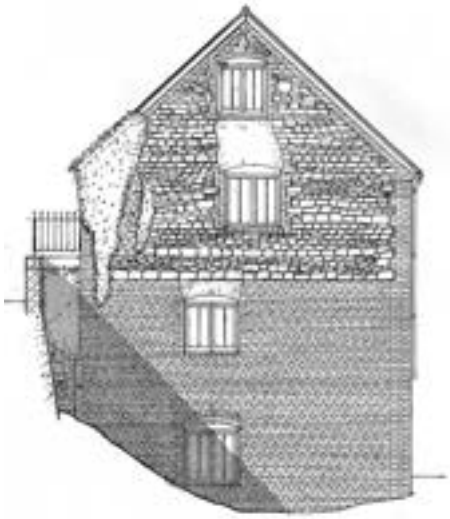
WATERMILL

PLANS

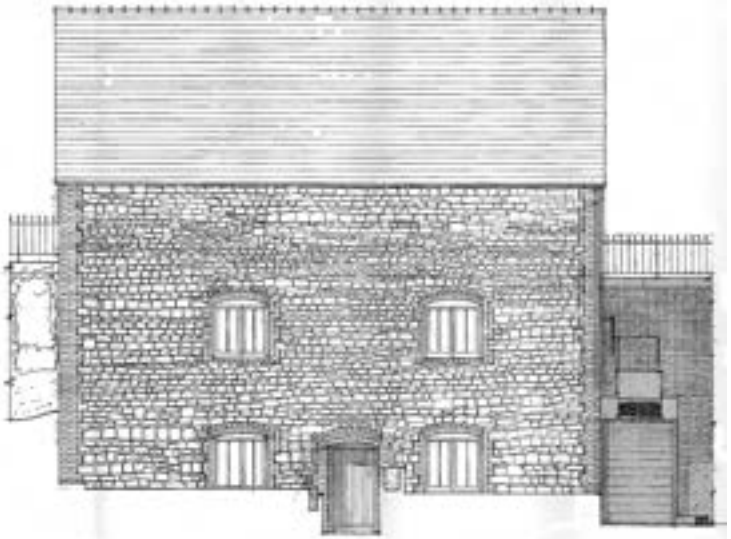
Drawing No. 1

Scale: 1:50 (on A1 sheet)

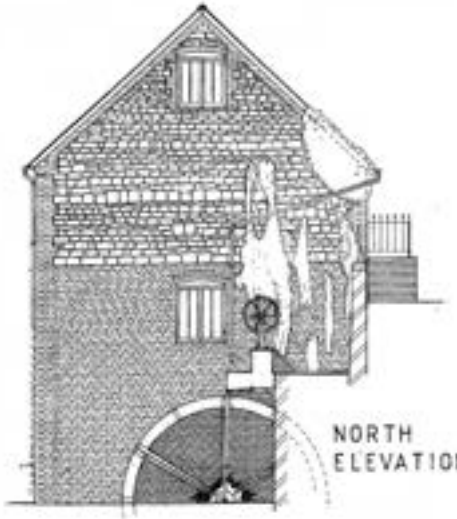
Date: May, 2007



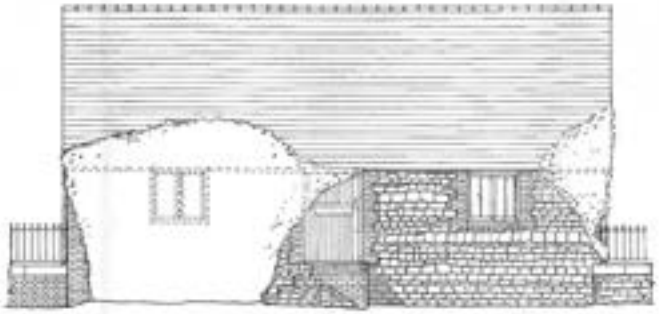
SOUTH ELEVATION



EAST ELEVATION



NORTH ELEVATION



WEST ELEVATION

SCALE

0 1 2 3 4 5 6 7 8 9 10 11 12 Metres

0 1 2 3 4 5 10 15 20 25 30 35 40 Feet

DUNCTON WATERMILL

DUNCTON

WATERMILL

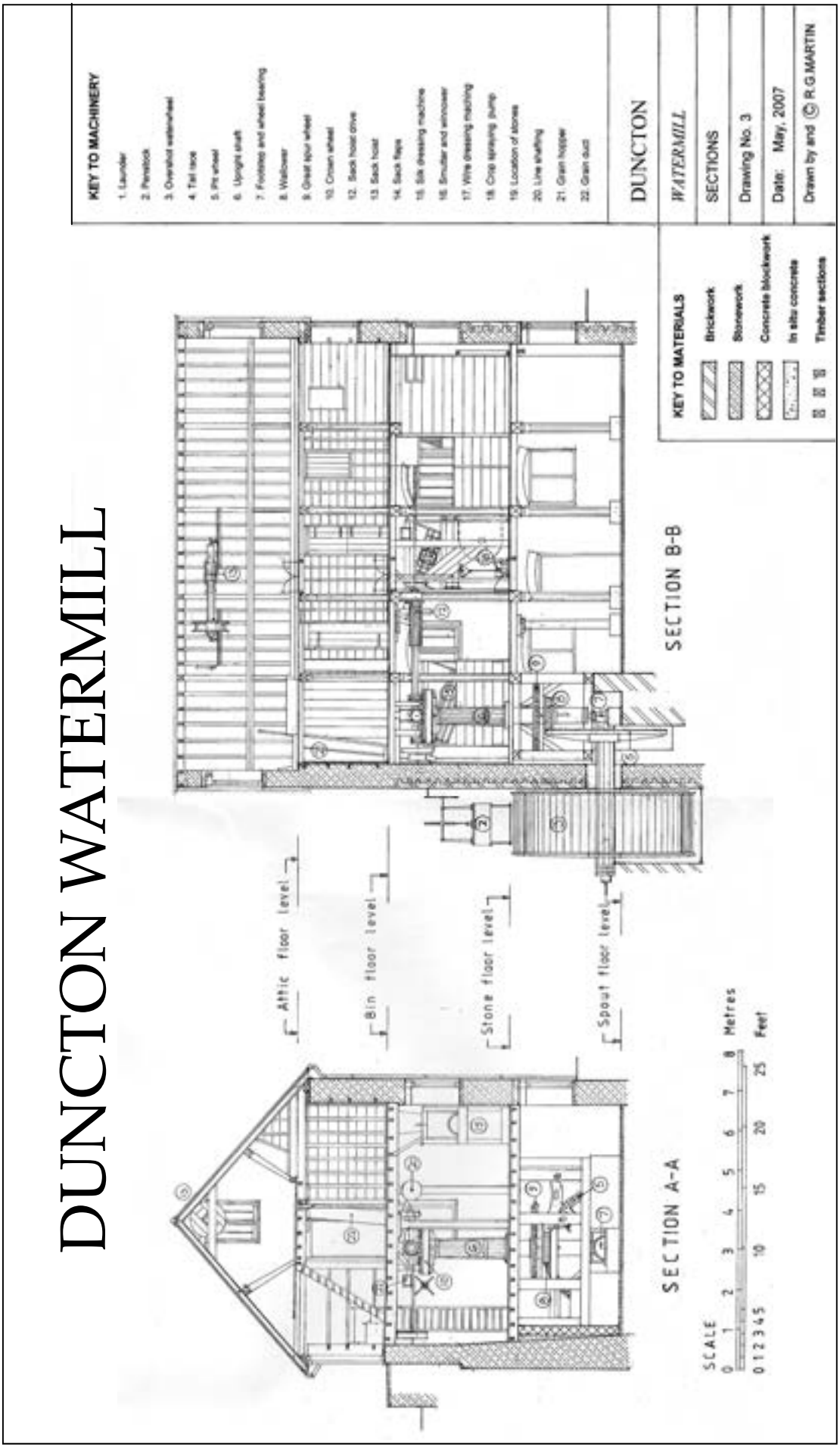
ELEVATIONS

Drawing No. 2

Date: April, 2007

Drawn by and © R.G.MARTIN

DUNCTON WATERMILL



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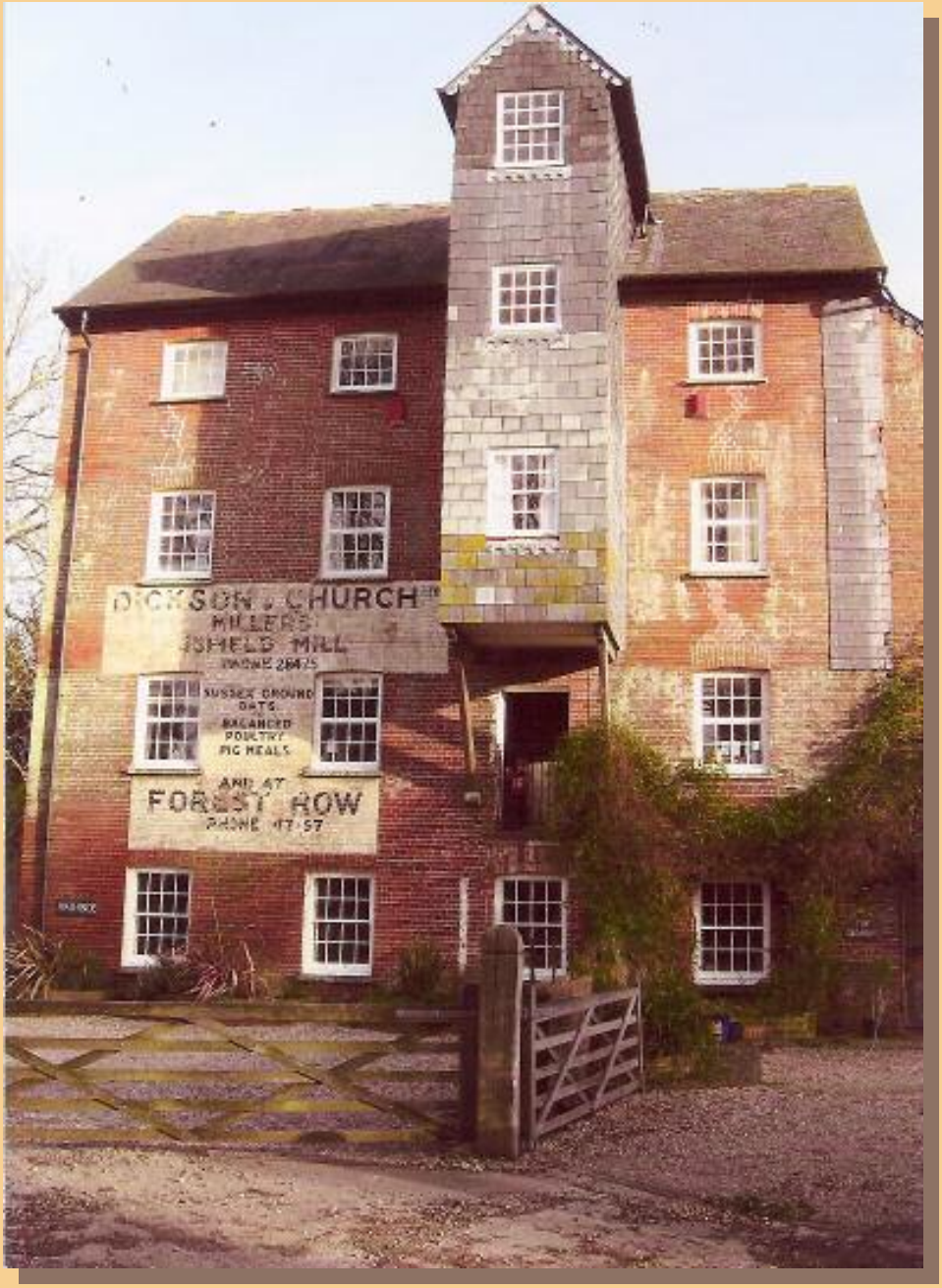

Isfield Mill today (Photo: Bob Bonnett)