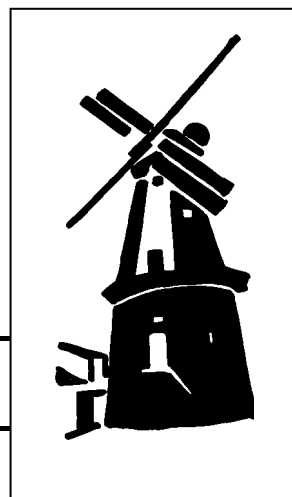


# KENT WINDMILLS EDUCATION PACK



HLF & KCC FUNDED PROJECT

Ian Coulson

## Kent Windmills: A unique community resource

This pack of materials provides a resource for teachers and pupils who visit the eight windmills owned by KCC and managed with the invaluable assistance of the Volunteer Groups.

The aim is to show how the buildings can be used for the study of local history and a range of other subjects. The pack includes a range of background information and activities for use in the classroom before, after and during a visit. Although aimed primarily at Key Stage 2, many of the ideas could be used with older children. It includes:

- Practical ideas
- Enquiry based approaches to learning
- Suggestions for work in a variety of subject

All the resources focus on the windmills and the contribution they can make to the curriculum. There are suggestions for further reading and sources for additional information. This first section provides background information for teachers. The second section is a compilation of activity sheets with further resources on the CD Rom.

Further copies of this pack and information about the windmills owned by KCC can be obtained from:

Heritage Conservation  
Kent County Council  
Invicta House, County Hall  
Maidstone  
Kent ME14 1XX  
Tel: 01622 221223  
Fax: 01622 221636  
[www.kent.gov.uk/environment](http://www.kent.gov.uk/environment)

### Introduction

With recent concerns about energy conservation we are perhaps coming full circle, from the first technological answers to acquiring mechanical power, through the use of fossil fuels to a return to natural, sustainable sources of energy. The windmills in Kent are survivors of what is now an old fashioned, inefficient technology. In their day they provided effective, if not reliable, power.

Kent County Council owns and is responsible for eight windmills scattered throughout the county. All are visually and historically significant features of the Kent countryside (most mills had to be positioned on high ground to catch the wind) and with a few others, are the most complete survivors of over 400 in Kent. There are two post-mill and six smock mills. All mills are "listed" - the majority being Grade I or Grade II\*. This places them within a group of the top 4% of the Countries historic buildings. Each is part of the living history of the area in which it is situated. Their preservation is the best way of maintaining a record of their construction and physical history as well as illustrating the Counties social history. The miller was a key member of the local community since the windmill was an essential part of the agricultural industry on which prosperity depended.

Most of the windmills that can now be seen in the Kentish landscape were used for the grinding of grain for animal feed. Some also produced grain for bread but from the late nineteenth century steam driven mills were much more efficient and effective.

This pack presents a number of activities that will help teachers and pupils work on site and in the classroom. The focus on excellence and enjoyment allows teachers to look in a more flexible way at planning the curriculum, site visits to windmills are the ideal way of both extending the curriculum and adding the enjoyment and interest that stimulates learning.

Pupils are the conservationists of the future we need to invest in their education about our cultural past so that they in turn will help preserve and enjoy the windmills of the county.

There is a windmill near you so go out and discover part of the built heritage of Kent.

**Remember...** always prepare carefully for a site visit. Refer, in Kent, to the Outdoor Education Unit that was established in April 2003 following recommendations issued by the DfES in August 2002. They advise and support LA Schools and Youth Centres on all issues relating to Educational Visits. Consult Clusterweb for the most up-to-date information  
<http://www.clusterweb.org.uk/policy/offsite.cfm>

## Activity and Information sheets

### Activity Sheets

1. Who worked on the site?
2. How does a windmill work?
3. What to look for at a post mill
4. What to look for at a smock mill
5. How tall is the windmill?
6. A quick grind through the history of milling
7. A conversation piece
8. Asking questions
9. Where should I build my mill?
10. Sorting cards (1)
11. Sorting cards (2)
12. Gatefold pamphlet
13. Poetry
14. Verbs
15. Annotated drawing
16. See, hear and smell (1)
17. See, hear and smell (2)
18. Rebuilding Chillenden Mill
19. Should we preserve the mills?
20. What do you think?
21. Windmill photo mosaic
22. Design a brochure for the windmill
23. Design a safety poster
24. Design a scarf or tie
25. Design a visitors centre
26. Making a 3D model of the area
27. Make your own windpump
28. Make your own windmill
29. Making an anemometer
30. Cranbrook Mill drawing
31. Chillenden Mill drawing
32. Chillenden Mill cutaways
33. Early horizontal mill drawing
34. Tower Mill drawing
35. Wind generator drawing
36. Querns and pestles drawing
37. Horizontal mill

38. How did they make bread?
39. A real grind

### Teachers' Guide

1. Working on site
2. Questions prompts on site
3. Investigative questions
4. Working in cramped conditions
5. Asking questions: starter activity
6. What happened to Chillenden Mill?
7. Destroyed windmill dismantled
8. Power plan for old windmills
9. To conserve or not to conserve?
10. Should we preserve the mills?
11. Making a buck
12. Drawing on site
13. Using a sketchbook
14. Looking at windmills
15. Music and the mills
16. ICT and windmills
17. ICT task
18. Oral history
19. History of Chillenden Mill
20. History of Cranbrook Mill
21. History of Drapers Mill
22. History of Herne Mill
23. History of Meopham Mill
24. History of Stelling Minnis
25. History of Stocks Mill
26. History of West Kingsdown
27. Weather Record sheet
28. All about mill-stones
29. Windmills in Nord Pas-de-Calais
30. Further Reading
31. Web sites
32. Finding out about Industrial Archaeology
33. What is wheat grain?
34. Historic documents and sources

### Planning your Project

Project work can be highly motivating for pupils. Combined with the stimulus of a visit a project can provide a personalised learning journey for each pupil.

Introducing the project and its various stages is important so that pupils can have a clear picture of what they will be doing, what is expected of them. Openness about the work and discussion at each stage will encourage an effective pupil voice linked to clarity about the purpose of the work.

When considering using one of the windmills it is important to consider:

- how the site and visit will fit into the curriculum.
- how the potential the windmill offers as an historic resource.

There are also supporting materials that can be used to supplement the building and encourage children to use a variety of sources of evidence for their study

- how windmills, their building, position and technology suggest a range of questions. Investigative questions should form the basis of any visit and study. For example, 'why was the mill built on this site?' Why has it survived and not been taken down?'
- how there are numerous skills that can be developed in a study ranging for historical investigation through to recording, measuring and drawing.
- how much interest and enthusiasm a visit may engender rather than some of the existing schemes of work.
- how the 'wow' factor should not be underestimated especially if the mill is working or if children can climb into the building and see the machinery.

Planning the work set in context is very important. The context for work in history is the historical time frame with an understanding of the development of technology. Work on the geography of the site also needs to be set in a wider knowledge of the topography of the area. Planning investigative work requires some careful thought about key questions that start with what the children know and understand.

- Why was the mill built on this site?
- How has the mill changed?
- What is the story of the mill?
- Why did people build mills and how do they work?

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Work preliminary to the visit is vital. Some introduction to the skills and information about the windmill is essential. If art is to be the focus of the visit pupils should experiment with pens, pencils or paints that they will be using on site so that they are familiar with the techniques of using tone, colour and line.

Before the visit ask the guide or mill manager what their ground rules are and the sort of activities they might offer. Be very clear about what you need from the visit for the children.

If it is your first visit to the site look for:

- Things that the children will relate to through modern equivalents
- Things that move
- Things that can be handled
- Places where there are unusual shapes, materials, colours and textures
- Dramatic views
- Interesting details
- Aspects of the site where children can work out that things have changed over time

On site the pupils need to record information and observations without spending all their time with their noses in a worksheet. Getting a good balance is important between looking, getting the children to see the details and making inferences and recording.

Making use of digital camera can help record very quickly a wide range of details that can then be used for reference and display following the visit.

Throughout the investigation pupils should be encouraged to talk about their experiences and where possible their curiosity should be encouraged and developed.

Two aspects of visiting a windmill are worth emphasising. The first is the importance of safety on site. Windmills are not the easiest buildings to move around so it is important that pupils are especially careful.

Highlighting the nature of the windmill is also important, bringing to the fore the ways that people in the past sought economic well being through technology and technical innovation. Several mills have collections of documents and ephemera related to the working of the mill and their owners and tenants. Using printed posters and bills of sale is one effective way into this complex area of study.

Evaluating the visit is important for both staff and pupils. Back in school, after the visit, pupils should be encouraged to make an assessment of not just whether they enjoyed the experience but specifically what they have learnt. This

will be easier for the children to express if the learning intentions are clear and have been reinforced throughout the investigation.

### Investigating windmills can help:

- encourage observation, recording and deduction.
- to relate the shape and size of windmills to their function, and how they have changed over the years.
- to provide the three-dimensional evidence to reconstruct how the building was used.
- pupils understand the social and working conditions in the past
- to provide a context for discussing difficult issues related to development conservation and reconstruction
- to enable pupils to use a variety of historical sources including documentary, pictorial, oral and archaeological evidence
- develop the ability to communicate information, observations and conclusions about an historic site
- the understanding of cause and effect related to historic buildings
- to understand the context of the historic site, its chronology and the sequence of events that took place on the site and the broader historical context of the site
- to show the strengths and weaknesses of archaeological remains as historical evidence
- pupils understand the interrelationship between industries, landscapes, communications and available technologies
- an appreciation of competing claims of preservation and urban renewal
- the understanding of prestige and utility as factors in building design
- the understanding of change, continuity, development and stagnation

### The Story of the Kent Windmills

*Peter Cobley is an architect and planner who worked as Principal Conservation Officer for Kent County Council. Here he provides an introduction to the history and some of the conservation issues related to the Kent windmills.*

After a career as an architect and town planner in various local authorities, in 1990 I became Kent County Council's Conservation Architect. Amongst other roles, I was responsible for advice on the care and repair of the sixty or so listed buildings in County ownership. Of these, eight are windmills, three being Grade 1, three Grade II\* and two Grade II. It was in 1998 that I entered this world of sprattle beams, cant posts, damsels, sheers, cogs and breast beams, when I was asked, on behalf of the Planning Department, to take over care of the windmills in the Council's ownership.

On taking over, I visited the windmills. All were suffering from varying degrees of structural and/or maintenance problems, as might be expected with structures which are really sensitive machines first and historic buildings second. Indeed mills work for a living and have a limited life expectancy. In 1933, William Coles Finch, in his book, *Watermills and Windmills*, quotes the life expectancy of a post mill at 200 years and a smock as 100 years – but this assumes the continuous care of an on-site miller. Mills nowadays do not have this luxury and repairs can be piecemeal and fail to address longer-term issues. We cannot therefore treat them as other listed buildings and in fact working mills may require more invasive change than in (for want of a better phrase), the normal listed building. I surveyed each mill and assessed the costs involved for repair and restoration at something under £1 million. Because of the costs involved, it was agreed that a Lottery Bid application should be submitted. The special needs of windmills were recognised in the submission and this approach also fitted the HLF criteria of funding high quality work. Overall the work consisted of sensitive repair to the mill structures and work to improve the potential for tourism and for educational purposes.

Another important issue related to the seven volunteer groups who look after the mills for the County Council on a day to day basis and open them to the public. They perform an excellent service and it is obviously necessary to maintain their interest and morale, something which is less easy to do if the mills are not in good shape. There is also a further problem since the numbers of volunteers are dwindling and the existing members are ageing. (I'm sure they would not object to me stating the obvious). Without new blood, there is a danger that the mills will not be able to open as at present. This seems to be a difficulty not unique to Kent - maybe a national effort is needed to resolve the problem.

The Heritage Lottery bid was for £523,000 with matching funding from KCC and others of £120,000. Included in the bid was a commitment to spend money promoting the windmills for tourist and educational purposes. This included improving facilities for volunteers where possible. The bid was submitted in June 1998. Approval of a grant of £400,000 for work on seven of the eight windmills was given in September 1999. As well as repair work to the mills themselves, the grant covers the production of measured drawings, volunteer training, site work, interpretation, school education packs, leaflets, disabled facilities where practical and professional fees. Of these longer-term items, volunteer training has taken on a wider dimension than originally envisaged due to health and safety issues.

Work on Herne, Drapers mill at Margate and Chillenden mill was begun as a first phase. The inevitable lead time before work started was a little frustrating for everyone, particularly the volunteer groups who realised they would have to close the mills during repairs and could lose volunteers as a result. The repairs at Drapers and later at Chillenden illustrated the hidden extras (and additional costs) likely in buildings of this type and caused a halt to some work. At Chillenden we concentrated initially on making the mill body watertight and structurally sound for the winter. Because of the cost increases at Chillenden and Drapers mills, however, a further grant application was made to the Heritage Lottery Fund. This was a much more straightforward process since it involved topping up an existing approved grant. As a result the total grant was increased by £326,000 to a total of £726,000. A condition of this increase was a commitment from KCC to implement a 10-year programme of planned maintenance involving an estimated annual expenditure of approximately £35,000. There was recognition here that funding capital repairs without considering the costs of longer-term care can easily be a wasted resource. After agreeing with the HLF, we were able to initiate repair work on the remaining mills and complete the work on Chillenden windmill.

### **THE INDIVIDUAL WINDMILLS**

Windmills were for a long time an economically essential feature of the Kent countryside. The historian William Coles-Finch, found evidence of over 400 windmills in the County. Many villages had two and Deal and Sandwich had six each! In spite of inevitable losses and demolition over the last 50 years, there are still about twelve windmills in Kent in near original condition. The windmills owned by the County form the largest group in near complete or working condition in Kent. Unlike many other historic buildings, they have a multiple value.

Two types of windmill survive in Kent in near complete form, the post mill and the smock mill. Of the eight KCC mills, Chillenden and Stocks mill at Wittersham are post mills, whilst Drapers mill at Margate, Stelling Minnis,

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Meopham, Herne, the Union mill at Cranbrook and Kingsdown mill at West Kingsdown are smock mills. (Can it really be true that it is so called because of its similarity in shape to a farm worker's smock - five of ours were always coated in coal tar?) A few brick tower mills remain, but none are complete and all disused or in residential use.

All the windmills owned by the County still look like real mills inside and out. None have been subject to any changes of use and most have the majority of machinery in place. Some are capable or with minimum effort could be made capable of grinding. The County between 1958 and 1985 acquired the eight mills. The first one we accepted was Chillenden post mill, dating from 1868. This is situated in open country. Up until 1958, it had a barn and engine house adjoining. When acquired by KCC, the mill was only valued as a landscape feature so the barn with its machinery was demolished and the interior fittings of the mill were burnt. How attitudes have changed! The last mill to be acquired was Herne in 1985. Built in 1789, it was acquired from the miller's family and was therefore complete with machinery and capable of producing flour.

### Herne Mill

Listed Grade 1. This is an early type of smock mill built in 1789 to replace a C16 century post mill on the same site. In 1856,



***The old curb and cogs removed for rebuilding***

the wooden structure was raised and two storeys of brickwork constructed underneath so that the mill could take advantage of the prevailing southwest winds. The windmill finished working as a mill in 1980 and was taken over by KCC in 1985.



***Fitting new laminated timber stocks***

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The HLF grant application identified this mill as the top priority due to the imminent danger of structural failure. This was therefore the first mill to be repaired, although the HLF only contributed a small amount due the emergency help of an English Heritage grant of £20,000 and £2,000 from Canterbury City Council.



***The work completed***

The opportunity was taken to convert the engine house into a Parish Office and add a meeting room, toilets and a volunteers' store. The involvement of the Friends of the Herne Mill throughout was encouraged. I commissioned a member, a local architect, to design and supervise the work. Existing rights of way across the site were removed, the site was landscaped

and on site car parking was provided. The mill has been extensively

repaired, including replacing the steel stocks with lighter laminated timber, much more suitable for the delicately constructed Kentish smock and cap. The EH funded work involved the repair and replacement of the failing smock curb and timber cogs. Bretts

Waste Management, through the Landfill Tax and Canterbury City Council funded other work and the Parish paid for their Parish Office. The volunteers have organised money-raising events and a keen volunteer gardener has beautifully planted and maintains the site.



***The engine house converted into a parish office with the new meeting room to the left***

Recent widening of Thanet Way (A299), the route to Margate from the west means a wonderful view of the mill has been created when travelling east. The black smock and white painted sweeps [sails are called "sweeps" in Kent], is a sight to remember, even though the mill is surrounded by a housing estate. If the sweeps are turned, then this makes a major difference to visitor numbers. As a result of the work and the enthusiasm of the volunteers, the number of visitors has increased and over 1,500, a record, were shown round during the summer weekends in 2002. The provision of toilet accommodation has proved essential for school visits.

## Chillenden Windmill



***The mill in 1955***

Listed grade II\*. Chillenden post mill was built in 1868 and retains its open trestle. As normal in Kent, it was never fitted with a fantail and would have been turned manually with its long tail pole. This is one of only four remaining Kentish post mills and was the last to be built. It replaced a former post mill on a site where it is believed

there had been mills for

500 years. The mill remained in use until 1949 when one sweep broke in a gale. In 1955 local residents raised enough money to make the mill weatherproof but could not afford a full repair. The mill remained in private hands until 1958, when KCC acquired it. Unfortunately the adjoining barn was demolished and the milling furniture removed. The mill stands in an exposed position amongst fields and lanes and forms an important and distinctive local landmark, the original reason for its purchase.



***Work in progress***

The mill had suffered over many years from superficial repairs, sometimes carried out by local builders rather than a millwright. As a result repairs were done without dealing with the basic problems. The most important alteration and one of which compromised the mill's structural continuity, was to wedge the

post to the cross trees below and secure the tail pole to the ground with a steel post. This prevented the body moving independently on its trestle. As a result, the mill body suffered further and with beetle and water damage the mill frame was becoming dangerous.



***Major frame repairs***

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The repairs have now been completed. This includes re boarding and extensive repairs to the frame, trestle repairs, replacing a stock, rebuilding sweeps and replacing shutter frames and shutter furniture. As part of an ongoing experiment comparing alternative coatings and materials, the mill body has been painted with a white lead paint, whilst the stocks and sweeps have been painted using a natural pigment made up of titanium dioxide, zinc oxide and chalk, suspended in raw linseed oil.



***The completed mill***

### **Meopham**

Listed Grade II\*. This smock mill was built in 1821 by the Killick brothers, a well-known Kentish milling family and is the last in a line of mills serving Meopham. It was built as a 'model' mill to demonstrate milling and was consequently very well constructed. John Norton and his nephew took over the mill from Thomas Killick in 1889, and in 1959 the Nortons transferred the mill to KCC. The machinery is complete and capable of grinding if the surrounding screen trees are removed. The mill is situated within the Green Conservation Area in the centre of Meopham and forms a highly distinctive feature in the village. The original engine house is used as the parish office and the ground floor of the mill for parish meetings.



***The original Curb Cogs***



***Replacing the Cap  
on 17 October 2002***

When surveyed, the mill was found to be in reasonable condition. The weatherboarding, though not tarred for many years, only needed replacing on the cap and minor repairs were needed to the structure. I took the decision to remove the cap in any case and as a result the cap frame and smock curb and curb cogs could be properly assessed. This exposed structural problems that had to be dealt with because the cap is unlikely to be removed again for many years. The breast beam and one failed rib has been replaced and one other rib part-replaced with a wedged scarf matching the other ribs. All the timber cogs have been replaced in the smock curb. The fact that the mill continued to turn satisfactorily for many years is very much to the credit of the original builders particularly

since some of the replacement cogs were made from mahogany furniture legs.

The opportunity has been taken to improve the weathering details of the fan stage frame and modify the weatherboarding at the cap ridge, the latter being a weak point for water egress in all our mills. Late in the contract,



***Junction of the  
Breast Beam and  
Shear showing  
failed dovetail***

removing oak slats on the reefing stage exposed wet rot in the supports. Replacement of these and all the slats was considered essential. In order to extend their life, the supports have been tarred and new oak slats bedded in wet tar.



***Removing the Steel Stocks***

The mill has not been able to open for visitors this year. Instead, a volunteer member has attended most of the site meetings to allow all volunteers to be kept informed of progress. As with all the mills, I commissioned a millwright knowledgeable in Kentish mill detailing to produce a drawing enabling the restoration of the original sweep design to be reproduced. A photograph has recently been discovered showing an alternative design. An application for listed building consent using this information has

been approved and will be implemented. Discussions with the Society for the Protection of Ancient Buildings (SPAB) Wind and Watermills Section and the HLF monitor are closely maintained on this and all the other mills. The award of a Hanson Land Fill Tax grant and a grant from Gravesham Council means that three funding bodies are involved and this complicates the administrative process. Mature trees are a problem since they block wind and prevent the mill turning and restoring its setting should also be a priority.

## Stelling Minnis

Listed Grade 1. This is a small smock mill of a size once very common in Kent. It has an octagonal tower clad in tarred weatherboarding with a rectangular cap. The base is only a few courses of bricks in height and as a result this mill is only 43ft high. The mill was built for George Goble in 1866 on the site of an earlier post mill. The millwright was T.R. Holman. On the owner's death in 1878,



***Timber failure on cant post***

Henry Davison acquired the mill and it stayed in his family for 92 years, becoming known as Davison's mill. Kent County Council took it over on Alec Davison's death in 1970. The mill, which stands in a rural location on the outskirts of Stelling Minnis village, was fully restored in the 1970s by the millwrights Pargeter and Lennard. As a result, the mill is virtually as built. Adjacent trees screen the mill and these need to be removed before the mill will be capable of turning two pairs of millstones by wind power. The mill machinery can however be operated using the original 1926 oil engine. The Parish Council and the Kent Mills Group jointly maintain and manage the mill.



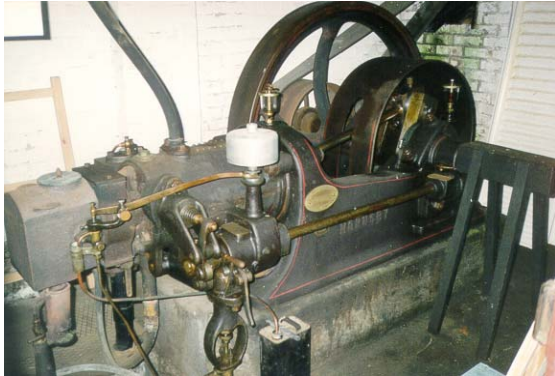
***Weatherboarding stripped and frame repairs continuing 17 October 2002***

Of all the mills in KCC ownership, this appeared to be in the best condition. The only clues as to possible problems were permanently damp weatherboarding and moisture on the surface of three structural posts. Limited areas of wet and dry rot were also visible. It was only when the cap was removed and the weatherboarding stripped off, that the true extent of the problems were revealed. In the 1970's the mill was painted in plastic paint on the original tar. This sealed the boarding including the joints between boards and prevented the mill breathing. As a result the water entering at the cant posts where the butt jointed boarding had failed could not dry out and massive damage to the outer concealed face of the posts was present. Removing the boarding also exposed holes for which no obvious cause was discernible, until the sight of a mouse explained all. When the cap was removed, and this was done during the village fete as an extra event, stress in the cap frame was discovered. Removal of the

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boarding exposed a problem common in many Kentish Mills. The side sheers are of too small in section and bend with the weight of the breast beam and wind shaft at one end and the fantail supports at the other. It is probable that the cap is stiffened by the weatherboarding, but a decision on possible strengthening of the frame needs to be taken before re-boarding is done.



*Oil engine – still in working order*



*Bending of sheers to Cap*

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### **Drapers, Margate**

Listed Grade II. Drapers is a smock windmill with tarred weatherboarding on an octagonal brick base. The mill was constructed in 1845 by the Canterbury millwright John Holman, on the site of earlier mills. It was worked by wind until 1916 and powered by a gas engine until 1933. The mill was in a dilapidated condition when acquired by KCC in 1968 and a programme of restoration was then carried out under the Drapers



***Drapers windmill in 1965***

Windmill Trust. Drapers windmill is now completely restored.



***The dismantled gas engine awaiting funding for restoration***

The location of Drapers mill was once completely rural but it is now part of Margate. However, open land still exists to the south (a school site) and to the north (a field owned by the County Council). The initiative for preservation of the Mill came from Mr R. M. Towes, the then Headmaster of the school who opposed redevelopment of the site for housing. Since then, local support has ensured that the mill is open to the public and well used.



***Drapers windmill today***

The enthusiastic group of volunteers is restoring internal shafts, gears and bearings and has acquired a gas engine to enable the mill to be run on windless days. Funding is being raised for this restoration work. The volunteers are also, with KCC's help, laying out and planting a miller's garden. It is intended to grow seed for milling demonstrations, particularly for school visits.

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Work on the repair of the mill is complete and included repairs to smock frame, cap, reboarding, tarring and repainting, rebuilding the sweeps, replacing shutters and stocks.

### **Union Mill, Cranbrook**

Listed Grade 1. Union Mill is a white weather boarded smock mill, reputedly the finest example in England. At 70ft in high, it is the tallest smock mill in the country. It is of seven storeys, including a brick base of three storeys. Humphrey the millwright constructed the mill in 1814 for Henry Dobell. After Henry Dobell went bankrupt in 1819, the mill was taken over by his creditors and became known as the Union mill. In 1832 George and Henry Russell bought the mill and it remained in the Russell family until 1957. Following a successful fund-raising appeal by SPAB, the mill was acquired by KCC in 1961 and restored to full working order. The windmill is in a prominent position in the attractive Wealden town of Cranbrook and provides both a local landmark and a visitor attraction to the town. The mill is also in the Cranbrook Conservation Area.



***The mill with the Dutch style sweeps***



***The mill on 26 October 2002***

When restored in the 1960's, only a Dutch millwright was available to carry out the work. As a result, a pair of Dutch style combined sweeps and stocks replaced the Kentish originals. Over the last two years, some of the sail bars and shutters were failing and, as an emergency measure, these were removed before last winter. Work has now begun on the main contract with removal of the steel stocks and sail frames. The existing white painted weatherboarding is failing due to the use of a modern paint on wet boarding. Early in 2003, the cap will be removed and repaired under cover off site. The mill will be scaffolded, the boarding removed, the structural frame repaired where damp has promoted extensive rot. The cap and smock will then be completely reboarded. Traditional

coatings will be used as finishes. Timber stocks will replace the previous steel. The site in the centre of town and its height means that great care in the selection and treatment of the timber is of major importance. The replacement stocks are to be Baltic pine, specially selected from a managed forest on a North German estate and sawn in England. The timber for the sweeps will be

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from the same source. In order to promote links between the foresters of the managed woodland and the end user, it is hoped to arrange for visits to the mills where their timber has been used.



***Removing the Dutch sails***

The work is complicated by the position of the mill in the centre of the town and it is likely that the next stage, the removal of the cap will involve a road closure for part of the day. A repeat of this will be required when the cap and the new sweeps and stocks are replaced next year. At a cost of about £120,000, this is expected to be the most expensive of all the windmills to repair.



***Sodden and failed weatherboarding***

### **Stocks Mill, Wittersham**

Listed Grade II\*. Stocks Mill is a post mill with a roundhouse of tarred brick protected by a sloping felted wooden roof. It is the tallest of the county's remaining post mills. The centre post of the mill has the date 1781 and the initials RV carved on it - this is either the date of the mill's construction or the date it was moved to Wittersham. It may have been called Stocks Mill after the village stocks that stood nearby. The mill operated for 120 years up to the beginning of this century. No machinery remains although



***The mill on the 26 October 2002***



***Sweeps removed for repair***

there are some interesting features, such as the fine post and trestles, a well-preserved roundhouse and four spring-shuttered sweeps - a rare arrangement in Kent. In 1980, the mill was transferred to KCC and a local 'Friends of Stocks Mill' group established to help preserve the mill and open it to the public. The mill is at Wittersham on the Isle of Oxney, and is surrounded by the private gardens of Stocks Mill House, the

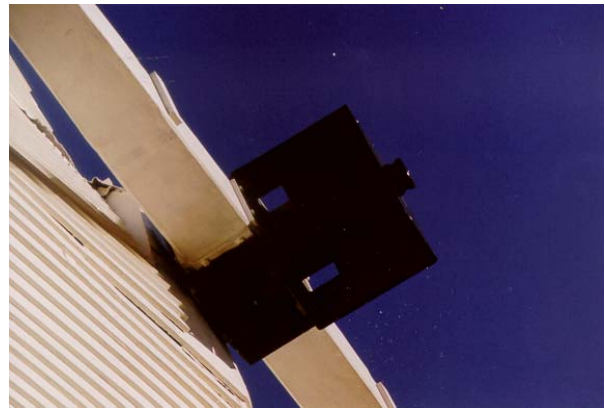
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original, now extended C16 mill house, listed Grade II.

Work is now under way; the mill has been coated with traditional lead and linseed oil paint. The previous lead coating has lasted very well and once the powdering top coat had been removed, further protective coats have been easily applied. Two new sweeps are under construction. The original mill floor, badly damaged by wet rot will be revealed under a modern timber floor. It will be recorded before removal and replacement by sound boarding. Internal furniture will be replaced and the sprattle beam relocated in its correct position to properly align with the stones below.



***Canister - large and heavy for the size of mill***

It is also hoped to thin and prune trees that are overhanging the mill and damaging the paint finish.

### **West Kingsdown**

Listed Grade II. West Kingsdown mill has an octagonal tarred weatherboarded smock on a square base, a seven - bladed fantail and once had two common and two patent sweeps. The mill was built nearby in 1800 but was moved in 1880 to its current site by its then owner, Tanner Norton. The Norton family ran the mill in conjunction with a post mill nearby (burnt down in 1909). Kent County Council acquired it in 1959. The mill is located within the farmyard of Mill House on the outskirts of West Kingsdown village - it is a significant village landmark and a prominent feature in the landscape, clearly visible from the M 20 motorway.



***The mill today***

This is the only mill for which Heritage Lottery Funding was not agreed. The HLF considered that the mill was not adequately available for public access and so did not comply with the relevant criteria. Nevertheless, the mill does need some work to repair a sweep and prevent water entering the mill smock. The County Council will fund this work from its own resources. The Council will also fund a visitor's information leaflet and interpretation board to match the other HLF funded windmills.

### **The Future**

Kent County Council decided that, in order to safeguard the mills long term and make full use of them as an important part of the County's heritage, immediate extensive maintenance and repair work was required. Additionally, a policy of encouraging their use for tourist and educational purposes was essential. The maintenance and repair work is now well on the way to completion. When complete, the work will have ranged from structural repairs, safeguarding the mills in the future by installing lightning conductors, health and safety guidance for volunteers and visitors, information packs for schools and other visitors and providing tourist sign posting. Other related projects for which funding is not yet available are also being pursued. At Drapers windmill, Margate, we hope to restore a historic gas engine to working order to turn the machinery when there is no wind. A coal gas manufacturing plant originally existed on site so it would complete the project to replace this. At Chillenden, improved vehicular access is necessary and this is being investigated. Finally, we are, as part of the HLF bid, recording each mill both drawn and photographically.

I should like to end with an appeal to readers. As part of the work I am attempting to build an archive of photographs, drawings, memorabilia and written records for all the mills. If you are aware of anything please let me know. In particular, neither the SPAB nor KCC have any detailed written, drawn or sketch records of Cranbrook mill. It is possible that this information exists in Rex Wailes original file deposited with the SPAB and now mislaid. If it is out there, its return would be very welcome.

**Peter Cobley** - formerly Conservation Architect, Kent County Council.

### **Photographs**

Photographs by Peter Cobley and IJP

### **Acknowledgements**

This extensive and complex project could not have been started without the help of and funding from many bodies. The support of the Heritage Lottery Fund, waste operators through the Land fill Tax scheme, Canterbury City Council, English Heritage, Gravesham Borough Council, Kent County Council members, parish councils and volunteers has been essential. Special thanks has to go to the many volunteers who give up their spare time looking after the mills on behalf of KCC.

### GLOSSARY OF MILLING TERMS

**BATTER:** the slope on the walls to tower and smock mills, inwards from base to top.

**BODY:** or buck, the moveable chamber of a post mill which contains the machinery.

**BRAKEWHEEL:** wheel attached to the front of the windshaft to drive the wallower. The brake band, operated by the brake lever, contracts on its rim to stop the sweeps turning.

**BREAST:** the front of a post mill body.

**BREAST BEAM:** the transverse front member of a post mill or cap frame, supporting the front bearing of the windshaft.

**BRIDGE BEAM:** beam supporting the spindle on which the millstones rest.

**CAP:** the revolving top of a smock or tower mill supporting the sails, windshaft and fantail.

**CAP FRAME:** the framework at the base of and supporting the cap, mounted on the curb.

**CAP RIBS:** curved rafters meeting at a ridge supporting the weatherboarded covering to the roof.

**CANT POST:** the corner posts of a smock mill, inclined inwards as they rise.

**CROSSTREES:** two beams at right angles forming part of the trestle over which the horns of the main post of a post mill are located.

**CROWNTREE:** the beam at second floor level, weighing about a ton, pivoted on the pintle bearing on top of the main post and supporting the body of a post mill.

**CURB:** circular ring-beam at the top of a smock, supporting the metal track-plates on which the cap rotates.

**DUST FLOOR:** the topmost floor, over the grain bins, to collect dust and rain.

**FAN STAGE:** the framework at the rear of the cap which supports the fantail.

**FANTAIL:** a vertical fan of six to eight vanes which automatically operates the mechanism to turn the cap and keep the sails facing into the wind.

## KENT WINDMILLS

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**FLOUR DRESSING MACHINE:** separates fine flour from the coarse.

**GOVERNOR:** a device comprising rotating fly-weights and levers that automatically maintains the correct distance between the millstones, according to the strength of the wind.

**GRAIN BINS:** wooden compartments for the storage of grain, on a level above the stone floor.

**GREAT SPUR WHEEL:** the main driving wheel, meshed into the brake wheel, which transmits power via the stone nuts to the millstones, from either above (overdrift) or below (underdrift).

**HEADSICK:** describes a post mill which has an undue forward lean.

**HEMLATH:** the member on the outer edge of a sail which holds the ends of the sail bars.

**HOPPER:** a wooden funnel that supplies grain from a bin overhead via a shoe to the horse or container resting on the millstones.

**LEADING BOARD:** a narrow board fixed to the leading edge of a sail.

**MAIN POST:** large fixed vertical timber post weighing about one and a half tons, with a pintle at the head on which the body of a post mill pivots to be faced into the wind.

**MEAL FLOOR:** the floor below the stone floor with bins to collect via meal-spouts the meal from the millstones.

**MIDDLEING:** Kentish term for a stock.

**PETTICOAT:** boarding that infills the space between the cap and smock or tower.

**PIERS:** brick or stone work pillars supporting the ends of the crosstrees to raise them off the ground.

**PINTLE:** onion-headed timber bearing at the top of the main post in a post mill. Often replaced by a flanged cast iron bearing known as a Samson's Head

**POLL END:** the cast-iron sockets at the end of the windshaft through which the stocks are held.

**POST MILL:** a mill with a rotating body supported on a central main post.

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**QUANT:** square iron shaft with a stone nut at its head powering the runner (upper) millstone from above. Can be moved across to disengage drive.

**QUARTER:** one side of a smock mill.

**QUARTER BARS:** diagonal braces off the cross-trees supporting the main post.

**ROUNDHOUSE:** a building around the trestle of a post mill.

**SAILS:COMMON:** latticed wooden frame over which sail-cloth was fixed to suit strength of the wind.

**DOUBLE SHUTTERED:** sails with shutters on both leading and trailing sides of their whips.

**PATENT:** sails with shutters capable of automatic adjustment by the striking gear even whilst rotating.

**SINGLE SHUTTERED:** sails with shutters on the trailing edge only.

**SPRING:** sails with hinged timber shutters, set before operating the mill, and connected by a spring loaded lever which allows the shutters to open if struck by a gust of wind.

**SACK HOIST:** a mechanism comprising a horizontal sack bollard around which a rope is wound to haul sacks of grain from the ground through a series of trap-hatches to the meal floor. It is controlled by the sack control lever which engages a friction drive off the wallower.

**SAIL BAR:** upright timbers set into the whip to support the hemlath.

**SHEER TREES:** longitudinal beams flanking the main post supporting the bottom floor of a post mill body.

**SHOE:** inclined wooden trough which channels grain from the hopper to the centre of the millstone.

**SHUTTERS:** hinged timber vanes on the sweeps, connected by the shutter bars.

**SIDE GIRT:** longitudinal member weighing about half a ton, fixed to the end of the crowntree, and supporting the body of a post mill.

**SMOCK MILL:** a mill with a fixed wooden tower, usually of eight sides, with a revolving cap at the top.

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**SPIDER:** a metal coupling at the front of the striking rod, connected to the shutter bars.

**SPILL THE WIND:** to open the shutters whilst the sails are rotating.

**STAGE:** a wooden platform around the lower part of a tower or smock mill from which the sails can be adjusted.

**STOCK:** a tapered timber to which whips supporting sweeps or sails are fixed.

**STONE FLOOR:** the floor supporting the millstones.

**STORM HATCH:** a small door at the front of the cap allowing access to the sails.

**SWEEPS:** local term for sails used throughout Kent and Sussex.

**STONE NUT:** small cogged wheel at the top of the quant, meshed into the great spur wheel in smock or tower mills, or the wallower in a post mill.

### STONES

**DERBYSHIRE PEAK:** a single piece of millstone grit, used for grinding barley, oats and maize.

**FRENCH BURR:** a composite stone of many pieces, used for grinding wheat.

**RUNNER:** upper and rotating stone of a pair.

**BED:** lower stone, fixed to the floor.

**STONE DRESSING:** the cutting of furrows radially from the centre of the grinding surface of a millstone, to grind and direct the grain.

**STRIKING GEAR:** a mechanism to operate the shutters, comprising a striking rod passing through a hollow windshaft, connected to the spider at the front and a weighted endless chain at the rear. A strong wind would raise this weight and thus open the shutters automatically.

**TAIL:** the rear of a post mill.

**TAIL BEAM:** the transverse rear member supporting the rear bearing of the windshaft.

**TAIL POLE:** a large wooden lever attached to the rear of the body of a post-mill, or the cap of some smock mills, to enable it to be rotated by hand, thus bringing the sails into the wind.

**TAIL WHEEL:** mounted on the rear of the windshaft within some post mills, to drive an extra pair of millstones.

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**TAIL WINDING:** damage caused to the sails when a gust of wind catches them from behind, owing to failure of the fantail, the cap not rotating, or a sudden change of wind direction.

**TENTERING GEAR:** the mechanism for setting the initial gap between the millstones.

**TRANSOME:** beam spanning between the cant posts to supporting floor joists.

**TRESTLE:** the supporting base structure to a post mill.

**TOWER MILL:** a mill with a round brick tower and revolving cap at the top.

**TUN:** wooden casing enclosing the millstones.

**UPLONGS:** longitudinal timbers bracing the sail bars.

**UPRIGHT SHAFT:** principal shaft connecting the wallower to the great spur wheel.

**WALLOWER:** a bevelled gear wheel meshed with the brake wheel and driving the great spur wheel. More commonly in post mills, it drives a runner stone.

**WEATHER:** the angle at which the sail bars are set into the whip to give a twist to the sail, greatest at the tip, in the manner of a propeller.

**WEATHERBOARDING:** the overlapping shaped timber planks covering the framework of a post mill body, smock or cap.

**WHIP:** the principal longitudinal member of a sail, bolted to the stock or middling and supporting the sailbars.

**WINDING:** turning the sails into the wind.

**WINDSHAFT:** a shaft, usually of cast iron after the mid eighteenth century, to which are fixed the stocks, brake and tail wheels. It is inclined to balance the weight it carries and is supported in a neck bearing on the breast beam at the front and a tail bearing on the tail beam at the rear.

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