



The Magazine of the Mills Section of the  
Society for the Protection of Ancient Buildings

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# Mill News



## **Water wheels floating?**

Micro-hydro power using stream wheels; an interesting approach to sustainable power

## **Windpower is not straightforward**

We need to be aware of the evidence; night-time is not so productive

## **Is Brexit the end?**

Not if you read Jon Cook's report from Western France

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## SPAB MILLS SECTION

37 Spital Square  
London E1 6DY

Switchboard 0207 377 1644

Direct line 0207 456 0909

Email: [millsinfo@spab.org.uk](mailto:millsinfo@spab.org.uk)

Website: [www.spabmills.org.uk](http://www.spabmills.org.uk)

Administrator – Silvia McMenamin  
0207 456 0909

Office Hours: Monday, Tuesday and  
Wednesday; 8.45 am – 4.45 pm.

Also on Twitter - @ukmills

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**Front Cover:** Rex Wailes measuring up  
the head wheel, Tower mill, Norton  
Subcourse, Norfolk.  
Picture – Mills Archive.

**Back Cover:** Lacey Green Smock Mill.  
Picture – Michael Hardy.

# Guest Editorial

## *Movers and Shakers*

**W**e are proud to be the home for major mill collections since 2002. Our track record encouraged the Science Museum to pass over to us the Rex Wailes Collection, one of the most important of the 20th century. The subsequent interest in our appeal for help with Rex's collection highlighted an issue for all those interested in the images and documents that record our milling heritage.

**T**he Mills Archive preserves and protects the records of our milling heritage, but that is not enough. We have created a world-leading catalogue, providing basic information about our millions of items with 82,000 entries including more than 71,000 digital images and covering 12,000 mills to a greater or lesser extent. In 2019 this rich resource attracted more than 180,000 virtual visitors who between them accessed almost three quarters of a million pages, so what is the issue?

**T**here is no doubt that Liz, Nathanael and their 20 volunteers are amazingly productive, aided by Section members who help spot errors and identify mystery mills for the benefit of all. Our concern is to ensure that, as this is your archive and we are here for the public benefit, do we provide what you need?

**W**e frequently refer to the 260 collections we hold and the mill information they contain, but to a non-specialist that is surely only half the story, should we not also make more of the people who assembled these collections often over a lifetime? To do that, we need your help.

**W**e recently received some encouraging comments from people who remember Rex; here are just two examples:

“I have a great respect and admiration for all that he did. I am certain that many valuable and exciting discoveries will come to light as the conservation work proceeds”

“I remember Rex as an influential and authoritative personality when I first joined the SPAB Mills Group, about 50 years ago. My interest, in common with the Mills Archive, is to help ensure that records carefully and uniquely made are safeguarded for generations to come.”

**C**ould you tell us who you think were the pioneers, the movers and shakers of the mill world? If you knew any or were influenced by them, please spare the time to let me know. I have just had a quick look at some possible candidates; you will have heard of some but the ones you have not heard of underline my point. Don't let their footprints in the sands of time vanish by neglect. To start you thinking here are just a few of our collectors we could name.

**T**here are local heroes such as Peter Dolman, Don Paterson, Clyde Riley, Gwladys Davies and Tony Yoward. I knew Tony very well, but I had no idea until today that GM Davies was Gwladys. In the list of national heroes, we have only recently discovered the story behind Miss EM Gardner, only the second woman on the list. Other national heroes include Frank Gregory, Stephen Buckland, Donald Muggeridge, Sid Simmons and Arthur Smith. Internationally there is Michael Harverson as well as Rex Wailes and there are characters such as Ken Major and Ronald Hawksley.

**I** could have included many more such as Niall Roberts, Stanley Freese and Roy Gregory, but I have left the best to last. What about Vincent Pargeter? We have his collection which covers 200 mills but both our attempts to obtain funding to catalogue his material have been rejected. Grants are now very hard to obtain, so our priorities depend on your support and what you think is important, so why not get your pen out or fire up your computer and help to restore the balance?

Ron Cookson  
chairman@millsarchive.org

*Wishing all our members a Happy New Year and a big thank you to you all for supporting the Mills Section from Mildred and the Mills Committee*

# Floating Water Wheels as Sustainable Hydropower Technology: Types, Design and Innovations

Emanuele Quaranta

*Water wheels are hydraulic machines that use the energy of water to rotate. They are used in watermills to power the mechanical engines, like the millstones for wheat grinding. Nowadays, some kinds of water wheels are also attractive machines to generate electricity (high efficiency if they are well designed under the fluid dynamic point of view), due to simplicity in construction, low costs and low environmental impacts (Quaranta, 2018; Quaranta and Revelli, 2016).*

Water wheels can be classified into gravity water wheels and floating (or stream) water wheels (Fig.1). Gravity water wheels are used in sites where the upstream water level is higher than the downstream one; the water level difference generates the so called head difference (that can be identified in the height of the waterfall, Quaranta and Revelli, 2018; Quaranta and Muller, 2018; Quaranta and Revelli, 2015). Floating water wheels are instead used in flowing water, or for very low head differences. While floating water wheels exploit the kinetic energy of the flow, i.e. the flow velocity, gravity water wheels exploit the potential energy, i.e. the weight of water.

Stream water wheels can be used for different purposes: power supply for local activities and mills (handmade works or crop grinding) (Fig. 2a) electricity (Fig. 2b) (Müller, Jenkins, & Batten, 2010, see Quaranta, 2018), and as devices for pumping water in irrigation canals, the so called spiral pumps (Fig. 2c). For the generation of electricity, an electrical generator has to be mounted at the shaft. Instead, in spiral pumps, a spiral tube is wrapped around the central shaft of the wheel. Water of the river is collected by the external edge of the spiral tube (located

at the wheel circumference). Water flows along the pipe, from the pipe edge to the wheel shaft, where a pipe connected with the river side carries water to the final destination. Common spiral pumps are able to pump to a maximum height of 20 m and a maximum flow rate of 40 m<sup>3</sup>/day.

Stream wheels are very convenient in sites where local manufacture and materials can be employed for their installation, like in rural areas. They are of simple construction (little civil engineering work is required), with low installation costs, few maintenance problems and their cultural and aesthetic value is high.

Three types of floating/stream wheels can be identified: stream wheels in shallow subcritical flow (water flows that flow quite slowly and with low water depths), that are called Hydrostatic Pressure Wheels; stream wheels in shallow supercritical flow, called kinetic wheels (fast flows and with low depths) and stream wheels in deep flow (the common floating wheels). These types of stream wheels are depicted in Fig. 3. The most optimized design of the Hydrostatic Pressure Wheel is the Hydrostatic Pressure Machine (Fig.3d, see *Innovations* section).



Fig.1. Gravity water wheel (Gatta s.r.l.) and floating water wheel (Aqysta).



## Floating Water Wheels – continued



*Fig.2. Stream water wheels for different purposes: (a) mechanical power generation (photo courtesy of AIAMS Italy), (b) electricity production (Turnock et al., 2007), and (c) pumping in irrigation systems (photo courtesy of Jaime Michavila (Aqysta)), see Quaranta (2018).*



*Fig. 3. Stream water wheels in: (a) subcritical shallow flow, (b) supercritical shallow flow (photo of Emanuele Quaranta), deep flow (photo courtesy of AIAMS Italy) (c), and Hydrostatic Pressure Machine (picture of Nick Linton) with diagonal blades to reduce water resistance (drag forces) at the blades (described in Innovations section) (d).*

### Technical design suggestions

The most important parameter to be chosen for the wheel operation is its tangential speed  $u$ . In some cases, the optimal tangential speed  $u$  is a function of flow velocity  $v$ , and the ratio  $u/v$  is similar for kinetic wheels and floating wheels. But, in kinetic wheels, due to the fast flow, water velocities are faster, typically higher than 3 m/s, so that kinetic wheels rotate more than three times faster than floating wheels. Tangential speeds of Hydrostatic Pressure Wheels are higher with respect to floating wheels. Since the wheel tangential speed  $u$  (the wheel velocity expressed in m/s) depends on the

diameter of the wheel  $D$  and on the revolutions per minute  $\omega$ , different combinations of  $\omega$  and  $D$  are possible to obtain a certain tangential speed. The range of wheel speed should be chosen in order to obtain reasonable diameters for engineering applications, like between 1 m and 5 m. The higher the diameter, the higher the costs, but the lower the outflow power losses downstream, due to the more favorable blades inclination with respect to the free surface of water downstream. The final solution will depend on the best compromise. At the moment there is not enough supporting literature on this interaction, that should be investigated in the future.

## Floating Water Wheels – continued



Fig.4. (a) The floating water wheel with the hydrodynamically shaped floating structure, that can convey water to the wheel with minimum head loss (experimental installation, W.M.J. Batten Batten et al. (2011)); (b) example of a floating wheel in deep water, real installation (photo of Salmini Santino Elettromeccanica, Italy)

Instead, the minimum value of the number of blades can be determined considering that when one blade is fully submerged, the upstream and downstream ones should be in contact with the water surface. Then, the final value ranges between the minimum one and two times it.

Speaking about the shape of the blades, a curved blade shape would be useful to reduce water resistance and friction, and to increase power output, due to the better exploitation of the flow kinetic energy (Quaranta, 2018).

### Innovations in floating water wheels

The optimised design of the Hydrostatic Pressure Wheel (Fig.3a) is the Hydrostatic Pressure Machine (HPM, Fig.3d), intentionally designed to behave like a weir, and with blades mounted diagonally to reduce water resistance while rotating in water. Standard HPM dimensions are with external diameter (maximum diameter) three times larger than the downstream water depth, while the central hub diameter is as large as the

downstream water depth. This means that the hub has a diameter equal to the head difference, and blades with a depth similar to the downstream depth. The upstream water depth ranges up to the hub top level. The HPM has a smaller diameter than common HPW, and it is more compact. A prototype of HPM has been tested at Politecnico di Torino (Italy), and a video of the tests is available here:

<https://www.youtube.com/watch?v=kHwDvpF9Q5U>.

Since an accurate blade design is not enough to increase significantly the power output, studies focused on the floating and supporting structure of the wheel (Fig. 2b, Fig.4) have been developed over the last decade (some of these works, cited in Quaranta, 2018, are: Batten et al., 2011; Cleynen, Kerikous, Hoerner and Thevenin, 2017; Hadler & Broekel, 2011; Müller and Batten, 2010; Turnock et al., 2007). The floating structure has a contraction region upstream of the wheel which is designed for the development of an head in front of the turbine. A downstream expansion section is provided so that the flow can exit at a shallower depth and with

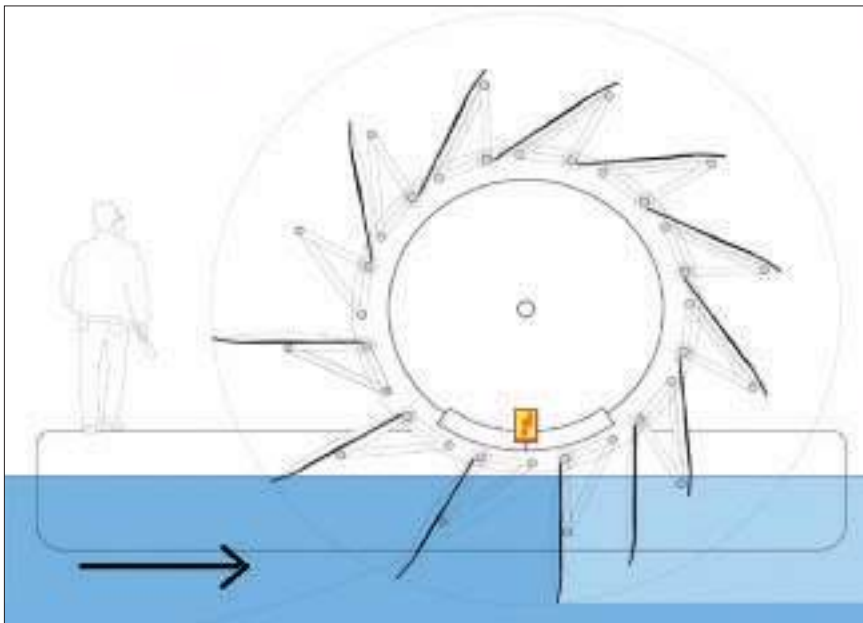


Fig.5. Floating wheel with adjustable blade inclination, so that inflow and outflow losses are minimised.

Photo courtesy of Hartmuth Drews.

## Floating Water Wheels – continued

higher velocity. Downstream separators are installed to provide a region of low pressure downstream; the water level downstream of the wheel is hence reduced, facilitating the water outflow process. A base plate is installed under the wheel (Fig.4), and, generally, a curved bed shroud below the wheel has to be provided.

When outflow losses are also desired to be minimised, adjustable blades could be used, where the blade root is hinged to the wheel instead of being fixed (Fig. 5). In this way, blades are free to adjust their inclination automatically. After passing under the wheel shaft, blades automatically assume a backward inclination. Therefore, at the outflow they dispose normally to the water surface, minimising water uplift downstream and increasing the efficiency (Fig.5).

### Conclusions

Nowadays, thanks to the renewable energy targets set in worldwide legislations, and the need of energy in remote localities, micro-hydropower is becoming very attractive, and stream wheels can constitute an interesting technology in this context. The review presented in this article, based on the scientific work published in Quaranta (2018), defines the state of the art of stream water wheels, guidelines to achieve a good preliminary design and the most recent innovations.

Successful studies to improve the efficiency have been performed. The most efficient achievement is the awareness that the optimal design can be obtained not acting only on the wheel rotational speed and blade design, but especially on the surrounding structure of the wheel. This consideration is valid for all kinds of stream water wheels. In shallow water, curved bed sections are required to minimise gaps and leakages, while, in deep water, ad hoc floating structure hydrodynamically shaped can double the power output. Anyway, also the shape and number of blades play a significant role in the achievement of the optimal efficiency.

Further research is needed to better understand the performance of stream wheels in shallow supercritical flow. Additional research is required to solve some gaps in the engineering design of stream wheels, like the optimal number of blades, their geometric dimensions and wheel diameter. The electro-mechanics equipment is an important aspect also.

### Acknowledgements and data requests

The author wants to thank all the companies and people that shared their data and pictures: Gatta s.r.l., Aqysta, AIAMS, Nick Linton, Salmini Santino and Hartmuth Drews. The author is available at [quarantaemanuele@yahoo.it](mailto:quarantaemanuele@yahoo.it) for future cooperations with any people, and he is always looking for water wheels data (like geometric dimensions, real applications and study cases) and pictures to be used for his future researches and articles.

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# Wind Report

Steve Temple

*As Stanley Freese once said “often enough when the wind blew in autumn, the miller would work from Sunday midnight to Tuesday evening, Wednesday morning to Thursday night, and Friday morning to Saturday midnight”. I now have evidence that this is unlikely.*

## I. Introduction

SPAB has bought an anemometer with which to measure wind speeds at a windmill. Below, I report on why we wanted to do this, and what results we are obtaining. This will be an ongoing project which has important consequences for all wind millers, and, we hope, will become a major influence on planning decisions.

A surprise result of measurements taken with the anemometer is to find that the wind only blows at night with less than 40% of the daytime speed – and 40% speed equates to much less, about 10%, of the time for milling, because the mill has a threshold wind speed below which there isn't enough power to grind. So, Freese's comment might represent a once in 10 year event, but hardly one that occurred often.

## Background

### Wind loss at Windmills

When a house is built or a tree planted near to a windmill, the wind available to the mill is reduced by the “wake” behind the obstacle whenever the wind blows from it towards the mill. Most mills (apart from the very tall town mills) were built in open fields some distance from their local village, typically more than 400 m, and enjoying unobstructed wind flows. In many places, modern developments have now encroached on the mills and caused a substantial reduction in the wind availability. At my mill, I now only receive enough wind to operate about 23 days per year, compared to 166 days during its working life before 1930 when the surrounding housing estate was built.

### Planning Issues

In such circumstances, additional building causes a disproportionately higher loss of the remaining available milling time and there is an urgent need both to define the current state and to predict reliably what further loss would arise from building the planned development so that the harm that would be done by granting permission can be quantified. Planning law, governed by the NPPF, states that “the benefit of the proposed development must outweigh the harm done to a listed building” in order for permission to be granted.

However, until very recently, the assessment of wind loss was always carried out by the developers themselves, and, not surprisingly, underestimated the harm. In particular, the loss due to the new development has always been judged without taking into account the current state. At Stanton Mill, a planning inspector upheld an appeal, rejecting our wind loss arguments out of hand and basing his decision on the developer's estimates instead.

Following this decision, I have been writing wind reports for planners based upon Dutch methods of assessing wind loss. The Dutch have used a calculation called the Molenbiotoop since the late 1940s, and in most districts this prescribes the maximum acceptable loss at any mill, restricting the height of developments within a 400 m radius of the mill.

This year, at High Salvington Mill, following SPAB representations based on the Molenbiotoop, another inspector rejected an appeal by the would-be developer, giving his decision that “substantial harm would be caused to the mill by wind loss”. This is a milestone because it seems to be the first time that wind loss calculations carried out on behalf of the mill have achieved any recognition.

What we now want to do is set formal guidelines for calculating wind loss and, if possible, get these accepted by planning authorities across the country. This process has to begin by determining the current situation at any mill. It would then go on to estimate the additional loss that would be caused by any new building and hence provide a measure of the harm that would be done to the mill.

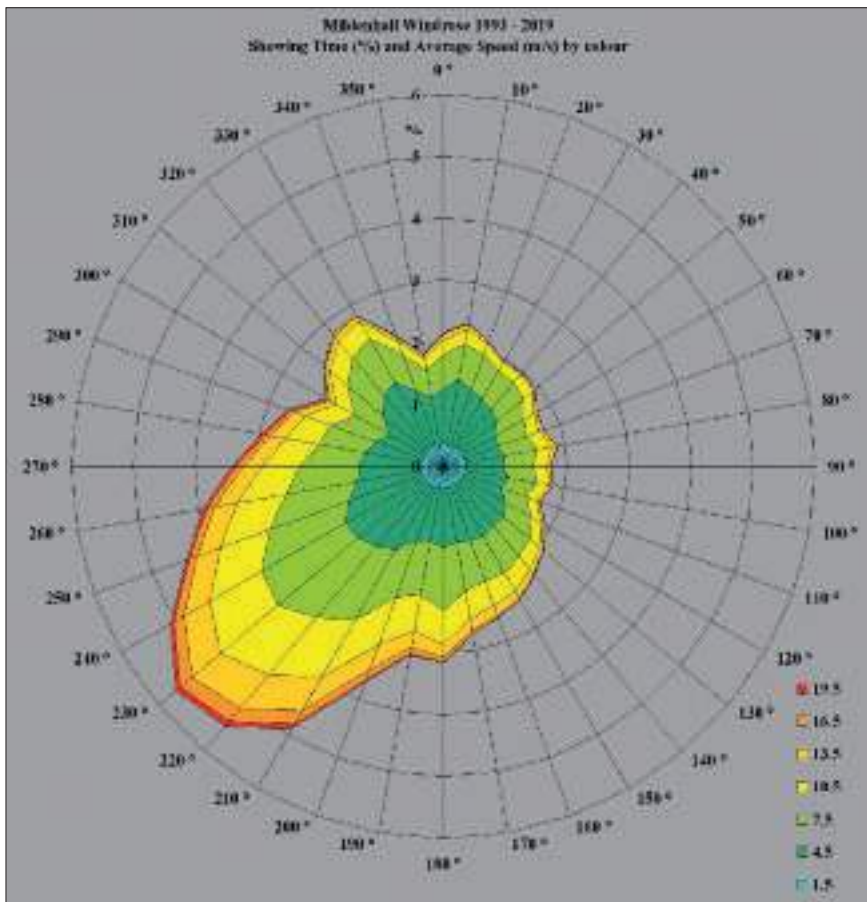
### The SPAB Anemometer

The primary data for determining how much wind is available at any site is the windrose, usually presented as a radar plot.

This shows the time and wind speed available (the radial axis) versus compass direction (circumferential axis). Such windroses are available from meteorological stations averaging the results over long periods. The one opposite (Fig. 1) is from RAF Mildenhall for the period from 1993 up to the present. This is the nearest published station to my mill at Impington – and it's 30 km away. Generally the meteorological stations are sited at airports as far away from local obstacles as



## Wind Report – continued



*Fig. 1. Mildenhall windrose - the coloured area shows the distribution of wind speed by direction.*

possible, so that this rose represents the open field condition, as enjoyed by most mills during their heyday.

To work out what is happening at Impington, we need to transpose this rose and take into account the wind loss due to local obstacles. Following a suggestion by Dave Pearce, SPAB has bought an anemometer and datalogger, built a magnetometer to go with it, and mounted it on my windmill.

The anemometer collects the windspeed and direction at frequent intervals and the datalogger records these. In addition, we need to determine which way the mill is pointing and add that to the anemometer's built-in wind vane – hence the magnetometer, which is an electronic compass built around the same chip as is used in mobile phones.

The anemometer is mounted high up, above the cap, and as clear as possible of the sails. The magnetometer and datalogger are inside the cap and turn with it. This confuses the wind vane, which does not know which way is north, so the magnetometer provides this information.

With these tools, we can measure how the wind speed differs at the mill from simultaneous readings taken at Mildenhall, and can deduce the relationship between them.

### Objectives

The overall objectives of the wind analysis are:

- to provide methods for transposing a local meteorological station windrose to the actual windmill, taking into account the local obstacles;
- to verify the whole calculation process for assessing the current state of the wind at a mill by testing it at a number of mills;
- to check and update the Molenbiotoop calculation used to predict future losses. As it stands, the Molenbiotoop does not allow for trees, and there is no available verification evidence from its original inception;

- to provide well substantiated statements to planners about the potential harm done by any new planning proposal in the vicinity of a windmill.

To meet these objectives, we need to break down the process into a number of steps.



*Fig. 2. The anemometer (arrowed) mounted on the fantail frame at Impington Mill.*

# Wind Report – continued

## Proof of Linearity

We need to show that the whole system is linear. In mathematical terms, that means that we can add or multiply two effects together to find their combined effect. This is one of the basic assumptions made by the Molenbiotoop. If the system is non-linear (and most fluid dynamics is) then we cannot justify the use of a simplified approach.

It is obvious that we cannot afford to spend 10 years or more collecting data in relation to any one windmill. However, if the system is linear, then we can use data collected in the much shorter term to define a simple relationship between wind at the mill and at the nearest

meteorological station, from whence we can get published long-term data. Basically, we assume that for any one direction, there is a simple factor that gives the wind speed at the mill as a fraction of the simultaneous windspeed at the meteorological station. This is pretty fundamental – if there were no such constant factor, then we could not use the long-term data from the station.

At Impington, the anemometer was installed for three months (May to July this year) during which time the wind turned a full 360° three times. A sample of raw data is shown in Fig. 3 below. The data has been cleaned up a bit, with averages taken over two hours to smooth out the gusts and missing data removed. Even so, it's not obvious how to make sense of it.

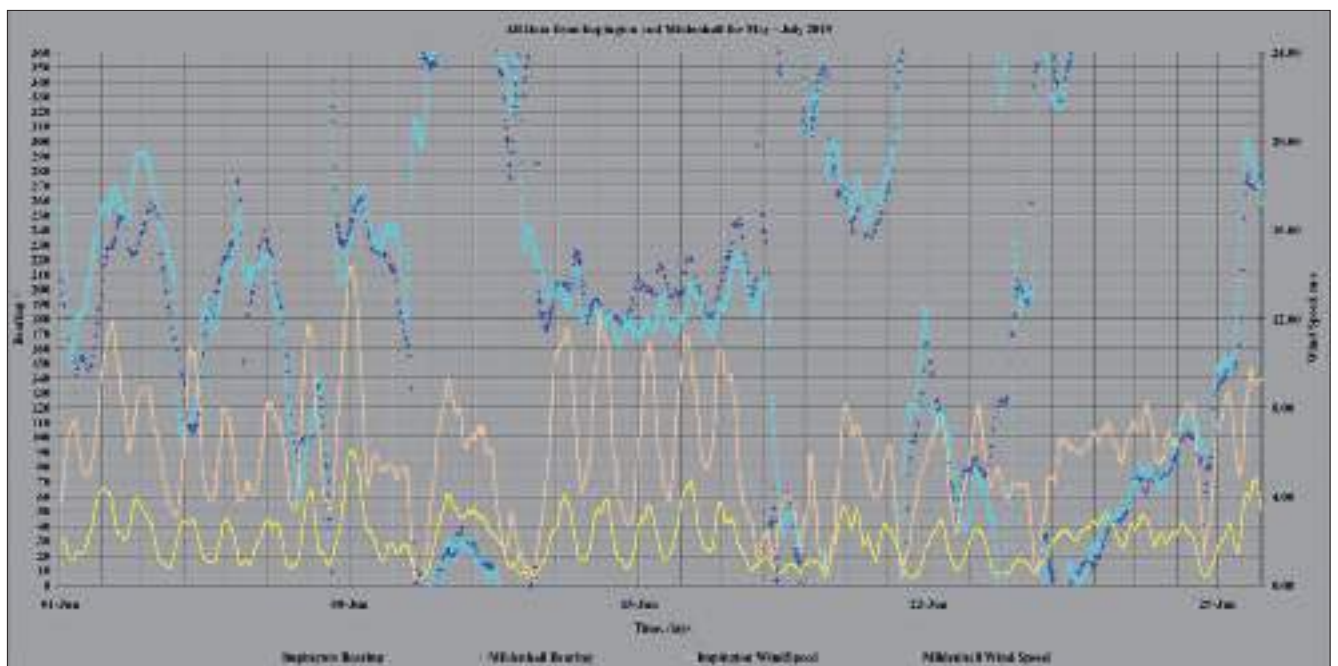


Fig. 3. Comparison of anemometer data from Impington and Mildenhall, May to June 2019.

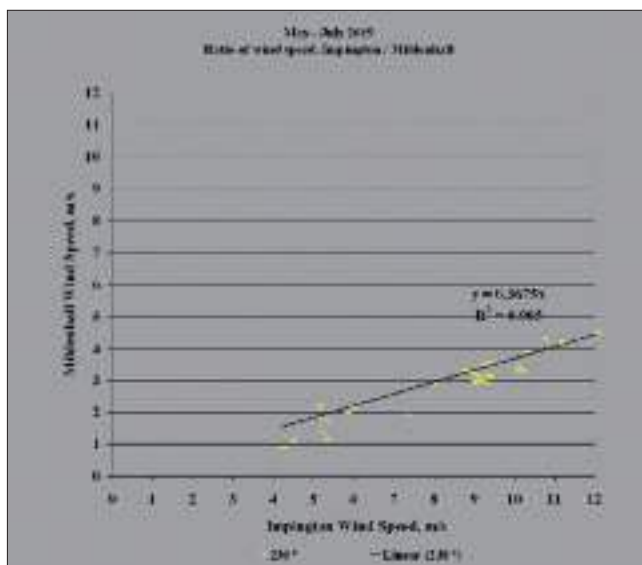


Fig. 4. Relationship between windspeeds at Impington and Mildenhall.

Something that jumps out, however, is that the wind speeds have a maximum and a minimum each day, a diurnal variation, with the peaks always occurring at around midday, and the troughs about midnight. I have not been able to find an explanation of this, except on the coast where differential heating of the land and the sea produce sea and land breezes diurnally. Since we are nowhere near the sea, this phenomenon was a great surprise and explains my comment in the introduction. It's a quite big effect with generally less than 40% of the wind available at night, and over the entire three months of measurement there were only a few nights when the speed barely got above the minimum speed for milling – certainly not enough to justify the intense night-time milling that Freese quotes.

The other obvious conclusion is that the speed at Impington tracks the speed at Mildenhall – this is what we hoped for.

## Wind Report – continued

There is enough data to draw a scatter plot for each 10° wind direction and show that the relationship between the two speeds is indeed linear. One of those plots is shown in Fig. 4 above.

It is fairly obvious that the solid line fits the data well, and means that we can accept the single factor; in this case, 0.37 with a 90% confidence, as relating the two sites for this direction, approximately SW. The factor means that the windspeed at the windshaft of the mill is 37% of that at Mildenhall. All the 36 sectors gave a similar linear relationship, all with a high statistical confidence, and with factors ranging from 26% to 53%.

### Transposition of Windroses

We can now take all the data from the long-term windrose at Mildenhall, multiply the availability of the wind in each direction by the equivalent measured factor and re-plot the windrose, effectively transposing it to Impington, taking into account all the current obstacles surrounding the mill. This is plotted in Fig. 5, with Mildenhall shown in orange and Impington in yellow. One way of interpreting the two lines is that the Mildenhall line represents what wind my grandfather would have received at Impington with open fields surrounding the mill and the second line represents what I get today, and makes rather depressing reading.

### Milling Time

We can go further and predict the actual time available for milling in each direction. The mill will only operate when the wind blows faster than 5 m/s at the windshaft, and by using a mathematical formula called the Rayleigh Distribution, we can calculate how much time the wind blows above any particular speed.

We need to know if this method fits with the data. As with the speed factors, this is crucial to being able to use the data effectively and to make future predictions. It is common practice to use the Rayleigh Distribution, but I have not found strong evidence to support its use. Here it is: for each direction, we plot the wind speed distribution data from Mildenhall (blue line) and from the Rayleigh formula for the same average speed (yellow line). They are extremely similar, as they are for all directions – so we can justify using the Rayleigh formula. This means that the windrose can be summarised by just two figures for each direction: the % time and the average for all wind speeds

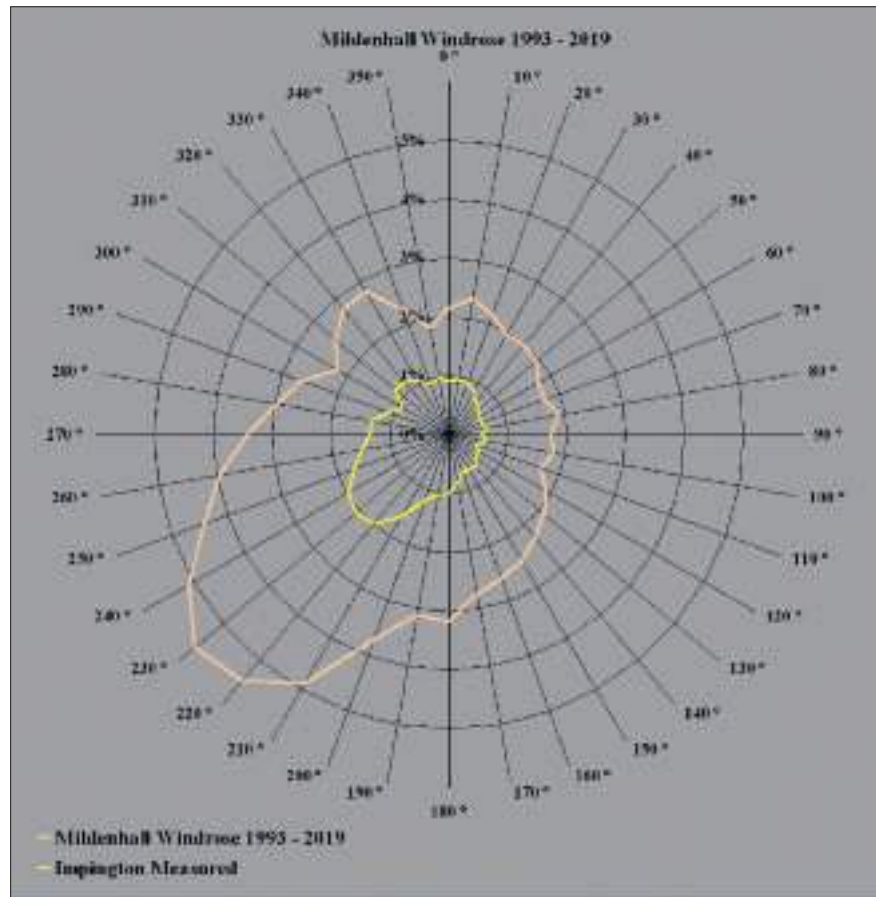


Fig. 5. Mildenhall long-term windrose transposed to Impington Mill.

from this direction. The transposition is summarised by multiplying the average speed by the speed ratio for each direction.

Using the Rayleigh formula, we can then calculate how often the wind speed lies between the minimum and

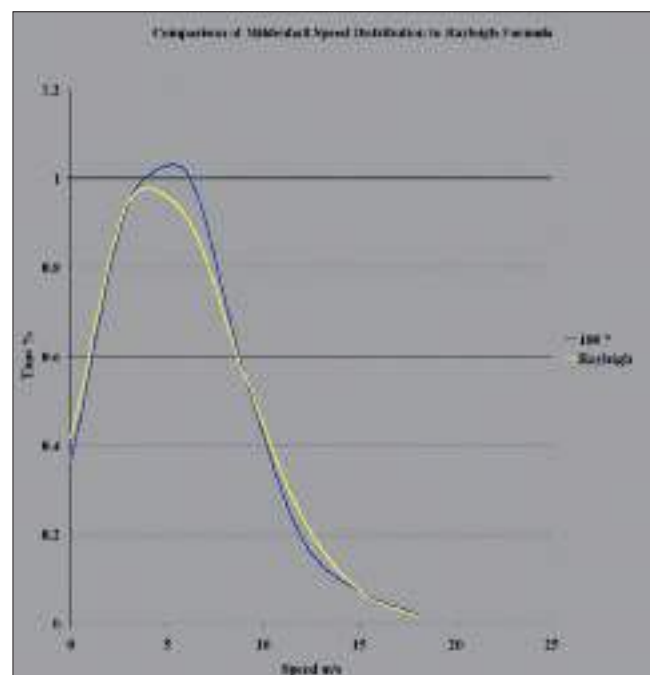


Fig. 6. Comparison of Mildenhall to Rayleigh Distribution.



## Wind Report – continued

maximum speed for milling, both for the original rose and for the transposed one. Fig. 7 shows these versions of the rose, but now the lines only show time available for milling, and we call it a “milling rose”.

Adding together all the times from the sectors, we find that my grandfather could have milled on 166 days each year, while I am restricted to just 23 days. This is even more depressing than the speed plot, because of the threshold milling speed. It fits with what I have known for many years – the sails will not turn if the wind has an easterly component.

**This is the key plot from the point of view of presenting evidence to planners. Anything the developers produce must accord with this result – and past experience shows that this is not what happens, as, for example, at the Stanton inquiry.**

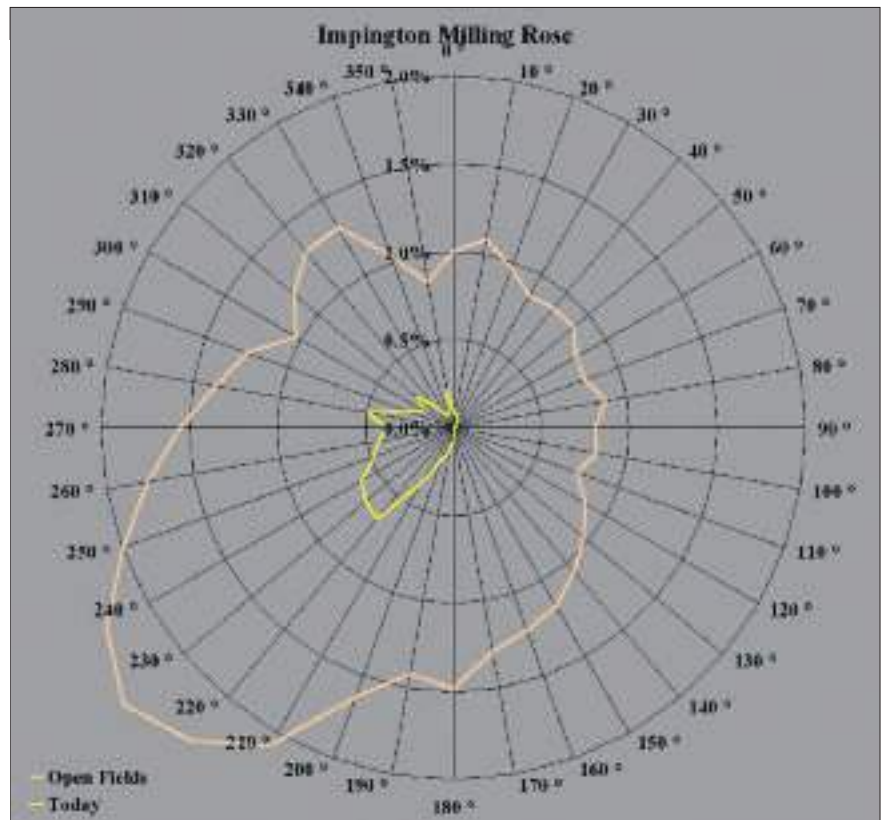


Fig. 7. Milling rose for Impington Mill.

On it must be superimposed any further loss due to the proposed development – which we look at next.

### Molenbiotoop

The Molenbiotoop calculation has been in use in Holland for many years, and is incorporated into planning regulations in many districts. Unfortunately, the original theory and measurements to support it have been lost, so we effectively need to redo them. We also need to extend it to model the effect of trees, using similar simplifications to those applied (very successfully) to houses. There are two objectives for doing this:

- we need to be able to predict the effect of a new development, putting its additional wind loss into the context of the existing situation;
- we may not always be able to collect sufficient data from anemometry to reproduce the milling time wind rose above – for example, when, as often happens, we don't get enough notice of a planning application to set up the anemometer and measure enough all-round wind speeds to replicate the above data. Instead, we can do a “desk top” study and predict the transposition of the rose using the Molenbiotoop alone.

The Molenbiotoop makes more assumptions of linearity and we need to check that these are justifiable. The

anemometer results can be used to do this: if we apply the Molenbiotoop to a known situation and it gives similar results to those measured, then its simplifications and assumptions are verified. Preferably, we need to do this several times for different situations (e.g. different mills and different seasons to allow for leaf fall).

The Molenbiotoop addresses the wind speed at the windshaft height (i.e. at the centre of the sails). It predicts the same factor that we have derived from the anemometry and which gives the ratio of the speed at the mill to the open field speed (upwind of obstacles), as given by the meteorological station.

It assumes that the effect of an obstacle is to lift the “boundary Layer” (the atmospheric layer in which the wind speeds are reduced by the drag of the ground) up to the height of the roof. This uplift then gradually reduces downwind of the obstacle until it meets the ground again and the free stream is restored. It is assumed that the distance in which this takes place is 50 times the height of the obstacle. The wake region can be thought of as a “wind shadow” in which the wind speed is zero. In the wake length, the speed at the windshaft height simply reduces linearly based on the height of the wind shadow at the windmill compared to the height of the windshaft. This is what gives the speed ratio for this obstacle. If there are multiple houses in line, then only the one that casts the highest wind shadow at the mill is relevant. This is an example of a non-linear effect.

## Wind Report – continued

The effect of a tree is somewhat different because it is porous, so the boundary layer does not come to a complete stop – instead it simply slows down to the porosity value. In summer, this may be 50% or so, while in winter it may be 80% – these are figures which need to come out of the measurements.

Because of linearity, the effect of a house and a tree or multiple trees in line is simply to multiply the wake profiles together.

### Height Measurement

It is fundamental to the Molenbiotoop that an “obstacle rose” can be prepared – measuring all the heights and distances for every dominant house and tree round the mill. Data for any new development comes from the architect’s drawings, but this has to be put into the context of all the existing obstacles in order to determine the additive effect of a new development. Obtaining the heights of the existing obstacles can be non-trivial.

### Google Earth

Google Earth (GE) can be used to measure horizontal distances to a high resolution, less than 1 m. However, where they are available, heights are only resolved to 1 m, and this is quite a large error compared to the height of typical houses. The values for heights given at Impington

accord well with a few measured ones. Fig. 8 shows the obstacle rose taken from GE at Impington in glorious 3D. Green lines show the dominant trees, red ones, the dominant houses.

Unfortunately, GE’s coverage of buildings in 3D is limited, and so at other mills it may not be so straightforward to plot the obstacle rose.

### Summary of Results

#### Impington Mill

The wind speed ratios as calculated by the obstacle rose for Impington mill and applying the Molenbiotoop calculations are shown in Fig. 9 overleaf, blue line, with the measured values from the anemometer in yellow. Also shown are error bars on the measured values giving an idea of the uncertainty arising from anemometry, and addressed by fitting a single common line to them as described above for the scatter plot.

The correlation between the Molenbiotoop and the measurement is good – everywhere the Molenbiotoop value falls within the range represented by a height error of  $\pm 0.5$  m and  $\pm 1$  standard deviations of the scatter in wind measurement. Most importantly, it shows that the Molenbiotoop method is giving results that are far closer to reality than any fluid dynamics calculation that have yet

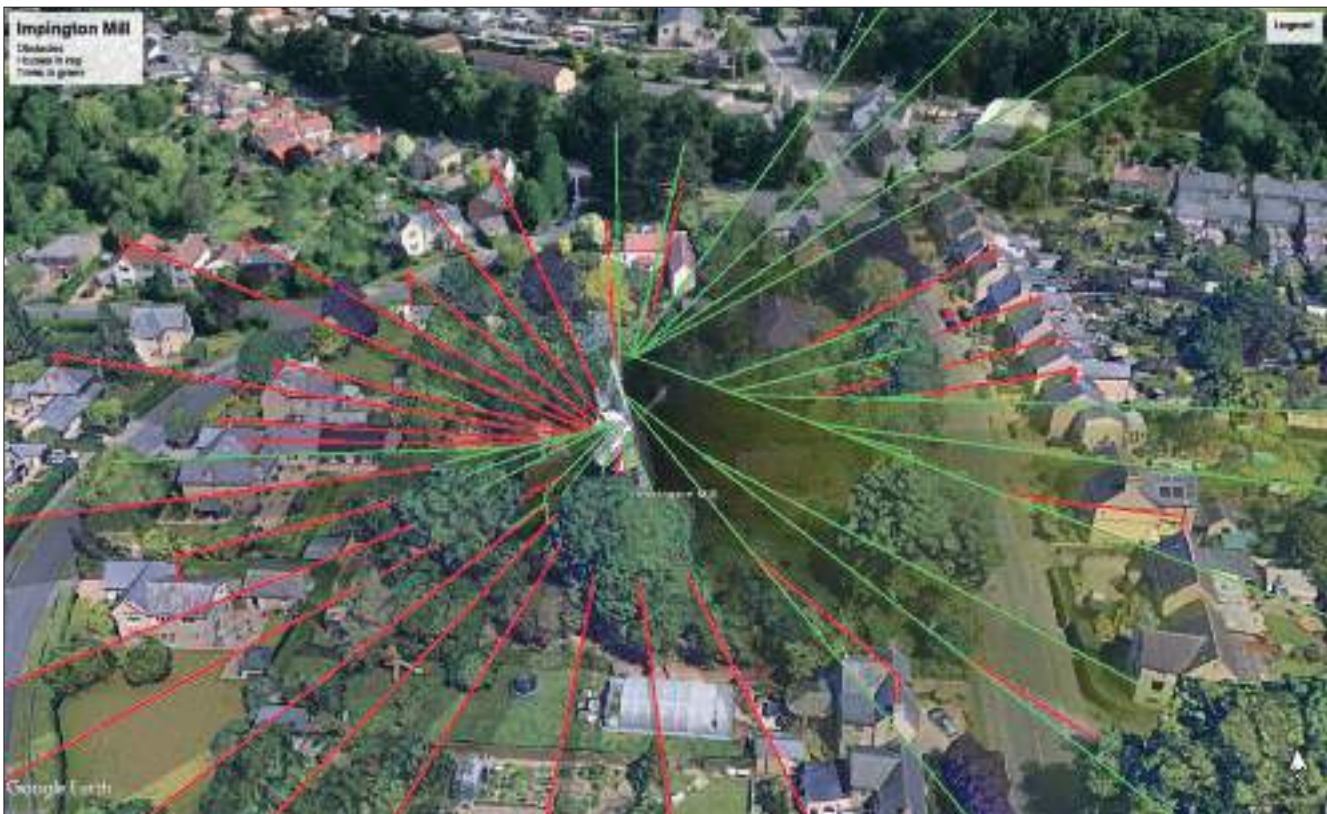


Fig. 8. Obstacle rose for Impington Mill derived from Google Earth.

## Wind Report – continued

been seen for this type of prediction. It is reasonable to assume, therefore, that it is much more reliable than the techniques typically used by would be developers. Its basic assumptions appear to work well.

### **We conclude that:**

**The Molenbiotoop can be used to transpose a wind rose from a nearby meteorological station to a windmill, taking into account the obstacles round the mill. It can be used to predict the additional loss that would be caused by a new development, expressing that loss as a percentage of the currently available milling time.**

### **Foster's Mill and beyond**

I have also gathered data from Foster's Mill at Swaffham Prior. At the time of writing, the results are similar but not so conclusive. At Impington, I was able to measure heights of obstacles directly from Google Earth, but this data is not available at Swaffham. Instead, I measured from photographs and this is neither straightforward

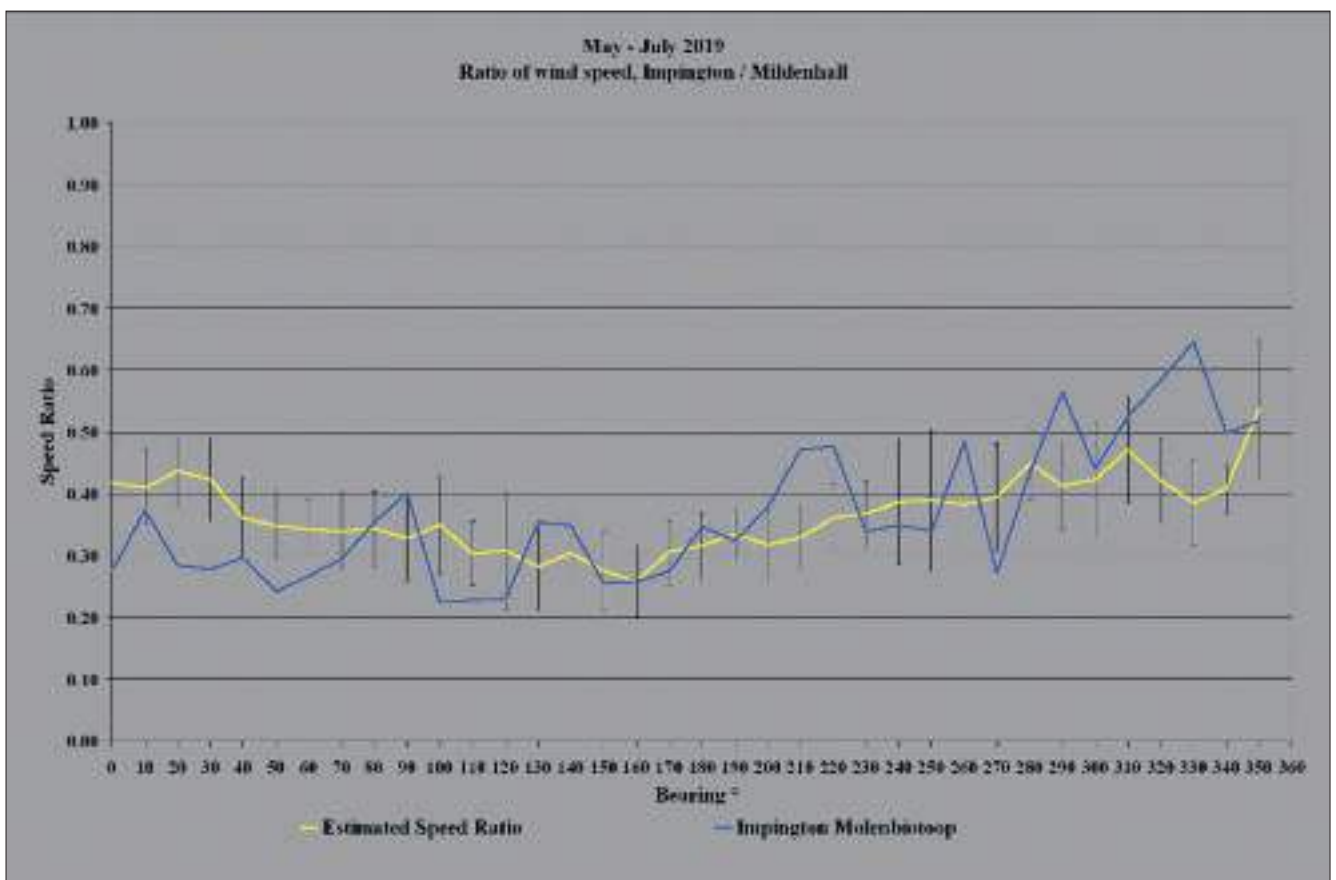
nor is it giving consistent answers, so that developing tools to do this is a work in progress.

I also plan to take measurements at both Impington and Foster's during the winter months to see how much difference this makes and to provide a winter calibration for trees. This should give a firm basis for setting the Molenbiotoop parameters to account for a variety of situations and thereby give authoritative values for prediction of harm to a listed building.

I plan to place articles such as this one in architects and planners/conservationists magazines.

### **Acknowledgements**

- This venture was made possible by the SPAB's acquisition of an anemometer system.
- The magnetometer was developed by John Lewis.
- The wind roses were provided by Iowa State University.
- The Molenbiotoop calculation is supplied by De Hollandsche Molen.



*Fig. 9. Comparison of measured and calculated speed ratios for Impington Mill.*





## Mills Section Event Calendar

### 2020

- Sat 14th March      **Event: Mills Section Spring Meeting**  
*Mills of Coast and Country*  
The Gallery, Cowcross Street, London E1  
(see page 15 for further details)
- Tue 17th March      **Conference: Managing Health & Safety Risks in Traditional Mills**  
Heckington Windmill, Lincolnshire  
(see page 21 for further details)
- Thur 24th April      **One-day course: Maintenance Matters**  
Upminster Windmill, Upminster RM14  
(see page 19 and our website for further details)
- 9th/10th May      **National Mills Weekend**  
Theme: Millwrighting Past and Present

For further details and online booking, please visit [www.spabmills.org.uk](http://www.spabmills.org.uk) and click on 'Courses and events'.

To contact us, please email [millsinfo@spab.org.uk](mailto:millsinfo@spab.org.uk) or telephone 020 7456 0909 (Monday to Wednesday).

### March Meeting 2020

Anyone wanting to give a Group report or members' contributions please let us know by 1st February (e-mail to me – [mcstonenut@gmail.com](mailto:mcstonenut@gmail.com))

It is essential we know beforehand so as we can set out the timings for the meeting and not disappoint anyone. At the moment anyone wanting to report will have 15 minutes, but if we get more requests it may have to be reduced to 10 minutes, but I will let you know.

Thank you,      **Mildred**

Welcome to our new Administrator, Silvia, who will be starting with us on 13th January. She will be working three days a week, Monday, Tuesday and Wednesday, and her hours will be 8.45am to 4.45pm.

Silvia will be attending our March meeting in London, so those attending will be able to meet her there. Her previous employment makes her ideally suited for her position with us.

# Casework Report

Steve Temple

## Comments submitted by SPAB

### WD/2019/1705/F (Wealden District Council) - Newbridge Mill House, Kidds Hill, Hartfield

*Proposed erection of new oak footbridge over watercourse*

Favourable response submitted.

*Approved*

### 19/02092/LBC - Furnace Mill Farm, Furnace Lane, Lamberhurst, Royal Tunbridge Wells, Kent

*Listed Building Consent - Extension to existing dwelling to form internal link to ancillary residential annexe; associated internal and external alterations to existing dwelling, ancillary residential annexe and landscaping.*

SPAB response:

I write in relation to the above proposals which have been referred to the SPAB for comment. We would like to thank you very much for allowing us an extension to the deadline for response.

Furnace Mill is a Grade II listed building of considerable historic interest and character and, while the SPAB appreciates the innovative approach put forward to connect the mill building to the existing dwelling, we do not feel able to support the application as it stands.

While we welcome the reinstatement of the lucum, the application does not include elevation drawings of the building so it is not possible to understand what is proposed for the lucum and new opening at first floor level or what the impact on the existing building would be.

In addition, we would like to ensure that the millstones are safeguarded. In response to the 2015 application to convert the derelict mill into an annexe we noted that the mill building was devoid of machinery except for two bed millstones and, as they do not appear on the submitted drawings, it would be helpful to understand how it is intended that they would be retained in the current proposals.

*Approved subject to full plans of the lucum being provided and to a watching brief by an archaeologist to ensure that items of historic interest are retained.*

### 19/01242/FUL East Cambs DC, Smock Mill, Swaffham Prior

*Proposed 1 No 4 bedroom dwelling | Fourth Land Parcel South East Of 30 And 32 Mill Hill Swaffham Prior*

SPAB response:

The Smock Mill at Swaffham Prior has long been partially converted into a dwelling, but its new owner aims to restore the working sails and to use them to generate electricity – sufficient, for example, to power an electric car. The conversion has preserved the original one-storey tower base of the mill, with a rebuilt two-storey smock on top. The latter uses the base sections of the original cant posts, extended (to replace rotting parts) with modern timber. Four of the eight posts have been strongly tied into the tower with iron stakes. The attachment is firm, though the stakes may need extending to the remaining 4 posts to provide for the additional wind forces to be expected when working sails are attached. It is planned to replace the non-working cap with a replica of the original one. The existing sails can be furnished with shutters to enable them to work, and a new curb and fantail winding system will be needed.

When the conversion was carried out, much effort went in to ensuring that it was largely reversible and would allow the mill to be put back into working condition at some future date. The proposed restoration to a working mill is entirely feasible and would result in the unique situation in England that Swaffham Prior would have two adjacent working mills. All the Cambridgeshire villages originally had multiple mills, so this would make an outstanding contribution to the milling scene in the locality.

For this project to be viable, the wind supply to the mill needs to be conserved. It currently has fairly open access to wind clockwise from N to WSW. The westerly directions are largely blocked by the rest of the village, including substantial modern developments and a line of four 19C houses (contemporary with the mill) along the eastern side of the B1102. The prevailing wind is from the S to SW, and the mill benefits from the majority of the most frequent and fastest winds. See map below [not shown here].

The proposed house would lie about 60 m from the mill to the SSE at a height of 7.5 m. The mill wind shaft (at the centre of the sails) is at a height of about 11 m with the sails coming to within 2 m of the ground. This represents typical Cambridgeshire practice, with little requirement to make high mills because the surroundings are so flat. A house as proposed would cast a “wind shadow” reaching 6.5 m height at the mill and blocking about 1/3 of the sail area. Effectively, it would reduce the possibility of operation from the directions which it shadows to near zero.

Such a development would not be allowed in Holland where planning in the vicinity of windmills is governed by a regulation known as the MolenBiotoop. This would

*continued on page 16*



# SPAB Mills Section Spring Meeting

## Mills of Coast & County

Saturday 14th March 2020

77 Cowcross St, Faringdon, London



Join us at 77 Cowcross St, Faringdon, London, for a day of fascinating and informative talks on the windmills and watermills of the coast and counties of southern England - and beyond!



Ripple Mill © Rob Cumming

### Guest speakers and their topics

- Keith Atkinson - *The Repair of Ripple Mill*
- Nick Kelly - *Windmills of the Offshore Islands*
- Charles Baxter - *Guedelon Castle's 12th-Century Watermill*
- David Plunkett - *Hampshire Watermills*
- John Wallis - *Millwrighting Challenges*
- Nathanael Hodge - *Rex Wailes Collection*

**Plus** regional updates

And members' contributions



Sack Mill (Mills Archive)

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I wish to book for the 2020 Spring Event as follows:

..... place(s) **with** lunch at £40pp (£45pp for non-members) - book **by 1 February** if you require lunch

Dietary restrictions: .....

..... place(s) **without** lunch at £35pp (£40pp for non-members)

I enclose a cheque for the sum of £ ..... payable to **SPAB Mills Section**.

Send cheques to: SPAB Mills Section, 37 Spital Square, London E1 6DY

To pay by credit or debit card over the phone, please ring 020 7456 0909

Please check **terms and conditions** at [www.spab.org.uk/content/terms-conditions-spab-events-and-courses](http://www.spab.org.uk/content/terms-conditions-spab-events-and-courses) before booking. Secure online booking available at [www.spabmills.org.uk](http://www.spabmills.org.uk) (click on Courses and events).

**BOOK  
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£40 with lunch  
£35 without



## Casework Report – continued

disallow any development that would cast a wind shadow more than 10% of the height of the windshaft – compared to the 65% of the proposed development. In a recent planning case at High Salvington Windmill, the Planning Inspector refused an appeal on the grounds that it would result in wind loss to the mill as calculated using the MolenBiotop method.

The proposed house is on an old orchard outside the current planning limit of the village (which runs along the line of the houses on the B1102). If planning permission were to be granted, it would imply a major shift of the planning boundary, and would release more land for development on the fields to the S of the Mill. Were this to happen, the mill would lose much more than 50% of its available wind. In Holland, they say “Loss of wind equals loss of mill”. They have long experience of this effect: once housing is allowed in the vicinity of a mill, it will no longer pay for its own upkeep, and interest in it dies away. This causes it to decay and eventually to collapse. Once built, houses are rarely demolished, so this effect is irreversible. There is already evidence of this type of decay in the rebuilt cap – it has not been maintained since the conversion, and does not have the benefit of turning with the wind to minimise the exposure, for example, of the fantail framework to the rear.

For all these reasons, the SPAB supports the restoration of the mill for the purpose of generating electricity and objects strongly to the proposed house development. We hope that our comments are useful in determining this application.

### Refused

#### **DC/19/05122 Babergh and Mid Suffolk DC Application for Listed Building Consent at Buxhall Mill**

*Structural repairs to tower mill, works to facilitate conversion of adjoining building and detached two-storey outbuilding to form 2 no. holiday lets and conversion of single-storey outbuilding to form 1 no. dwelling as detailed in the schedule of works  
Buxhall Mill, Mill Road, Buxhall, Stowmarket, Suffolk*

*No response submitted at time of writing – due 27th December*

#### **Re. PA/2019/1846: Disused Windmill (Hewson’s Mill), off Mill Lane, Barton-upon-Humber**

*Listed building consent to demolish existing outbuildings, strip out mill tower and convert to a new dwelling, 3 no new linked dwelling houses and a block of 4 linked dwellings*

We responded to a previous application, which was refused, and which has been re-submitted in a different form.

*No response submitted at time of writing – due 29th November*

## Updates on previous applications

### **Argos Hill Windmill, Sussex – Wealden DC**

WD/2019/0078/F – *Installation of ground based solar panels*

*Approved*

### **Soham Downfield Windmill, Cambridge East Cambridgeshire Council**

18/00059/FUM - *Land Rear Of 55 To 69 Fordham Road  
Soham Cambridgeshire: Development of 80 houses [near to  
Soham Downfield Windmill]*

*Still pending, but we have answered several queries from the officer*

### **Bartley Mill, Wadhurst, East Sussex Wealden District Council**

WD/2016/0831/LB – *Interior and exterior alterations to a residential listed building.*

*Nothing has happened since 2016*

### **Chirk Mill, Wrexham Wrexham County Borough Council**

P/2016/0453 – *Listed building consent for conversion of ground floor of Chirk Mill to a tea room, removal of internal wall to create a counter area for the tea room, conversion of outbuilding ... for the tea room, conversion of outbuilding to commercial kitchen, ... re-installation of internal doorway in*



*Hewson's Tower Mill, Barton-upon-Humber.  
Picture – Copyright Bernard Sharp under Creative commons licence.*

## Casework Report – continued

existing bricked-up doorway cavity, re-installation of windows in existing bricked-up window cavities in external walls.

*Nothing has happened since 2016*

### **Land adjacent to the Old Gated Road, Gaydon/Lighthorne Heath (Chesterton Windmill) Stratford District Council**

15/04200/OUT – Outline application (...) for the construction of up to 1000 dwellings, Assembly and Leisure floorspace, and Retail floorspace together with associated public open space, recreational areas, natural accessible green space and associated infrastructure including roads, footways/cycleways, car parking, attenuation ponds, sewers, swales and acoustic bund adjacent to the M40.

Note: the proposed plan does not seem to have been revised since 2015, though there is a new determination date of early 2019 – still not determined, so it's hard to tell what is going on. The site is 2 km from the mill, so there will be no wind loss arising from it.

*Still pending but no action since 2015*

## Appeals

### **APP/M3835/D/19/3227654 17 Furze Road, High Salvington**

We objected strongly to this application because of potential wind loss at the mill. The District Council refused the application, but the developer took it to appeal. This was dismissed in August 2019 (and there is no further recourse). The Inspector's grounds for refusal cited:

*6. Analyses of wind directions and speeds show that main flows are from the west-south-west as well as the south-west. The orientation of the existing dwelling relative to the windmill means that it would be likely to interrupt wind flows from the west. The Society for the Protection of Ancient Buildings (SPAB) has undertaken modelling to demonstrate the effect of the development on wind flow. This demonstrates that the development would cast a wind shadow that would cause a 12% loss of operational area for the mill. However, this is in the context that buildings and trees that are further away from the mill already cast a wind shadow. The effect of this is greater in summer months when the trees are in leaf. SPAB estimates that existing buildings and trees in the area reduce the working capacity of the mill by 75%.*

*7. The evidence provides clear demonstration that the development would be likely to have some effect upon wind flow to the windmill.*

This is the first time that SPAB wind analysis has been cited in a planning appeal.

*Appeal dismissed*



*High Salvington post mill.  
Picture – Sara Jarman.*

### **APP/CI435/W/19/3234300 Beggars Lane, Stone Cross**

We also objected strongly to this application because of potential wind loss at the mill and for its effect upon the setting. The case was dismissed and went to appeal which was determined on 25th November 2019. The inspector quoted from the SPAB objection and others in dismissing the appeal.

*Appeal dismissed*

If you have relevant expertise to offer, and would be willing and able to help with casework, please don't hesitate to contact the Mills Section – we'd love to hear from you.

## Boost your support for Mills

We are very grateful to all our dedicated and enthusiastic supporters whose membership subscriptions and donations help us so much in our work. We would not have achieved so much over the years without you! If you're interested in ways to boost your support to the Section without it necessarily costing you a penny more, here are a few suggestions.

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Help to raise funds for the Mills Section with every purchase you make online, at no extra cost to you. By signing up to the Easyfundraising scheme and nominating the Mills Section as your charity, every time you make a purchase through the scheme a small percentage of the total amount spent is donated to us. For more information visit

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### Leave a Legacy

Remembering the Section in your Will can be a way of providing a far greater level of support to the protection of our milling heritage than you may be able to do during your lifetime. For a small but influential organisation like ours, legacies and bequests make a real difference. Leaving us a legacy can also be an easy and effective way of reducing the inheritance tax due on your estate. Whatever the size of your gift, we promise to put it to good use. If you would like to know more, please contact Kate Streeter (tel: 020 7377 1644, email [development@spab.org.uk](mailto:development@spab.org.uk)) or visit [www.spab.org.uk/get-involved/support-mills/mills-legacies](http://www.spab.org.uk/get-involved/support-mills/mills-legacies).

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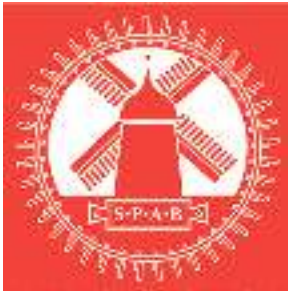
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If you would like to know more about any of the above, please don't hesitate to get in touch with us ([millsinfo@spab.org.uk](mailto:millsinfo@spab.org.uk) or 020 7456 0909).

We look forward to hearing from you.





# Maintenance Matters

Friday 24th April 2020

## Upminster Windmill

A one-day course for those responsible for caring for traditional windmills and watermills

Keeping a mill in good order will, in the long run, save money on repairs. Our popular short course offers the chance to spend a valuable day in the company of some of the UK's leading mill experts, gaining insight into how to maintain your mill using the correct methods and materials. All the speakers have many years of experience in either repairing, recording or milling in a mill, and delegates will be encouraged to discuss issues relating to their own mill, with speakers offering tailored advice.

The course will be held at Upminster Windmill, which is undergoing an extensive programme of repairs and is not currently open to the public. This fascinating venue will provide the opportunity to see many parts and aspects of a mill that are not usually visible.

You will learn about:

- Maintaining your mill in line with the Mill Section's philosophy of repair
- Recording work before and after a repair
- How to plan a project and where grants can be obtained
- Problems and solutions from an owner's perspective
- Maintenance techniques for working and non-working mills

**Price:** £130 pp including lunch and refreshments  
(£110 pp if booked by 28th February)

**When:** Friday 24th April 2020  
9.45am to 4.45pm

**Location:** Upminster Windmill, The Mill Field, St. Marys Lane, Upminster RM14 2QL

**Book online:** at [www.spab.org.uk/whats-on/courses/maintenance-matters](http://www.spab.org.uk/whats-on/courses/maintenance-matters) or visit [www.spabmills.org.uk](http://www.spabmills.org.uk) and click on Courses and events.

For enquiries please email [millsinfo@spab.org.uk](mailto:millsinfo@spab.org.uk) or call 020 7456 0909.



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**T**HE accompanying photograph shows a portion of the huge purchase of flour by the Soviet government from the Maple Leaf Milling Co., Ltd., prior to being shipped from Portland, Maine, to Leningrad. It is one of four cargoes cleared from this port aggregating 310,000 sacks of 140 lbs for Russian destinations, since the milling company began shipments in fulfillment of its contract. Apart from the shipments from Portland, cargoes were loaded at Halifax, New York, Baltimore and Philadelphia, and amounted in value to \$16,305,000, the largest single purchase of the kind ever made. The flour represented 9,600,000 lbs wheat, or the average crop of 475,000 acres. It was the equivalent of 165 trainloads. Thirty-four ships carried it across the Atlantic.



Taken from the North Western Miller 1925.

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## Wind & Watermill Repair, Conservation & Maintenance. Traditional Millwrights.













## Managing Health & Safety Risks in Traditional Mills

**Revised Conference Date: 17th March 2020**

### Speakers to include:

**Erik Kopp, Chairman, Guild of Voluntary Millers, The Netherlands**  
**Fabian Klasse, Board Member Britzer Mullerei, Germany**

**This conference is designed for millwrights, mill owners, mill managers and those responsible for managing health, safety and risk at mills. It will help you better understand your obligations from a health and safety perspective and how to better manage those risks while enabling the repair, maintenance, operation and opening of your mill to the public.**

Looked at from the perspective of Health and Safety legislation and practice, traditional mills are complex, challenging pieces of industrial machinery fraught with potential risk. Many of the major areas of risks are present – working in confined spaces, working at height, moving machinery (which is often difficult to guard), ladders, slips/trips and falls and, to add to the mix – the management of visitors and customers.

Over the last few years a number of significant incidents have taken place in mills in both in Europe and the UK. At the same time mill owners, in particular public bodies, are having to review their procedures and processes around managing risk at their mills, in some cases taking decisions that potentially compromise their ability to fully maintain their mills; making the work of millwrights even more challenging.

Our speakers both from the UK and Europe will share their experiences of assessing and managing risk in their mills to help you develop policy and practice at your own mills. The afternoon workshop will enable you to discuss your specific issues and gain feedback from fellow participants, many of whom will be tackling similar issues to your own.

To register your interest, please contact [mills\\_info@spab.org.uk](mailto:mills_info@spab.org.uk), telephone 020 7377 1644. For more information, please contact Luke Bonwick or Jonathan Cook who can be contacted at [info@fostersmill.co.uk](mailto:info@fostersmill.co.uk) or [luke@bonwick.co.uk](mailto:luke@bonwick.co.uk).

We are grateful to the Heckington Windmill Trust for hosting and supporting the conference.

Heckington Windmill, Lincolnshire  
9.30am Registration for 10.00am Start  
Cost: £50.00 per participant including lunch and refreshments

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# Kent County Council windmills

Luke Bonwick

*During the 1950s, Kent County Council (KCC) embarked on an ambitious programme of windmill repair and preservation. Over four decades the Council took on responsibility for a total of eight timber-framed windmills. Sixty years on, KCC remains committed to its aim of repairing and conserving each of the windmills and maximising public access to them.*

The smock mill became the most popular design of windmill to be built in Kent. Of the 17 smocks still standing in the county, KCC is responsible for six of them. Meopham Mill, listed Grade II\*, and West Kingsdown Mill, listed Grade II, were acquired in 1958. These were followed by Union Mill, Cranbrook (listed Grade I) in 1960, Drapers Mill at Margate (Grade II) in 1968, Stelling Minnis Mill (Grade I) in 1970 and finally Herne Mill (Grade I) in 1984.

The Council's two post mills are Chillenden Mill (Grade II\*), acquired in 1958, and Stocks Mill at Wittersham (Grade II), taken on in 1979. These two mills contrast sharply with one another in many respects – their location, design, internal machinery and vintage are all significantly different.

Maintaining each of the windmills in good condition is a challenge. The key parameters include finite amounts of available funding; the limited capacity of suitably skilled

millwright contractors and a variety of external pressures such as weather damage and insect infestation. Unlike tower mills, which are generally more robust, the structural elements of all eight KCC windmills are made of wood. Their continued protection therefore relies heavily on timber cladding, paint, tar and workmanship of the highest quality.

In spite of these difficulties, four of the eight mills are currently maintained in an 'active' condition, with working caps and sweeps. Union Mill at Cranbrook regularly produces flour by wind power on certain days during the visitor season. Recently completed repairs at Drapers Mill, Margate, have left this mill capable of producing flour using either its sweeps or the equally impressive 1920 Crossley gas engine.

Stelling Minnis Mill can also be powered by wind or engine power, although a small amount of work to the millstones



*Sweeps being removed for repair and repainting by Tim Whiting at Chillenden Mill in December 2019.*



*Tarring and window repairs being carried out by Owlsworth IJP at Drapers Mill, Margate in September 2019.*

## *Kent County Council windmills – continued*



*Electricity supply to West Kingsdown Mill being relocated underground by IAC Ltd in November 2019.*

is needed to enable milling to recommence. Unchecked tree growth in the surrounding area has reduced the power that the sweeps can develop, at least for the time being. At Herne Mill, although the millstones are not currently set up for work, the mill's hilltop location makes it a strong candidate for a future return to milling order.

All four of these smock mills receive hundreds of visitors every year, with several special events programmed over the opening season which typically runs from Easter until the end of September. KCC can organise and finance essential repair work but is completely dependent on local volunteers to ensure the mills remain accessible to the public. At Cranbrook Mill, with its seven floors, a minimum of eight volunteers are needed to ensure visitor safety on every open day. County wide, the willingness of local people to give up their weekends and bank holidays to show visitors around is very much appreciated.

Meopham Mill, which stands in the heart of a large village overlooking Meopham Green, has recently been made safe and closed to visitors while

plans for its repair are drawn up. The former engine shed adjoining the base of the mill is in daily use as the office of Meopham Parish Council, while the ground floor of the mill acts as the Council Chamber.

Meopham is one of the few hexagonal smock mills in the country and stands preserved with all its internal machinery intact. This includes a third pair of millstones on the meal floor which could be overdriven by wind power or underdriven by engine. The list of repairs required here is extensive and includes renewal of the reefing stage, repairs to the smock tower and cap frame, renewal of the fan stage and sweeps and an overhaul of the winding gear. If sufficient funding can be secured, the mill has the capability of being returned to working order, an aim which has begun to generate considerable enthusiasm locally.

The accompanying photographs show repair work in progress at some of the KCC mills in 2019. Further work at all eight mills is planned for 2020 and beyond, and updates will appear in future editions of *Mill News*.



*Meopham dismantled 2018 – Meopham Mill in 2018 with fantail blades and sweep shutters removed for safety.*





# *European Collaboration: the Seventh Annual Meeting of the Federation des Moulins de France*

*Jonathan Cook*

*At a time when the UK's relationship with Europe is under scrutiny like never before, both here and across the Channel, it was a very pleasant surprise for the SPAB Mills Section and Traditional Cornmillers Guild to receive an invitation to join the seventh Annual Meeting of the Federation des Moulins de France (FDMF), the French Mill Federation.*

Further enquiries established that the Federation was looking to organise an event to bring together different mills organisations from across Europe to explore the issues and opportunities that we face in our respective countries and through this to recognise those things we have in common, explore ways we might collaborate to tackle them and to learn from each other.

Yours truly agreed to go and represent both the Section and the Traditional Cornmillers Guild and so, on the 20th November, armed with a well-rehearsed presentation in French, I hopped onto Eurostar and travelled down to Niort where the meeting was to be held. Joining me, along with delegates from the regional mills organisations in France were Wouter Pfeiffer (representing the Hollandsche Molen, the Dutch Cultural Heritage Agency and the Dutch Cornmillers Guilds), Gabriele Setti, President of the Italian Amici dei Mulini Storici (AIAMS) and Armando Ferreira representing the Rede Portuguesa de Moinhos (the main organisation for people interested in mills in Portugal). A generous, warm welcome awaited us, the members of the FDMF were great hosts and the European representatives were soon introduced to the presidents of many of the regional mills organisations and various government ministers who were also joining the conference. The event took place at the Espace Regional – Aire Poitou-Charentes, a modern conference facility close to Vouille.

Over the two days of the conference, a number of key themes were explored, which I outline below. Through this

and the discussions around the conference, a number of areas of potential collaboration were identified. More about these once both the Guild and Section have had chance to discuss and explore them in detail.

## **France**

French watermills provided one of the main focuses for the conference, exploring the significant impact of the EU Natura Water Directive and its implementation in France. France, like Germany and to a lesser extent the Netherlands, has taken the decision to use the Directive to implement a series of river catchment-wide biodiversity assessments and associated action plans, ostensibly to improve water quality and the removal of pollution from many of its river systems. A major consequence of many of these action plans is to threaten watermill weirs as the plans involve the removal of “barriers” to the free movement of water, “restoring the original water course”, enabling fish to migrate upstream and enabling any pollutants to leave the river system as quickly as possible. Watermill owners have, as a consequence, found themselves fighting rear-guard actions to try and save their weirs, faced in many cases with local and regional government acting against them.

The FDMF is engaged at a national level to try and ensure watermill owners have a voice as a key stakeholder in the river systems alongside anglers, landowners, naturalists, agriculture and others, but so far they have been struggling to protect mill sites. The result has been a number of important mills have had their water supply removed. While comparatively few of France's watermills are still working, many have been converted to micro hydro electricity production. The fact that a weir is still being used, whether generating electricity or powering a waterwheel or turbine, has so far failed to protect mill sites. The French representatives were keen to understand the experiences of other European countries and to ensure the government representatives present heard how different the situation is in other European Countries. I was able to explain that so far there are very few examples of attempts to use the Water Directive to remove weirs associated with watermills in the UK.



*The opening session of the conference.*



## *European Collaboration – continued*

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The impact of the implementation of the Water Directive is being felt in other ways too. Mill owners have been required to conduct extensive biodiversity assessments at significant cost. One mill owner made a presentation on the study completed at her mill at a cost of €250,000, a sum she has been required to fund, although she may be eligible for retrospective grant aid up to 90% of the cost! These studies have confirmed that the ecosystems created by ‘artificial barriers’ (watermill weirs), most of which have now been present for hundreds of years, support their own complex ecosystems, sustaining many important, rare species of flora and fauna. The fact these local ecosystems will be significantly disrupted if weirs are removed seems to have escaped the decision makers.

All clouds have silver linings, so my late grandmother used to say, here, that silver lining has been an opportunity for some mill owners to use their biodiversity studies as marketing tools. The Moulin D’Edmond, close to Toulouse, has set up a network of wildlife walks showcasing the biodiversity found around the mill, something which is now drawing a new type of visitor to the mill and its facilities.

Whilst the UK is not experiencing the same issues at present, the same forces and competing interests along our watercourses exist. A key learning from the conference was that we need to be prepared to navigate similar political situations should they begin to arise as competition for water resources intensifies in the years to come.

### **Portugal**

For me, the presentation from Armando Ferreira was one of the highlights of the conference, introducing the mills of a country about which I know very little. Armando’s presentation not only showcased the incredible variety of both watermills and windmills found in Portugal, but also the social history and context which led to there being so many small watermills in Portugal, many of which remain and which are only now receiving attention and some protection. A primarily agrarian country which experienced industrialisation comparatively late in the 20th Century, rural communities relied on wind and watermills up until the 1960s and 1970s.

Armando showed examples of watermills with horizontal waterwheels, direct driving a single pair of millstones, just large enough to enclose the millstones, designs which go back to Roman times. Given the fact the mills worked until relatively recently, many are complete and families still care for the buildings, providing them with some protection. The country also had a heritage of windmills constructed in the late 19th and 20th centuries built with steel framed towers with sails constructed of steel and aluminium, many of which still survive. Portugal has only recently formed an organisation to bring people together

interested in protecting and promoting its milling heritage and Armando was keen to learn from the organisations represented to understand how Portugal can move forward protecting its milling heritage.

### **Italy**

The Italian Amici dei Mulini Storici (AIAMS) is also a relatively new organisation, formed in 2009 to promote and safeguard Italy’s traditional milling heritage. The organisation is working to survey and catalogue Italy’s mills, creating an archive and encouraging molinology research and associated publications. Gabriele provided an overview of some of the work being undertaken in various regions of Italy and showcased a number of mills.

### **The Netherlands**

Wouter Pfeiffer (who some readers may recognise, he having made presentations at Section meetings) introduced two very significant initiatives that have recently come about through inspiring leadership from Dutch mill colleagues. Firstly, the inclusion of the “Craft of the miller operating windmill and watermills” as Intangible Cultural Heritage of Humanity, as registered and recognised by UNESCO. The UNESCO Intangible Cultural Heritage List is internationally recognised and by succeeding in getting the craft of traditional milling recognised, the Netherlands have led the way in securing awareness and potential protection for our craft.

Now that the Netherlands have got the craft recognised, it may be possible for other countries to also have the craft recognised in their countries, including the UK. This will be increasingly important in protecting and promoting traditional milling, for example in securing funding and challenging regulation which has the implication of restricting the process and practice of traditional milling using horizontal millstones at windmills and watermills.

*continued overleaf*



*The European Delegation and Alain Eyquem, President FDME.  
Picture – Pascal Cazenave.*

## European Collaboration – continued

The second initiative was the foundation of 'Via Molina' ([www.viamolina.eu](http://www.viamolina.eu)). Along with Denmark and Germany, the Netherlands have secured EU funding to create a website which showcases tourist routes for people who wish to visit mills. Those who have visited France and Germany will be familiar with signage promoting a whole variety of routes from heritage to wine, Via Molina is an online route which offers visitors contact details, locations of mills, a route and places of interest / places to eat on the way. This excellent idea is one the UK could most definitely benefit in joining!

### **The United Kingdom**

Without even mentioning the 'B' word, our French hosts invited me to offer an insight into traditional milling in the UK today. After introducing the Section and the Guild, I talked about the opportunities and challenges facing us in the UK. Opportunities included the real bread revolution and the impact this has had on the market for artisan traditionally milled flour, the work of the Mills Archive including the fact they host material from other European countries. Challenges I explored included plans to fortify flour with folic acid, securing funding for repairs to mills, managing health and safety, protecting wind rights to

windmills, training for millers and millwrights and the impact of the Natura Water Directive in the UK.

Whatever the political outcome of the election and resultant progress (or otherwise) of Brexit, the conference reminded us all that there are huge advantages to work together across Europe to protect and promote our milling heritage. TMS has for many years provided a set of links for some of our colleagues from a research and historical perspective, but what has been missing has been a set of relationships that help with more practical issues around approaches to repair of mills, funding, regulation, training and the sharing of best practice running and managing our mills. After all, we all face similar issues, just with different shades of rules and regulations from our respective countries.

The connections made at the conference will provide important new links going forward. I would like to thank Alain Eyquem, the President of the FDMF, his Committee and friends for their wonderful hospitality. I cannot recall a similar UK event where we enjoyed such delicious food and where the wine flowed at every opportunity – red and rose of course! I look forward to our arranging a similar conference here in the UK and progressing some the opportunities for practical, mutually beneficial collaboration.



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# Rex Wailes: His life in brief

Nathanael Hodge

Rex Wailes was born in 1901 in Hadley Wood, Middlesex, to a family of engineers. His grandfather George had founded the family firm at the age of 23 in 1855, and Rex was the same age when he joined his father Reginald there in 1924.

Rex would remain at the firm for the rest of his working life. But his interest in engineering was more than a job – it was his life's passion. So outside of working hours he devoted himself to researching and preserving the history of industry in the United Kingdom and worldwide – and central to that history is the story of milling.



*Rex at work - the coffee cup and cigarette are not best practice.*

Windmills were falling into disuse throughout Rex's lifetime. Journeying throughout the country and to the USA, Europe and the Caribbean, Rex made it his mission to explore and document every mill he came across. This fascination would see Rex taking an instrumental role in establishing the SPAB Windmill Section, overseeing the repair of many windmills, and inspiring countless others to work towards the same goal.

By 1950 he had authored more than 50 papers in engineering journals and was elected President of the Newcomen Society in 1953. He published *The English Windmill* in 1954 and this became the 20th century's

windmill "Bible". In 1963 he was appointed as the government's lead consultant for the Industrial Monuments Survey to recommend which were worth saving for the nation. For this he was honoured OBE in 1971.

Rex married professional violinist Enid Berridge in 1930 and they had two daughters. He died at his home, Davidge Cottage, Knotty Green, Beaconsfield on 7 January 1986, aged 84.

After all these years his collection is now with the Mills Archive and we are still hoping more members will offer us some support. Go to [millsarchive.org/appeals/rex](https://millsarchive.org/appeals/rex) to find out more.



*Rex presenting an early SPAB Windmill Certificate to Chris Wilson*



*Rex and the Bremer brothers, Dutch millwrights who repaired Cranbrook Windmill*



# *Mills in the News*

## **Heage Windmill**

Heage Windmill is looking more like herself again as the two new sails were hoisted into position on the morning of the 6th November. The weather was calm which was perfect for the task.

These two sails were assembled by the maintenance team under the skilful leadership of the Maintenance Manager – David Land. The project has taken approximately 750 hours of volunteer labour.

Nicholls Engineering of Heage were on site helping the team both when the old sails were removed and when the two

new ones were attached. The firm have great experience in engineering projects and have worked on Heage Windmill before, so sincere thanks are extended to them.

Constructional Timber of Barnsley supplied and delivered the laminated pieces (84 in total) of wood for the sails. These arrived at Heage Windmill in the spring and the team have spent the summer assembling the new sails. This included coating all the pieces with sealer followed by undercoating and glossing – two coats of each. The shutters were removed from the old sails, washed, repainted and transferred to the new ones.



# *Mills in the News*



Alan Eccleston, Chair of the Trust, said that the Trustees wished to thank the dedicated team of volunteers who have worked tirelessly to make this possible.

Heage Windmill once again looks her old self and the Visitor Centre is open on the second Saturday of each month (November to March) for sales of flour, calendars and souvenirs.

*More photographs overleaf*





# *Mills in the News*

**Heage Windmill**  
- continued





# Mills in the News

## **Stracey Arms Drainage Mill, Norfolk**

Stracey Arms Drainage Mill, between the River Bure and the A47 between Acle and Great Yarmouth, is undergoing restoration as part of a National Lottery Heritage Fund supported project which will see the mill restored to working order, a new visitor car park and a small volunteer/education building installed.

The work to the mill is split between myself managing the millwrighting side and R & J Hogg Ltd who are working on the mill tower and tower joinery. Their work has included re-pointing the tower and re-opening one of the blocked gunloops (the mill was adapted into a two-storey pillbox during the Second World War).



*October 2018 – lifting off the cap frame*

My own work began in Autumn 2018 with the removal of the stocks, clamps, windshaft and capframe. The capframe was in very poor condition and required considerable additional support in order to lift it from the tower without mishap. A temporary cap was then fitted. As the site is very confined, all components were then transported back to my base at South Walsham.

My first task was to record everything and produce drawings to work from. I then removed all re-usable ironwork which was taken for blast cleaning.

Two of the cross beams (sprattle and headstock) were re-usable with repairs. Much of the remainder, which dates from the 1980s, had decayed beyond repair.

*continued overleaf*



*Patterns for missing, broken or badly worn components.*



*New sheers, test fitting new puncheons.*



*Fly spindle plummer blocks/angle bracket, new windshaft tail bearing assembly.*

# *Mills in the News*

I had hoped to retain the old weatherbeam with some extensive repairs. This had been repaired previously but it proved to be rotten for over half its depth. I have managed to source local oak for all the replacement cap frame components including a new weatherbeam with a grown curve.

The truck wheel carriages and centring wheels and their support brackets are all being re-used following re-machining. A new set of truck wheels was cast and machined as the old ones were beyond re-use.

The cap frame is nearly ready to turn over. Winter works will include producing the new fly frame and fly.

To be continued.

Richard Seago



*New neck bronze, new keeps (worm spindle bearing cups) re-machined y-wheel spindle bearings*



*Fitting new weather beam onto cap frame (cap frame being upside down at this stage).*



*Weatherbeam truckwheel and centring wheel assemblies.*



*Old shear ends and worn bangers.*



*Cap frame with overhauled running gear in position.*



# Mills in the News

## **Kibworth Harcourt**

As members will be aware plans are going ahead with the full repair of the mill, hopefully to commence in the Spring.

During a recent inspection it was noted that part of the lead flashing has moved on the roof and water was getting into the mill. Action was taken straight away to sort this on 11th December. The following images were taken by Owlsworth IJP.

Zinc strips along with some lead flashing to the offending area have been fixed under the existing lead flashing and under the existing roof covering. The millwrights also added a new lead flashing under the existing as there appeared to be holes in the old one.



## **Out and about in Lincolnshire**

It is good to see English Heritage have started on repairs to Sibsey Trader Mill. Tim Whiting is now working on site and preparations to remove the cap are now in hand.

**Jim Bailey**





# Mill Group News and Newsletters Review

Tom Derbyshire

*This report is produced by Tom Derbyshire. Will all groups please send copies of publications to Tom at [derbyshire.tom@gmail.com](mailto:derbyshire.tom@gmail.com), or by post to him at 15 Kinderscout, Hemel Hempstead, Herts, HP3 8HW.*

*The next copy date is 1 March 2020.*



## Hampshire Mills Group Newsletter No 127, Winter 2019

The opening page has a great photo of about 11 horizontal mills taken by Ruth Andrews in Jajce in Bosnia.

Ruth's editorial described the success of the heritage open day at Hockley Mill and reported of one visitor who lived across the road from the mill in 1944 and told members that the wheel was constantly turning to pump water to New Farm barn, which had a tank in the roof, the water being used for cooling milk, washing vats etc.

Andy Fish announced the Nottinghamshire and Derbyshire study tour planned for 14th-17th May 2020.

Alison Stott reported on the AGM on 13th September 2019.

The chairman thanked the committee for their continued support.

Longbridge Mill had received day to day maintenance – replacing decayed starts. Still the tailrace has not been cleared and the group is looking for millers to staff milling days there.

Hockley – the main sluice has had its woodwork replaced, and the chalk deposits on the wheel removed.

He reported on this year's study tour to Lincolnshire and announced the 2020 Nottinghamshire and Derbyshire study tour.

The secretary reported on visits to Eling Tide Mill and Mapledurham Watermill and Peter Hill's interesting talk on mills in the Channel Islands.

The treasurer reported that there was a decrease in subscriptions and outlined detailed costs of trips and meetings etc. during the year.

The membership secretary reported that membership numbers (110) had remained the same as last year.

The elected officers remained the same. The editor again asked for contributions to the newsletter and asked if someone would take on providing snippets of general mill news.

Before the AGM Dave Plunkett had given a talk on his survey of the rivers Whitewater and Hart.

The rivers are spring fed and flow north eventually joining each other before flowing into the river Clackwater and finally the river Loddon.

Dave had done much research on these rivers and traced any remaining evidence of their mills.

He started at Greywell at the headwaters of the River Whitewater where the existing mill building is now a residence, then to the Mill House restaurant, which has a waterwheel beside a large millpond. He continued north past Hook to Holdshott Mill where there was once a priory and north of this where the Whitewater and Hart

ivers meet. On the River Hart he mentioned Pilcot Mill – in need of much repair. The confluent rivers flow past Riseley Mill before entering the river Loddon. He finished by referring to Longbridge Mill.

There was a selection of four photographs showing: a water powered pestle and mortar in Sheffield (used for grinding tobacco to make snuff at Sharrow Mills); a rotating set of small jugs in Botley Mills (this was used to condition the wheat at Botley Mills. The jugs scooped up water from a reservoir and dumped it on the grain passing along an auger. The speed of the auger was linked to the speed of rotation of the wheel and the number of jugs could be varied); a crushing wheel on Unst in the Shetlands (this horse-driven crushing circle at Hamar on Unst was used to break up lumps of chromite, which is associated with weathered serpentinite rocks. It is the ore of chromium); and a machine photographed in Belgium – apparently there are similar machines in Ireland (it is a flax-scutching wheel, in a museum at Bachten de Kupe in Belgium. Bundles of flax are held in slots on the uprights and beaten by the paddles as they rotate to remove the husks and leave the valuable flax fibres.)

Susan Templeton wrote an article entitled Castle Mill in Dorking – it turned out to be about a model of the mill in Dorking at 1:12 scale (the real mill has been a residence since 1970).

Susan is fascinated by the use of raw power to turn machinery and create things and would like to own a full-scale mill, but has restricted herself to owning models. She already has one made by Graham Wood. Recently she found the Dorking mill for sale on eBay, this one made by Roland Taylor it too is 1:12 in scale and measures 39in x 19in x 36in, mainly constructed of wood but exceptionally detailed including lights in each room which can be switched on and off, but sadly has no mill machinery.

Lincolnshire watermills – Ruth Andrews wrote about Cogglesford Watermill with its enormous spur wheel and easily photographed sack hoist and Sacrewell Watermill at Wansford near Peterborough – a complete and interesting mill which is now part of Sacrewell Farm and Country Centre. The article was accompanied by excellent photographs.

Gunton Water-powered Sawmill – Alan Cullen wrote about Gunton Sawmill. The third Lord Suffield decided to build the watermill in 1821 to use as a sawmill – the timber thatched building contained a frame saw and an early circular saw. The building is on the banks of the lake on Gunton Park Estate and is believed to be the only working sawmill in England. The lake provides water for the two waterwheels. It was rethatched thanks to a lottery grant and is open several times a year by

## Mill Group News and Newsletters Review – continued

volunteers. The article was supported by good photographs and included one of a small corn or grist mill, which enabled the estate to produce its own flour.

Whitchurch Silk Mill has won yet another award. This time it has been chosen from over a hundred entries to be included in the SPACES yearbook (Society for Public Architecture, Construction, Engineering and Surveying).

The next article with accompanying photographs reported on the acquisition by the Mills Archive of the important Rex Wailes collection.

Andy Fish reported on Trelocke or Locks Waterwheel and stamps. This 18ft waterwheel is located at the Cornish Mining World heritage site at Geevor. The wheel originally drove a set of eight Cornish stamps, used until the early 1950s to reprocess low grade mine waste by crushing it to a fine sand prior to it going to be further processed into tin concentrate. They were saved by dismantling in the early 1980s by Clive Carter; they were again removed and restored in 1990 by Clive, John Williams and Jerry Harvey.

Siabost Norse Mill, again by Ruth Andrews. Ruth and Keith visited the Western Isles with a view to visiting four Norse mills, but because of heavy rainfall could not reach them. Ruth however bought *The Norse Mills of Lewis* by Finlay MacLeod with drawings by John Love (Acair 2009, ISBN 9780861523627). In 1850 there were 114 intact and 58 derelict sites on Lewis alone. Today over 250 are known, almost all of which now have little or no remains. There were also five vertical mills at Stornoway.

The Norse mills were local and free, and suited the relatively small quantities of bere and oats being grown on the crofts and continued to be used until the First World War. The book also provided more information on kilns. The kiln “bowl” or recess was topped by two boulders supporting a wooden cross-beam with shorter beams forming a miniature roof. This was covered in straw and the grain scattered on top to a depth of 3in. Sheaves were placed on the platform to stop the grain from sliding off. When it was dry the sheaves were removed, allowing the grain to slide off onto the platform.

Norse mills with thatched roofs still exist at Siabost and Great Bernera.

Eventually they did find the remains of a mill building on the west coast of Sutherland at Clashnessie, which they confirmed to be a Norse mill dating from the 18th to 19th centuries.

Vatnmylla Faroese Norse Mills – with photos by Keith and Ruth Andrews. Geographically, the Western Isles and the Faroes are quite similar, isolated groups of islands in the wild wet Atlantic, with an economy based on fishing (and whaling) and subsistence farming, and with a fairly sparse population. Their traditional approach to flour milling is therefore strikingly similar but the buildings look quite different due to the available rock types. On Lewis they are built using Lewisian gneiss, one of the oldest and toughest rocks in the world, whereas the Faroes are volcanic and the rock is slightly easier to use for straight walls. Also timber (historically driftwood) seems more widely available. The mills of the Faroes continued to be an integral part of the community long after those on the Western Isles had been abandoned. They were typically

located on streams in the centres of villages and are cherished as an important memory of the past. In the Western Isles it is very noticeable that the mills are generally located in isolated and less accessible sites, often a long way (miles) from other buildings.

The mill in Bour is one such cherished survivor; its stones were in position and you could clearly see the click mechanism attached to the hopper and the wear pattern on the runner stone – the mill is still possibly useable. A much smaller mill at Kvikvik is clearly a modern restoration. Other encounters were limited to small empty structures at Skarvanes, Gjogv and Sandavagar.

Bradwell Community Hydro. Mike Joseph moved into Bradwell in Derbyshire after many years working in the USA – one of his jobs was lighting New York at Christmas. Bradwell had no lights so with the help of Bradwell primary school, the Peak District National Park Authority, Derbyshire County Council and Derbyshire Dales District Council, Breedon Cement and many volunteers, Mike set up a mini hydro-electric plant using Bradwell Brook to produce sufficient electricity to light up six trees at Town Bottom.

Emma Meadmore ([emma.meadmore@live.co.uk](mailto:emma.meadmore@live.co.uk)) has a windpump for sale.

David Stirling, Simul Consultants Ltd ([simul@me.com](mailto:simul@me.com)), is looking for a mill expert to help him surveying and recording the waterwheel and gearing at Donhead Hall Watermill, Donhead St. Mary, Wiltshire.



### Mill Memories No 25, Autumn 2019

Lucy Noble wrote an interesting article on one of the Archive's heritage partners – Heron Corn Mill in South Cumbria – a mill was present on this site in 1096. It has four sets of stones and is driven by a 14ft diameter overshot wheel. The mill was rejuvenated in 2013. It is open to visitors five days a week and holds milling demonstrations each month. It also has a 100Kw Kaplan Turbine to generate electricity.

Peter King retires after 10 years' service to the Archive. Peter explained how he discovered mills – because a previous occupant of his house was a miller at Tickenham in Somerset where Peter lives now. He had followed up by researching the mill (now sadly a house conversion) which led him to discover the archive and subsequently volunteer his services.

Ron Cookson reported on feedback arising from the *Mills at War* publication. Three friends sent in comments. Bob Bonnet said how much he liked the cover and reported that a friend who researches warfare was able to identify the weapons in the illustration. Jon Sass sent a detailed account of what happened to Lincolnshire mills and millers in wartime, including the fact that because some millers did not return females had to step up and take on the roles, which involved reducing the size of sacks of grain so that they could handle them more easily. One wonderful story was about Addlethorpe Tower Mill, who had received printed instructions from the Ministry of Food that to save flour baking tins were not to be dusted before dough was put in – the reply was “In this bakehouse

## *Mill Group News and Newsletters Review – continued*

we are so careful that every time we catch a fly we shake the flour off its feet before we let it go. Hugh Howes sent in a four-page article from *Milling* magazine, entitled *The War for Freedom*, which referred to the damage done to flour mills at the ports. He finished by asking if people could report any other “mills at war accounts”.

Mildred reported on the momentous day – 23rd July 2019 – when the archive after long negotiations with the Science Museum had finally got them to release the Rex Wailes collection. There is a tremendous amount of work to be done to sort out and preserve his work, much of it needing specialist work on glass plates and damaged drawings etc. There is a great deal more to be done to ensure that one of the most important mill collections of the 20th century is properly conserved. Funds will be required to allow the archive to take on board the appropriate action – included in this issue was a special leaflet illustrating the state of some of the documents and how members can donate to help the preservation as previously announced in the last edition of *Mill News*.

Lucy wrote about The Queen’s Award for Voluntary Service, a unique UK national honour created by Her Majesty to recognise the outstanding work by volunteers’ groups to benefit their local communities. It was launched in 2002 to celebrate the Queen’s Golden Jubilee. The Mills Archive is one of the 281 charities, social enterprises and voluntary groups to receive the prestigious award this year. The Archive was one of only six in Berkshire and the only heritage organisation to receive the award. The Archive was given a certificate signed by Her Majesty the Queen and an exquisite crystal display trophy engraved with the Queen’s Award Emblem in a royal purple display box. A massive THANKYOU to all volunteers past and present.

Lucy reported on this year’s Friends Garden Party. There were two major displays, one where the various volunteers explained their contributions to the archive and another showing off the newly collated collection of “milling gems”. The weather was fine and over 70 guests arrived making it a very successful and enjoyable event.

Lucy’s next article on the Gems of the Archive related to art and artists. Artists mentioned were John Munnings who drew many watermills and told the stories around them, in particular the Chesapeake Mill in Wickham, Hampshire, where the building’s timbers came from a captured frigate called USS Chesapeake. Then on to Karl Wood, who travelled round to some 1,650 windmills to sketch them. Next mentioned was Frank Brangwyn, whose schemes of windmills were juxtaposed against his poetry. More articles of interest were a snuff box with a windmill inlaid into its wooden lid and, most interesting of all (a picture was included), was an etching done by Robert Dighton in c. 1798 showing a raft powered by windmills – more can be found about these on the [website https://millsarchive.org/collections/gems](https://millsarchive.org/collections/gems).

Naomi Pink described why she was a volunteer and demonstrated how enthusiastic she was.

Elizabeth Trout related a story borne out of the discovery of presentation certificates pasted on the inside

cover of three prime texts on flour milling. The certificates were presented by the National Joint Industrial Council for the flour industry in recognition for passing exams of the City and Guilds of London Institute in Flour Milling in 1932 and 1934. The recipient was George Highley Sugden, son of a flour mill owner who became a director of Henry Simon Ltd. and Deputy Chairman of the Council of the University of Manchester Institute of Science and Technology in 1973. A closer look at the certificates revealed that they had been signed by Ernest Bevin co-founder and secretary of the Transport and General Workers Union (TGWU). Elizabeth described his great belief in the benefit of education and the eventual publication of eight booklets covering all areas related to the operation of mills.

Liz Bartram rounded off this issue with a few snippets – the securing of £15,000 from the Foyle Foundation; the legacy of Reverend Richard Hills; and farewell to volunteer Frank who had been cataloguing Richard’s work. (Frank has left to embark on a course which hopefully will lead to him becoming a qualified archivist.)

A brief report on Mildred’s visit to Germany and her visits to Braunschweiger mine and its underground waterwheels, Strucken and its working forge and Bad Lauterberg which is now derelict.

A report on a collection from Glenys Crocker and her late husband on paper making, and snippets revealed from this by volunteer Susan including a story of a gentleman who sailed down the Thames in a paper boat!

Finally, a short comment on the success of Glenys and Alan Cocker’s collection display on the history of gunpowder at the garden party exhibition. The back cover had a collection of thumbnail portraits of past and present volunteers.



### **Sussex Mills Group Newsletter No 184, October 2019**

Chairman Philip Hicks reported that mills seem to have had a successful season and that the group visit to Lowfield Heath Mill was successful.

Justin Brice in his editorial noted that this was his 30th edition. He thanked various people for their contributions over the last years. He also reported on a visit to the Low Countries in particular to Zaanse Schans and its collection of historic windmills.

#### *News from the mills*

- Argos Hill Windmill – the shutters have been refitted, the sack hoist re fitted and verdigris removed from the side of the buck.
- Burton Watermill – now milling locally grown wheat, some wholemeal flour being available in local stores.
- High Salvington Windmill – Peter Casebow reported that although the date of 1720 is carved in the mill it was actually built in 1756. The summer fete raised £3,500. The roundhouse roof has been coated by Keywork system.



## *Mill Group News and Newsletters Review – continued*

- Nutley Windmill – the head sickness has been cured and the mill can turn again. An excellent article by Brian and Robert Pike with photographs described all the work involved in doing this job. The main cause of the sickness was wear at the pintle at the top of the centre post and wear on the crown tree – a metal collar was made and bolted to the crown tree and sliding around the top of the centre post so that the pintle is held in the correct position. Other timbers were replaced and strengthened with plates in the process and the common sweeps will now be refurbished. Over the winter new shuttered sweeps are to be made.
  - Lowfield Heath Windmill now has three new trustees.
  - Michelham Priory Watermill – the control sluice is leaking due to rotten timbers; 84 pit-wheel cogs have been renewed. The River Cuckmere is two feet below normal level and so not filling the moat.
  - Oldland Windmill had a very successful History and Heritage day.
  - Polegate Windmill – the summer fete raised over £500.
  - West Blatchington Windmill reported on its very successful 40th anniversary of opening with many photographs to support it. Visitor numbers are up.
- Philip Hicks reported on the SMG visit to Charlwood.

Visits were made to Lowfield Heath Windmill, Charlwood Providence Chapel and the house-converted Charlwood Smock Mill. A very successful and enjoyable day – again the article was well supported by great photographs of the event.

Noel Craggs reported on a visit to Hamsey old church, where laminated information sheets gave details of inscriptions on various graves. One notable grave was that of William Walker, a miller employed at John Sicklemore's post mill, which stood at the top of Juggs Lane along with Kingston Smock Mill. Mr. Walker died when he got caught in the machinery of the windmill. A full description of the accident was provided – seemingly while the miller was scraping grease off the brake wheel a gust of wind turned the sails and pulled the miller into the machinery causing fatal damage to him.

A page of windmill and watermill photographs possibly taken in the 1930s was displayed – reported by Peter Marshall as part of Bill Crittenden's collection.

Bob Bonnet reported on a watermill unknown to him and obviously unknown by Stidder and Smith, as it was not mentioned in their *Watermills of Sussex* Volume I. A friend had sent Bob details of Cowden Farm Watermill, first mentioned in 1598 and again from 1598 to 1604. A memorandum book refers to John Saxby paying tithes for the mill. There was also some supporting information and a map of the Cowden area giving evidence of a dam and dyke, which appeared to be associated with some form of mill.

Bob Bonnet made his usual report on news from other mills, which included Midland Wind and Watermill Group, SPAB *Mill News*, Mill Memories from the Mills Archive, Suffolk Mills Group and *Grist to the Mill* – the newsletter of the Mills and Millers of Ireland. Bob reported in detail on the story of Helendale Flax Mill –

I decided to report on the majority of this article because it was so different from other mill stories. The article is about how the grown and harvested flax was prepared and the process of scutching.

Rushes were cut and made into bands. The flax was pulled from the ground and made into sheaves using the bands. These were carted to the nearest pond or dam and soaked for ten days. Rushes were put on top with heavy stones to hold the flax under water. This was helped by taking off your boots and “tramping the dam”. The now heavy sheaves were manhandled out of the water, the bands undone and the flax left to dry out. The flax was then lifted, re-tied into bundles and taken to the mill.

The process of beating the flax plants to release natural fibres was called scutching. Beating was carried out by rotating blades, also called wipers, “flaying” the flax fibres from the flax stems. The blades were powered by a water wheel. The waste from scutching – called “showers” – made good kindling. It's dangerous work with noisy machinery, whirling paddles, beaters and crushers. Workers were unable to see with dry dust and fibres filling their eyes, throats and lungs. Many found themselves with a finger or more missing, snapped off by the rotating blades.

The flax was sold to mills to be spun and woven into cloth, now linen. This was not the end as the cloth then underwent finishing processes of boiling, bleaching and beetling (pounding) – washing many times before drying which was also carried out at Helendale.

Sebastian Graham wrote a glossary of words associated with flax.

In the field:

*Barm* – rising froth or bubbles from the flax dam

*Beets* – two armfuls of flax

*Boon* – a group of men who went around the countryside pulling flax

*Capper* – a person stacking the flax after it was taken from the flax dam

*Shigs* – after the flax had been gaited and dried it is stacked in a bart, rick or shig before it is brought to the flax mill

*Stook* – 12 beets make a stook.

In the mill:

*Berth* – where a scutcher stood

*Breasts* – scutching stands, stocks or berths

*Buffers* – buffers put the flax into rotating arms. Generally, these are the first scutchers who partially scutch the flax (and lose their fingers)

*Piggin* – a phrase used by a scutcher when referring to a woman who's shaking the tow to rid it of shows. The tow was scutched later in the season

*Shows* – the waste woody material that falls off the flax plant during scutching

*Tow* – flax that is scutched, but shorter in fibre.

*Correspondence*

Mike Anton sent in a photograph and asked if the society could identify a roofless sunken building with a small waterwheel under a tank. Rob Cummings explained that he thought it was a water-powered pump, normally used to provide a water supply to a large house nearby and that he had seen many similar.

The Rev Noel Staines wrote about a gentleman named “Lord Moon” who performed many antics at Amberly Mill.



### Welsh Mills Society Melin No 32

The first article was by Gerallt D. Nash, who had taken evidence from a 19th-century Census to look at mill-related occupations in Wales in part answer to the age-old question “How many mills were there in Wales in the past?”

Many people have studied old maps, this was an interesting attempt to relate the number of millers to the number of mills, but difficulties like one miller working in more than one mill and some millers calling themselves farmers etc. made the calculation a little complicated. Tables were provided to illustrate the number of males and females recorded as millers from the 1841 and 1881 census and broken down by county. A table was also provided showing the ratio of millers to total population, the average ratio varying from one miller to every 734 of population in 1841 to one miller to every 928 of population in 1881. Another complication to hamper the calculation was the fact that relatively heavily populated areas would perhaps have had one miller per thousand of population.

In conclusion the census returns do not specifically give us the number of actual mills operating but they do give an indication of how many people gave their primary occupation as miller. By inference, this suggests the approximate number of mills that would be working at the time – bearing in mind that some larger mills would have employed more than one miller and those attached to farms may well have been listed as farmers.

Interestingly the author’s great grandfather is variously described as “Carpenter”, “Miller”, “Miller and Farmer” and “Baker” in census returns from 1851 to 1901.

The second article by Phillip Vaughan concerned his extensive research on a mill on the Monnow – Ruthlin – and its conversion from corn mill to papermill and the family names associated with the mill.

Names mentioned were Thomas Jones, Roger Vaughan, James Watkin, John Evans and John Williams – in 1722 William Vaughan and Jeremy Wyatt/Wyatt with owner Thomas Evans seem to be the ones who for some reason diverted from grinding wheat, barley or oats to manufacturing paper. The papermills of the time were relatively small with one or two vats and used waterpower. In 1775 we meet William Phillips, papermaker. From 1785 to 1796 James Vaughan was the papermaker at Ruthlin’s. In 1796 Francis Lewis became the papermaker. Similarly named families were involved in tenancy and ownership of nearby farms, Ruthlin Farm and Tump Farm. Going back to the mill it was briefly in the ownership of Francis Lewis and in 1800. William Farr bought the freehold. In 1824, the lands and mill were reported as being occupied by Farr and son-in-law William Williams.

In 1826 Edward Johnson (papermaker) became the occupant. The Farr family continued its connection, then after Johnson moved in 1838 the property was put up for sale. After the 1830, small papermakers became unable to

compete with mechanised papermaking like the Fourdrinier machine – in fact by 1860 Fourdrinier was producing over 90% of England’s paper.

Edward Johnson left the mill some time after 1830. Occupation of the mill was with William Farr and John Day, but in 1841 the papermill building was recoded as uninhabited. After its grist mill days centuries before, and a rebirth as a papermill in the 18th century, the mill had become a simple dwelling house completely devoid of any milling activity. The principal mill building still stands, refurbished and modernised during its retirement.

John Peck wrote the next article on Cardigan Foundries. Once again an article based on years of research, helped by Mike Bennett. He discovered that the streams making up the water discharged into Aberbach cove at Dinas once powered nine waterwheels, while the streams that discharge into the other Aberbach cove at St. Nicholas had powered 11 waterwheels and the stream at his mill powered two waterwheels. Next upstream was the woollen factory and six more farm wheels. The farm waterwheel system was far more developed than is often realised. In the second half of the 19th century a system of linkages, including right-angled gear assemblies, was in use on farms that had a water supply for the farm wheel to power grinding, chopping, sawing and other farm power needs. Sometimes there was a considerable distance between the wheel and farm buildings – a very long one was found at Garreglywd farm where the farm was above a deep valley and the wheel way down below by the stream. Many of the wheels they came across were a combination of cast iron, iron bars and wood, some having names cast into the shrouds. This got John intrigued and motivated to research foundries and their millwrights, in the hope that they would help him date wheels and machinery. This was not to be the case. In the early 1830s Cardigan became a flourishing port, with small ship building and agriculture using more cast metals, there was an obvious need for a foundry. In 1836 Thomas Lloyd opened a foundry called Mwdan Engineering Works. Later David Davies built a second foundry called the Bridgend Foundry. In the 1850s two brothers William and Timothy Thomas took over both of these foundries.

Bridgend Foundry had supplied as far as research shows 11 lay shafts for corn mills (list supplied). Later the Mwdan Foundry premises were enlarged and fitted up for first-class work by W. Woodward, who turned out machinery that was sold throughout Britain. Woodward’s continued until 1886 when they were taken over by J.P. Baillie a fine Scottish engineer. At Bridgend T. Thomas owned it for a number of years, then S.F. Kelly took over for a while. W.E. Matthews ran the foundry until the Second World War after which it was opened by Major Gordon Matthew as a Motor Engineering Works, then sold to Gravells in 1960 and called “The Foundry Company” – finally it was demolished in December 1979. Similarly the Mwdan Foundry was demolished in the 1930s. A list of owners and dates for each foundry’s life was provided. Also listed are the farms with waterwheels from Daniel Davies’ account book and two lists of waterwheels identified by John and Mike’s research from the Bridgend

Foundry and the Mwdan Foundry. The article is well supported by photographs of shrouds with manufacturers identity as well as the location of the various finds.

Andy Parry related the story of restoring his Eureka grain cleaner manufactured by S. Howes and Co., Silver Creek, New York (a company still in existence today). Andy tells us there is a website giving much history of grain cleaners; manuals are still obtainable and that the basics of operation are still the same involving a powerful fan, shaking sieves, a revolving drum with vanes and beaters and an ingenious system of air draught. A drawing of the machine appears on the front cover of this edition and the article was well illustrated with clear photographs. The cleaner is installed in Felinganol.

Restoration was basically a strip down then replacing rusty metal with good metal and rotten wood with new, one addition was made to the restored item and that was a mesh screen on the outside wall to prevent the entry of any rodents. Completion of the restoration has made it possible for the millers to obtain grain from farmers who can provide it ex-combine but have no good cleaning kit of their own.

The final article by Evan M. Chapman describes the finding of a Roman donkey mill while doing building work on farm buildings close to the site of Clyro Roman fort. The mill consists of a bell-shaped lower stone (meta), which remained stationary, and a hollow hourglass-shaped upper stone (catillus) that turned. Grain was ground as it descended between the upper and lower stones, the flour collecting around the base. Both stones are on loan to the National Museum of Wales and are currently on display at St. Fagans National Museum of History – again the article was accompanied by an excellent photograph of the find.



### Welsh Mills Society Newsletter No 137, Oct 2019

In his final editorial Mel Walters thanked all the people who had supported him with articles and pictures over his 40 issues of the newsletter.

The front cover showed a picture of Blackpool Mill in Pembrokeshire – regardless of help from Gerallt and John Brandrick, the Bluestone Resorts application to develop the surrounding land and upgrade the mill was turned down by the Pembrokeshire Coast National Park Authority – Bluestone are submitting a new application and we hope it will give this important mill a brighter future.

Mel Walters appealed for help in indexing the 34 editions of *Melin*, which will appear on the membership page of the website.

A paragraph was written to congratulate the Mills Archive on receiving the Queen's Award for Voluntary Service and for managing to acquire the Rex Wailes Collection.

The Mucky Mills Group. Work was carried out at Carew Tide Mill, John Brandrick completing a survey while others examined the breastshot waterwheel (4.8 metres in diameter and 2.1 metres wide). A detailed report will be submitted to the mill manager and the Pembrokeshire

National Park Authorities and a set of John's impressive drawings will be given to the mill in the hope that they can be used to raise some money towards the upkeep of the site. For the future, the group has been asked if they would be interested in surveying and recording Castell Mellte Mill in Breconshire – last worked 120 years ago.

#### *News from the mills.*

Stuart Mousedale reported that while in the Llyn Peninsula he spotted a collection box for a project to restore the village watermill in Aberdaron. He also reported that Brynkir Woollen Mill seems to be becoming less active.

#### *Casework*

Under the auspices of the Mucky Mills Gang, who have been looking at the remains of Ffatri Isaf, Abercegir Woollen Mill near Machynlleth – they checked the waterwheel and fulling stocks (extremely rare) and asked Cadw to list them. Instead Cadw has scheduled the machinery under the Ancient Monuments Legislation and now it has been recorded in detail by John Brandrick, which will be presented to Cadw and deposited with the Royal Commission.

#### *Mills for sale*

- Pontdolgoch Sawmill and adjacent house Ty Coch near Caersws, Powys.
- Former woollen mill/forge at Aberarth Ceredigion.
- Melin Bryn Gro, Llanllyfni, North Wales.
- Parcel of land containing the ruins of Cwmdaeddwr Mill at Rhayader on the west bank of the River Wye.
- The old mill at Llancarfan, Vale of Glamorgan.

#### *Post Mills in Wales*

Because of the importance of this article, rather than summarise I have repeated most of the content below.

The editor attempted to stimulate discussion on post mills in Wales in the last newsletter, what follows is a detailed response from Gerallt Nash.

“The earliest post mill in Britain is either the one recorded at Amberley, West Sussex, built shortly after 1180 by Bishop Seffrid ii of Winchester, or one at Weedley in East Yorkshire in 1185. Thereafter they seemed to spread rapidly across England as well as Flanders and other parts of Western Europe, reaching Wales by the 1260s. It took another 100 years before the first stone-built tower mills appeared: one was built within the fortifications of Dover Castle in 1294/5. However, even though these were far sturdier than their timber-built counterparts, stone tower mills were also much more expensive, which meant that only wealthy lordships, ecclesiastical or monastic establishments or individuals acting with Royal patronage could afford to build them. A tower mill could cost between twice and four times as much as a post mill if not more. Consequently, it must be assumed that the vast majority of early (pre-Reformation) windmills must have been timber built.

That post mills did exist in Wales is beyond doubt, so let's consider the evidence, which we have. Evidence can be divided into four kinds: the written word, illustration, archaeological and circumstantial or inferential. Gerallt has provided a list of post mills, which were known through historical records.



## *Mill Group News and Newsletters Review – continued*

When a new settlement was established by Edward I in the Commote of Menai at Newborough, to accommodate people displaced by the construction of the new town and castle at Beaumaris, a timber post mill was built in 1303 to provide means of milling grain. A similar post mill was built at Walton in Somerset in 1342/3. In terms of early windmills (all presumably post mills) examples were built across Wales including those at Llantwit Major, Glamorgan (by 1233); Llantrisant, Glamorgan (destroyed by “Men of Glamorgan” in an uprising sometime between 1262 and 1280); Montgomery (by 1233); Angle, Pembrokeshire (by 1298); Tenby, Pembs (four built in 1301-31); Holt, Denbighshire (by 1315); Castlemartin, Pembs (by 1324); and Lamphey, Pembs (by 1326). On Anglesey, in addition to the mill at Newborough, Einion ap Ieuan, a prominent burgess, was granted a licence in 1327 to erect a windmill on the “Mulne Hill” just outside the town walls of Beaumaris, for which he paid the king 6d ground rent annually. Perhaps the fact that this mill was to be built on “Mill Hill” suggests that there had been an earlier windmill there at some time.

It’s interesting to note that all these references are to areas where the remains of tower mills can still be found; the distinction between areas where the most suitable power source for milling was wind or water clearly being established at an early date.

History also records an early cause of the loss of post mills – the Glyndwr Revolt of 1400-1415. Gerallt notes “this uprising targeted Anglo Norman castles, townships, manorial lands, crops and property. It is reckoned that nearly all the mills in areas controlled by, or on behalf of, the crown were damaged or destroyed at this time. Small timber-built post mills were an obvious target. Disabling a mill meant, of course, that flour could not be produced, and this, in turn, presented an effective and instant means of not only disrupting food supply but also Anglo Norman control over their subjects. References to the destruction of windmills appear in official inventories at this time, indeed, nearly a century after the uprising, the Minister’s account for Castlemartin records that “...The windmill there is said to be of no value, because it was burnt down in the time of the Welsh rebellion and has not been rebuilt...” The effects of the uprising were thus devastating and long-lasting. When these mills were eventually reconstructed many were rebuilt as stone tower mills. A stone tower mill had been built at Angle, Pembrokeshire, by 1480 and another built at Candleston, Glamorgan (it was buried by encroaching sand dunes between the 15th and 16th centuries). White Cross Mill, another tower mill, was built at Llantwit Major during the late 1580s. Evidence through illustrations begins to show what these early post mills might have looked like. A plan of Beaumaris published by John Speed in 1610 shows a two storeyed post mill on the cliff top beyond the castle, with its supporting trestle and cross trees buried under a mound. John Ogilvie’s strip map of the road from Chester to Holywell illustrates a windmill on Halkyn Mountain to the south of Holywell, which may have been the origin of the scatter of houses still called “Windmill”; Stuart Mousedale reminds us of the

paper on that settlement by Bryn Ellis in Melin 8. George Lees drew my attention to a chart of the coast near Amlwch, Anglesey, dating from the late 16th century, with a post mill with a rather insecure ladder and handrail to the door, the trestle seemingly enclosed by planks. Another is shown on a Llanddyfnan Estate map dated 1748, with a ladder and tail-pole extending from the rear of the mill, on a site where a tower mill was built only two years later.

Archaeological evidence in Wales is so far non-existent.

Lastly, inferential or circumstantial evidence; if the locations of post mills are known, what can be inferred from near neighbours outside Wales, as in the case of derelict tower mills in south Wales being compared to counterparts in Somerset? It could be inferred that post mills in north Wales would be similar to those in Wirral, Cheshire, where Bidston Windmill has been called the best remaining example of an Anglesey Tower Mill. Immediately next to Bidston tower mill is a grass-filled cross in the bare rock surface, marking the position of the 1596-built post mill which preceded it. and around the cross is a groove worn by the tailpole wheel as at Pitstone, together with toe-holds made by those who heaved the mill into the wind. Might similar marks be found where former Welsh post mills stood on bare rocky ground? Two Wirral post mills survived to the age of photography and photographs of their decline document the wooden structures of the trestle and body, as well as the circular stone enclosures protecting the trestle from the weather. The above represents a train of thought rather than a finished piece of research.”

A farm wheel at Hescwm Isaf by John Peck, who has now resumed his mill surveying. The wheel was cast by T. Thomas of Cardigan. At 7ft 6in diameter, this is a small wheel with only 30 buckets. The ring gear was connected to the now missing rear spokes and the spur gear – of larger diameter than many – has four spokes. The unusual opening stonework for the axles to pass into the mill is a fine and generous semi-circular arch (the inside of which is sadly filled with concrete so any remaining evidence of gears has been buried). There is no sign of the water control gear or any remains of the launder. The water board had built a pumping station right next to the millpond site masking any evidence of the pond dam and sluice. The article was backed up with two excellent photographs of the findings.

*Twenty-five years ago*

Dr Jon Kissock’s second newsletter floated the idea of publishing all the names and addresses of members. There was a short description of six mills. Trericket, Cenarth, Gelligatti, Dreifa Mills at Cwmorgan, Felin Newydd Grugybar and Felin Wen, Brawdy. Brian Taylor was recommending a visit to Melin Nant-y-bai.

There were various notices on the publication of a Council for British Archaeology Research report.

A 1797 advert for “Patent Bark Mills”. Details of Moelwyn Mills up for sale

And finally, the editor appealing for contributions.

Mill News no longer lists mills for sale that are converted. Only mills that have significant machinery will be advertised.

All mills for sale, however, will be put on our web site for members to view.

### Advertise in Mill News

Does your business offer products or services of interest to those who own or maintain a windmill or watermill?

Mill News is published and circulated quarterly to mill owners and enthusiasts across the country and beyond.

Contact the Mills Section office  
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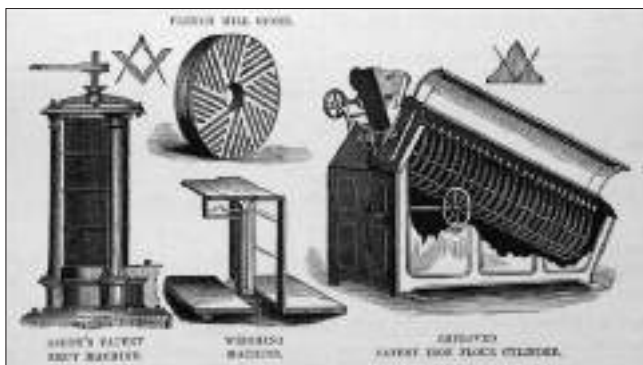


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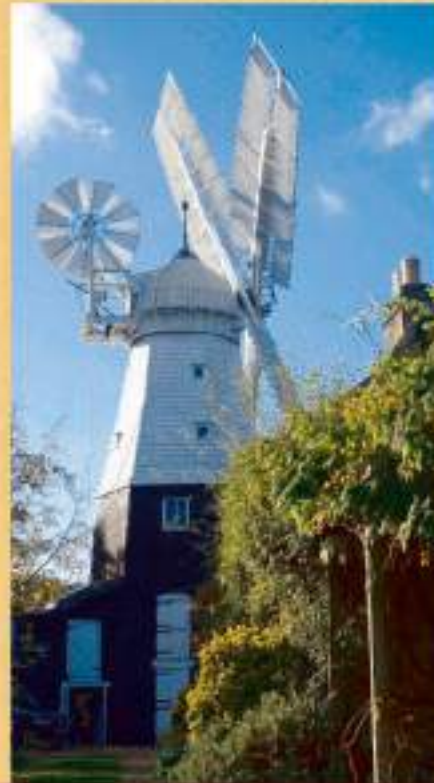


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