

Gunpowder Mills Study Group      NEWSLETTER 11, SEPTEMBER 1992

**AUTUMN MEETING AT BATH**

**FRIDAY, 31 OCTOBER - SUNDAY, 1 NOVEMBER 1992**

As announced in Newsletter 10, the Group will be holding its Autumn Meeting at the University of Bath, with visits to the Woolley and Littleton gunpowder sites. The arrangements have been made by Brenda Buchanan with the help of local industrial archaeology groups. There will be an informal meeting on the Friday evening, talks by Brenda and others at the University on the Saturday morning, visits to the sites on the Saturday afternoon and Sunday morning and a tour, buffet supper and members' talks at the local industrial archaeology museum on the Saturday evening. Those attending are making their own arrangements for accommodation.

The visit is now full. Anyone who wishes to be placed on a waiting list should give their name to Jenny West (telephone 0272 685526). Brenda will contact all involved after the middle of October to confirm the arrangements.

**SPAB WIND & WATERMILL SECTION: WATERMILLS MEETING**

**SATURDAY 14 NOVEMBER 1992**

The main theme of this meeting will be gunpowder mills. The speakers will be Gerry Moss on the technology of the industry, Jenny West on the industry in the mid-18th century, Alan Crocker on gunpowder mills in Britain and Paul Emerson of the RCHME on the Royal Commission's survey of the Oare Works at Faversham. The meeting will be held at the Institute of Child Health, Guilford Street, London (near Russell Square). Further details from Clare McClaren, SPAB Mills Section, 37 Spital Square, London E1 6DY (telephone: 071 377 1644).

**CHRISTOPHER SNAPE**

We are saddened to report the death of our member Chris Snape who was killed earlier this year while clearing mines in Kuwait. Several of us got to know him well on our Scottish Field Trip in 1990 and earlier, in Newsletter 6, he had reported on the gunpowder mill in Derby. He was a large, practical man, who worked in forestry on the Isle of Wight. He took on all sorts of heavy dangerous work and had an ambition to set up his own gunpowder mill. Chris had himself been left a widower with small children and he leaves his second wife and their combined family of five. We send them our sympathy.

**GEORGE KELLEHER'S THESIS**

In Newsletter 4 we reported the sad news that our member George Kelleher, authority on the history of the gunpowder industry in Ireland, and indeed throughout the British Isles, had died. Then in Newsletter 6 we announced that George was to be awarded a posthumous master's degree at University College Cork and that his brother John was arranging for the thesis to be published. This project has unfortunately been beset with difficulties but John contacted us recently to report that the book would soon be published. We shall circulate members with a prospectus as soon as it becomes available.

**REPORT ON THE MEETING AT WALTHAM ABBEY: 23 MAY 1992, by Jenny West**

This meeting at the Countryside Centre, in close proximity to the Waltham Abbey Gunpowder Factory site, was a most important one for two reasons; it provided a forum for discussion about the future of the above site - vital at a time when the Ministry of Defence is considering its sale, and also opportunity for papers on the historical significance of both that site and other parts of the Lee Valley.

The meeting, held at the Centre with the kind permission of the Lee Valley Park Authority and attended by twenty-five people, was arranged between the GMSG and the Waltham Abbey Historical Society of which Ken Bascombe, a Group member, is Chairman; first hand information on specific buildings on the powder mills site was provided by Ken and by Malcolm McClaren.

In his paper on Gunpowder Making in the Lea (Lee) Valley, Keith Fairclough provided detailed historical information on a number of sites which were not only the earliest powder mills on the Lea but among the earliest recorded in England. These included the site of the Three Mills of 1588, and the seventeenth century sites of Temple, Sewardstone, Walthamstow, Tottenham, Enfield and Waltham Abbey mills; the last was to become one of the most important in the country. General discussion followed on the possible reasons for the decline in national supply from this area during the eighteenth century when all of the mills but Waltham Abbey ceased production. Resulting from his research on the Lee, Keith is doing much to advance our knowledge on the early gunpowder sites not only in that locality but also elsewhere in Britain.

Malcolm McClaren gave a well illustrated paper on Gunpowder Making at Waltham Abbey which described the factory's history during three centuries and the development of the various complex processes in powder making. The earliest known title deed for the powder mills was of 1669; previously concerned with oil manufacture this site eventually changed during the nineteenth century from gunpowder manufacture to that of high explosives, and continued thus well into the twentieth century. In answer to a question from member Malcolm Tucker on the location of related historical records we learnt that the main body of these are now safely within the Public Record Office; others are in Epping Forest District Museum. GMSG holds a copy of these deposits. It is this wide range of records which combine with the site itself to make the whole an area of outstanding national importance.

In connection with this importance and the need to preserve the factory site at a crucial time concerning the future of the entire area Alan Crocker, Chair, and Ken Bascombe detailed the current position. At a meeting earlier this year organised by CIVIX, appointed by the MoD as Planning Consultants, representatives of the GMSG and other bodies, national and local, had the opportunity to hear about developments and to express views. Ken reported that English Heritage was considering listing selected buildings but no result was yet known. Five main issues had been discussed. Problems of possible contamination of the site with remains of modern explosives: possibilities for reuse of the seventeen main buildings: traffic access: possible use for leisure and recreation, and for housing.

Questions and comments from the floor to Alan and Ken concerned contamination, historical and industrial archaeological significance of the site, possible ways in which the gunpowder site, comprising buildings and waterways, could be decontaminated, saved, restored, used and displayed. Alan considered that the Group should concentrate on suggestions for preservation of some or all of the surviving buildings, which include waterwheels, rather than the specialised issue of possible contamination, and that the Group accept the invitation of CIVIX to present constructive ideas at a future meeting.

Dan Bone of CIVIX made it clear that ideas from GMSG were welcomed and would be seriously considered. At the same time one very important factor had to be remembered; that any plan for preservation/use, such as a museum or interpretive centre, must be fully cost effective.

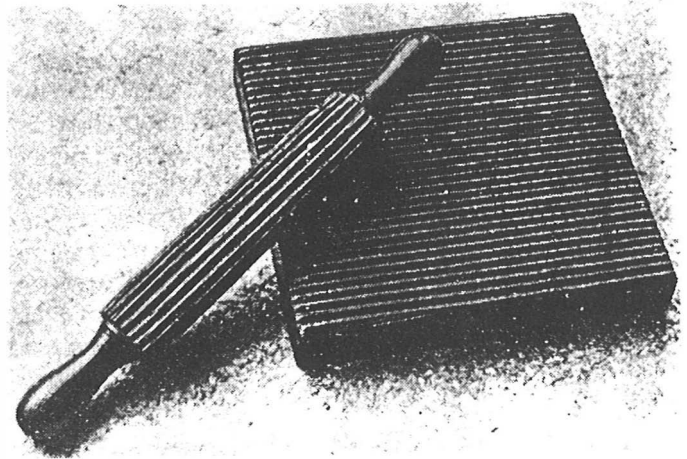
Subsequently it was considered essential by several Group members that a crucial first step should be detailed professional recording of the buildings and waterways; this should provide us with the necessary information on which to base our suggestions. The body which might be approached for this purpose is the Royal Commission on Historical Monuments of England which can in certain circumstances conduct a survey at short notice. A further comment was that consideration should be given to informing a body such as the Wind and Watermill Section of the current concern about and need for action on the site. The general agreement was that this is a unique site and should be preserved in part or whole, and that the Group should certainly be represented at the next meeting with CIVIX.

[Unfortunately, Jenny had to leave after tea and has therefore been unable to report on the last event of the day, which was a visit to a possible site of Naked Hall Mill at Enfield. It was a pleasant ramble across several fields with puzzling embankments and ditches, one of which had a watercourse, but we were not convinced!]

#### A GROOVEY GUNPOWDER ROLLING PIN AND BOARD?

Alice Palmer has sent us this photograph from the Autumn, 1970, issue of *The Countryman*. The accompanying text is as follows:

'Kathleen Stevenson of Broughton Beck, Ulverston, sent us this photograph. She believes that gunpowder for the Coniston copper mines was ground on the ridged board; metal was ruled out because of the danger of a spark. She has been told that the gunpowder was funnelled into a hollow straw, which was also the fuse.' Does anyone know what it was really used for?



*Polished mahogany board and 8-in. rolling pin*

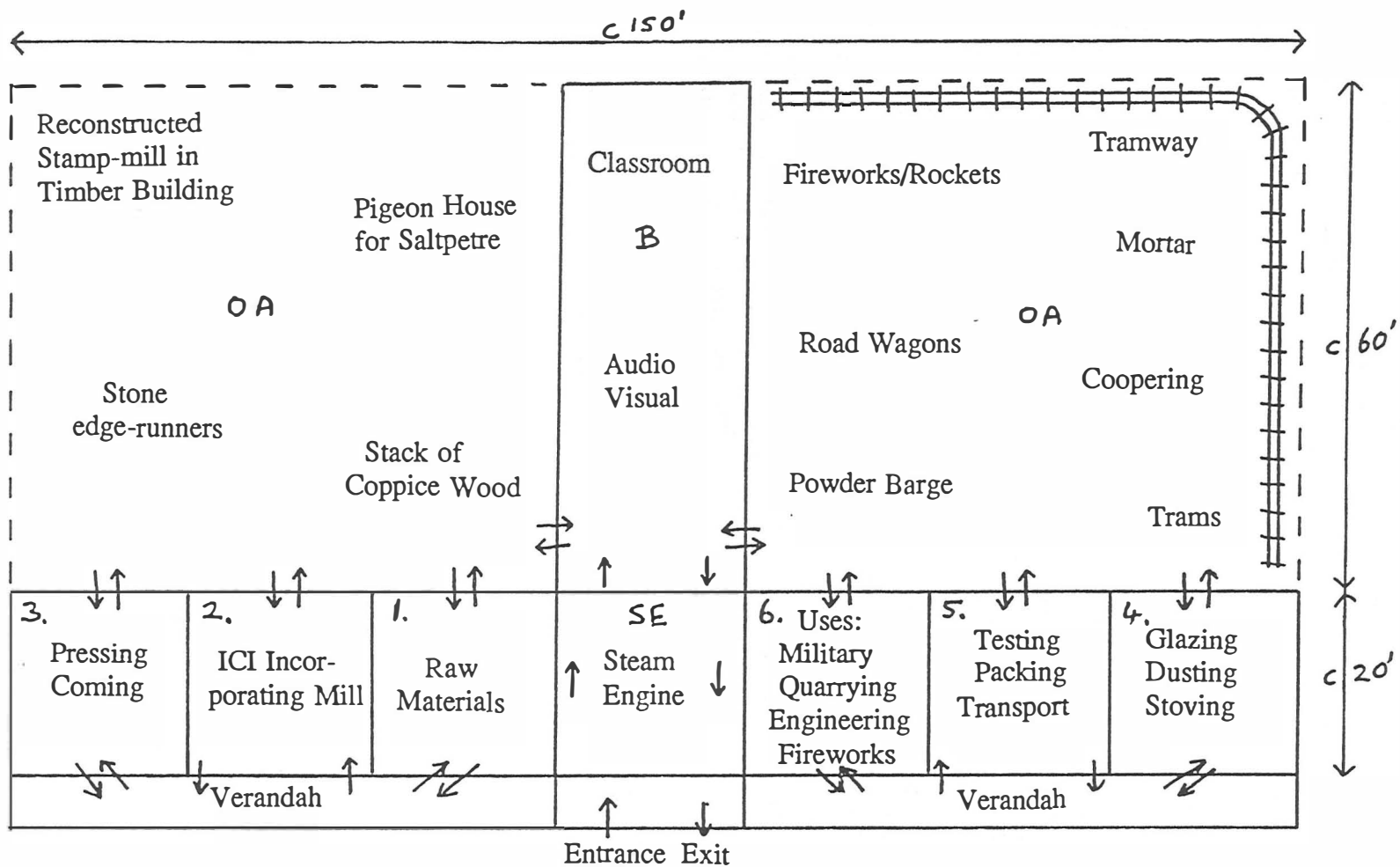
## PROPOSED DEVELOPMENTS AT RARDE WALTHAM ABBEY

Alan Crocker

At our Autumn Meeting in 1991 Ken Bascombe reported on the closure of the former Royal Armament Research and Development Establishment site at Waltham Abbey and the possibilities being considered for its future development. As a result it was decided to hold our Spring Meeting this year at Waltham Abbey and Jenny West reports on this elsewhere in this Newsletter. In the meantime CIVIX, the consultants appointed by the Ministry of Defence, organised a one-day Planning Forum at Waltham Abbey on 29 February and Ken arranged for Glenys and me to attend. The themes discussed were contamination, new uses, traffic and access, leisure and recreation and housing opportunities. There was support for an industrial museum on part of the site based on the gunpowder industry. Following the meeting we interacted with the CIVIX team and invited them to attend our Spring Meeting. I was very pleased that Dan Bone, one of their key staff, was able to come to the morning session and present his ideas. Brenda Buchanan provided him with information about the Frederiksvaerk gunpowder museum in Denmark and the Hagley museum in Delaware and CIVIX staff are planning to visit these sites during the summer.

Dan Bone also suggested that a small group of us should join him to discuss the creation of a gunpowder display on the RARDE site. This meeting was held at Waltham Abbey on 20 June and was attended by Ken Bascombe, John Boyes, Glenys Crocker, Keith Fairclough, Malcolm McLaren, Denis Smith of the Greater London Industrial Archaeology Society deputising for Malcom Tucker, Dan Bone and Ron Dane of CIVIX and myself. At the meeting I presented an outline plan for a gunpowder museum in and around one of the ranges of steam-powered incorporating mills. As a result of the meeting we were invited to prepare papers for a Second Planning Forum which was held on 25 July. I wrote on the gunpowder museum proposal, including the outline plan shown here, Ken Bascombe on utilisation of the River Lea, Keith Fairclough on the history of the River Lea and John Boyes on restored waterways at Amiens. These papers were distributed to the 50 or so people attending the Forum and, in enlarged form, were used as part of the exhibition. This also included the CIVIX architect's scheme for the museum developed from my sketch plan. In addition I was asked to present a talk at the Forum and I showed slides of gunpowder museums elsewhere in the world. The meeting gave very strong support for creating a gunpowder museum along the lines suggested.

During and following the Second Planning Forum the GMSG members present had discussions which led to two letters being sent to CIVIX with copies to English Heritage and the Royal Commission on Historic Monuments of England. Malcolm Tucker sent one emphasising the importance of carefully decontaminating and if possible retaining all five of the surviving steam-powered incorporating mills. I sent one about the significance of the water- and horse-powered period of gunpowder manufacture at Waltham Abbey and the importance of carrying out archaeological excavations on the sites of these mills. This resulted in David Stocker of English Heritage calling me to explain that they are in the process of listing many of the buildings on the site. Surprisingly he was unaware of the importance of the steam-powered mills and was unaware of our Gazetteer, so Glenys sent him a copy. He also informed me that English Heritage are making the gunpowder industry one of their special themes in 1993. We shall be meeting him at the

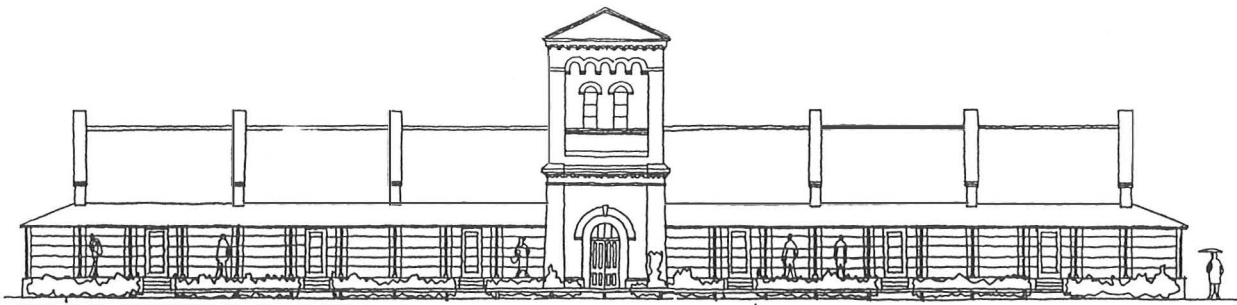


Possible Gunpowder Museum in a range of steam-powered incorporating mills at Waltham Abbey, consisting of a central 2-storey steam engine house (SE), six incorporating mills (1-6), a boiler house (B) and two open-air areas (OA)

Association for Industrial Archaeology annual conference at Cirencester in September and discussing the Waltham Abbey site in detail with him. Meanwhile the Royal Commission have arranged to carry out a detailed survey of the site during the autumn. This will probably take a couple of months. I was also contacted by Martin Bailey who wanted information for an article he was preparing for 'The Observer'. I hope I have discouraged him from stressing the Battle of Crecy and the Armada but perhaps if he leaves the legends out it will never get published.

Finally Ron Dane has visited me to explain CIVIX's present thinking about the future of the site. The idea is to divide the property into two areas. The first will be sold by the Ministry of Defence for housing and commercial developments. The second, containing a Site of Special Scientific Interest and the listed buildings, will be transferred to a Trust and used for various community activities including the gunpowder museum. A proportion of the MoD income obtained from selling the first area will be given to the Trust. Therefore, the larger the area allocated for housing/commercial development, the larger will be the initial income of the Trust! Clearly the negotiations about the boundaries between the two areas and about the proportion of MoD income to be transferred will be crucial. A planning application has already been submitted for house building at the southern end of the site and permission could be granted later this year. It is therefore possible that funds will be available to transfer to the Trust in the fairly near future. The structure of the Trust has yet to be decided but it is intended that the GMSG will be represented. Whether or not the MoD will accept this proposal remains to be seen. CIVIX are arranging a public exhibition at the Waltham Abbey Council Offices in September and plan to submit their final report to the MoD by the end of the year.

We are grateful to the GMSG members who have contributed to this major activity. If others would like to be involved please let me know.



West elevation of the proposed gunpowder museum in one of the ranges of steam powered incorporating mills at Waltham Abbey. Drawing by Robert MacDonald Associates, Architects.

## CATALOGUES OF DRAWINGS AND MAPS, FORMERLY HELD AT RARDE, WALTHAM ABBEY

In 1987 our member Malcolm McLaren, then Head of Management Services at the Royal Armament Research & Development Establishment at Waltham Abbey, prepared catalogues of the historic drawings and maps held in its Library. When the Establishment closed in 1991 this material was deposited at the Public Record Office, Kew and Malcolm was informed recently that the PRO Department of Maps and Drawings are hoping to complete the indexing of the material by the end of 1992, in preparation for making it available to the public. However if members show interest and request access to the documents it might encourage the PRO to index them more quickly.

The drawings catalogue lists some 350 items, all of which seem to relate to Waltham Abbey and date from between 1828 and 1966. In each case Malcolm has recorded the date, original reference number, information shown, alternative identification numbers, scale, size, material (e.g. paper, linen, dyeline copy), condition and signatures. The entry for catalogue item 901/110 is reproduced below as an example:

"13th May 1842

Drawing No C26

'Waltham Abbey, Plan, Section and Elevation of the method proposed for enclosing the Tray used in drying Gunpowder at the New Steam Stove No 100 on the General Plan Per Inspector Generals minute dated 6th April 1842. The parts colored yellow shew the proposed additions.'

Also bears the identification ref.148

1/4 of an inch to 1 foot.

Approximate size 14" x 8". Heavyweight paper on linen.

Coloured.

Bears the signature: JM. CW."

The maps catalogue has about 135 items but a dozen or so have been withdrawn. They date from between 1783 and 1979. Almost all are of Waltham Abbey but several show other parts of the Lee Valley, three are of Faversham (1783, 1785, 1846), one of Ewell (1863) and one of Chilworth (c1870 [but actually 1892]). Malcolm has recorded them in a similar way to the diagrams and the entry for map 900/2 is given below:

"June 1785

'A Plan of the Powder Mills, Gardens and other Lands belonging to His Majesty near Faversham in Kent. Likewise of Several Pieces of Land contiguous thereto part of which is proposed to be purchased for use of the King.'

30 references to buildings and lands.

2 chains or 132 feet to an inch.

Approximate size 51" x 23". Tracing paper on linen. Coloured."

The drawings catalogue occupies 148 A4 pages and the maps catalogue 43 pages. Malcolm has obtained the approval of Miss Margaret Condon, Head of the Department of Maps and Drawings at the PRO, for the preparation of photocopies for Group members. I can provide these for £7.50 (drawings) and £2.50 (maps) including postage and packing.

Alan Crocker

## GUNPOWDER MILLS OF SOUTH CUMBRIA

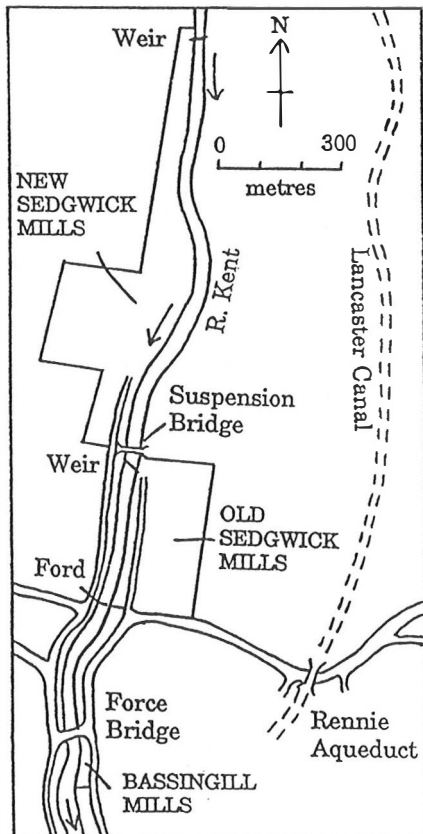
Alan and Glenys Crocker

At the beginning of September 1992 the Wind and Watermill Section of the Society for the Protection of Ancient Buildings held its annual long-weekend meeting in South Cumbria. This included a visit to some of the local gunpowder mills for which we prepared some detailed notes. An edited version of these is given here.

There were effectively eight gunpowder mills in Cumbria:

--	Old Sedgwick	(SD 508872):	1764-1852
13.	Bassingill	(SD 508868):	1790-1935
23.	Lowwood	(SD 346836):	1798-1935
34.	Elterwater	(NY 326052):	1824-1931
19.	Low Gatebeck	(SD 543855):	1850-1936
33.	New Sedgwick	(SD 508878):	1857-1935
40.	Blackbeck	(SD 334854):	1860-1928
181.	High Gatebeck	(SD 548857):	1898-1936

Here the initial numbers refer to the licensing certificates issued as a result of the 1875 Explosives Act and the grid references are to the main entrances to the sites. The mills were primarily concerned with making blasting powder but some military powder was produced and Lowwood was established originally to supply 'Africa' powder for the Liverpool slave trade. These notes refer to the five sites which lie south of Kendal: Old and New Sedgwick, Bassingill and Low and High Gatebeck. However only New Sedgwick and Low Gatebeck are treated in detail.



#### The Old Sedgwick, New Sedgwick and Bassingill Gunpowder Sites

The locations of these three sites are indicated on the sketch map of figure 1. Only traces remain of Old Sedgwick which was on the left or east bank of the River Kent between the ford and the suspension footbridge of 1875 (rebuilt 1988). It was established by John Wakefield, a Kendal Quaker, in 1764 and was expanded by building new incorporating mills 500m downstream at Bassingill in 1790. However the site closed in 1852 when the Wakefields opened the Gatebeck mills. The original weir was about 100m upstream from the modern one and fed a small leat for a corn mill, which became a corning house. The remains of the mill tail entering the river are visible in the garden of a cottage which pre-dates the works. The new large mill stream for the gunpowder mill was about 360m long and powered most of the processes in buildings which were crowded rather close together.

Figure 1. Sketch map showing the locations of the New Sedgwick, Old Sedgwick and Bassingill gunpowder mills.



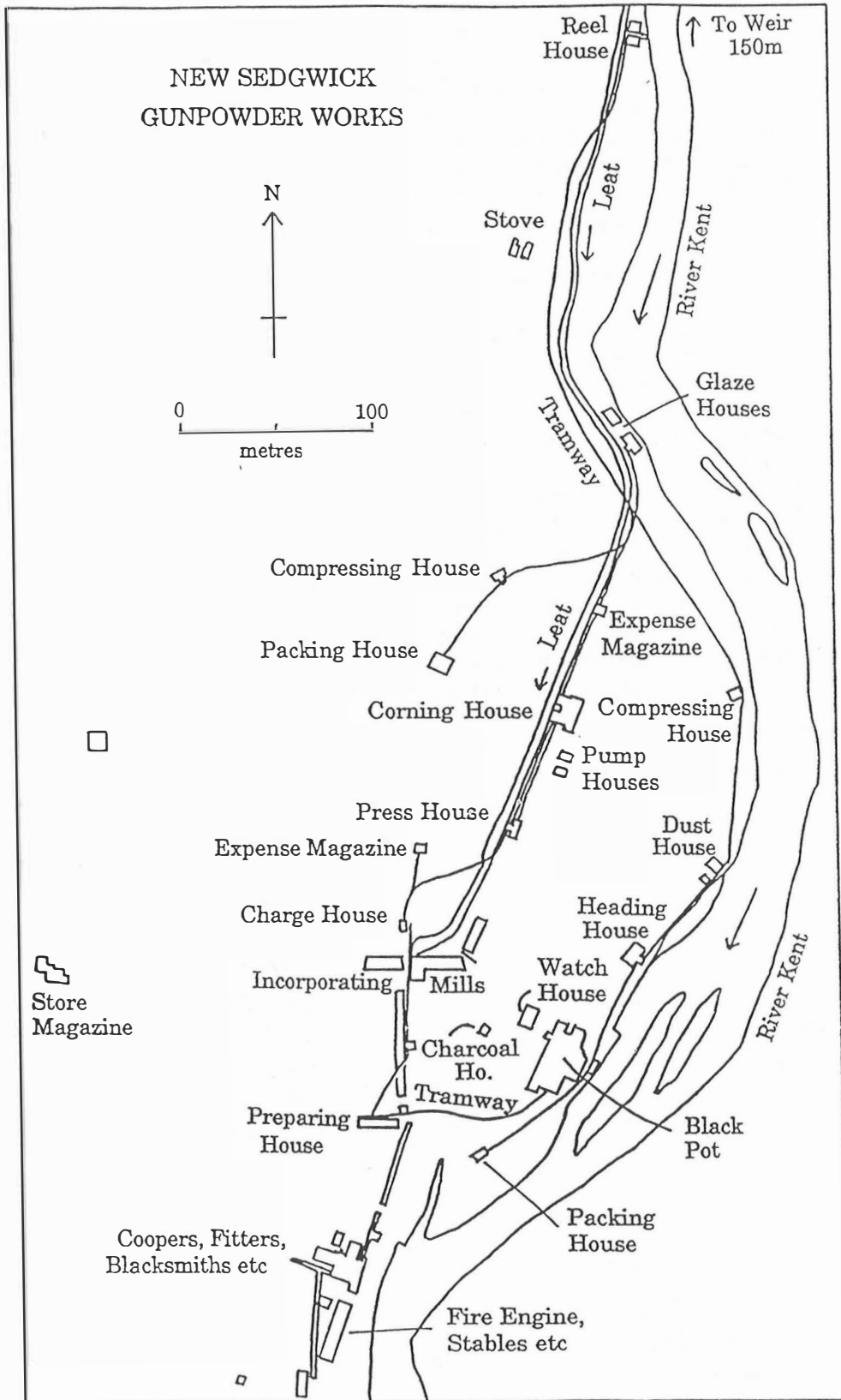


Figure 2. Plan of the New Sedgwick Gunpowder Works, based on an undated original in the Cumbria Record Office (Kendal).

**New Sedgwick** was farther upstream on the right or west bank of the Kent (see figure 1). It was established in 1857 by Walter Charles Strickland of Sizergh Castle, 1km to the west, but the company failed in 1864. The business was reconstructed by The Sedgwick Gun Powder Company and Henry Swinglehurst of Hincaster House, 3km to the south, became the owner. His family remained in control until 1918, when it was taken over by Explosive Trades Ltd, which became Nobel Industries Ltd in 1920, which became part of ICI in 1926. The works closed in 1935. The site is now owned by the National Trust but managed by the Caravan Club.

A sketch plan of the New Sedgwick site is reproduced as figure 2. The most interesting structures are probably the water-powered incorporating mills, near the reception area. As shown on the more detailed sketch plan of figure 3, there are two ranges of these separated by a blast wall. The original range of six mills with a central wheel-pit dates from 1858. Some of the mills are in a very bad condition and the most westerly chamber has been covered with rubble. The wheel was probably 37ft x 6ft and powered the six edge runner mills from below by means of lay-shafts in tunnels. A broken iron edge runner, probably early 20th century, lies on the ground south of the wheel-pit. Each chamber has three stone walls, the front wall and roof, which were deliberately made of lightweight materials, having disappeared. In an explosion these light structures would be destroyed but could easily be replaced, whereas the stone walls would hopefully survive. There are remains of brackets on the side walls of the chambers which supported troughs of water which automatically drenched the mills if there was a fire. The most striking feature of the mills however is that the plan

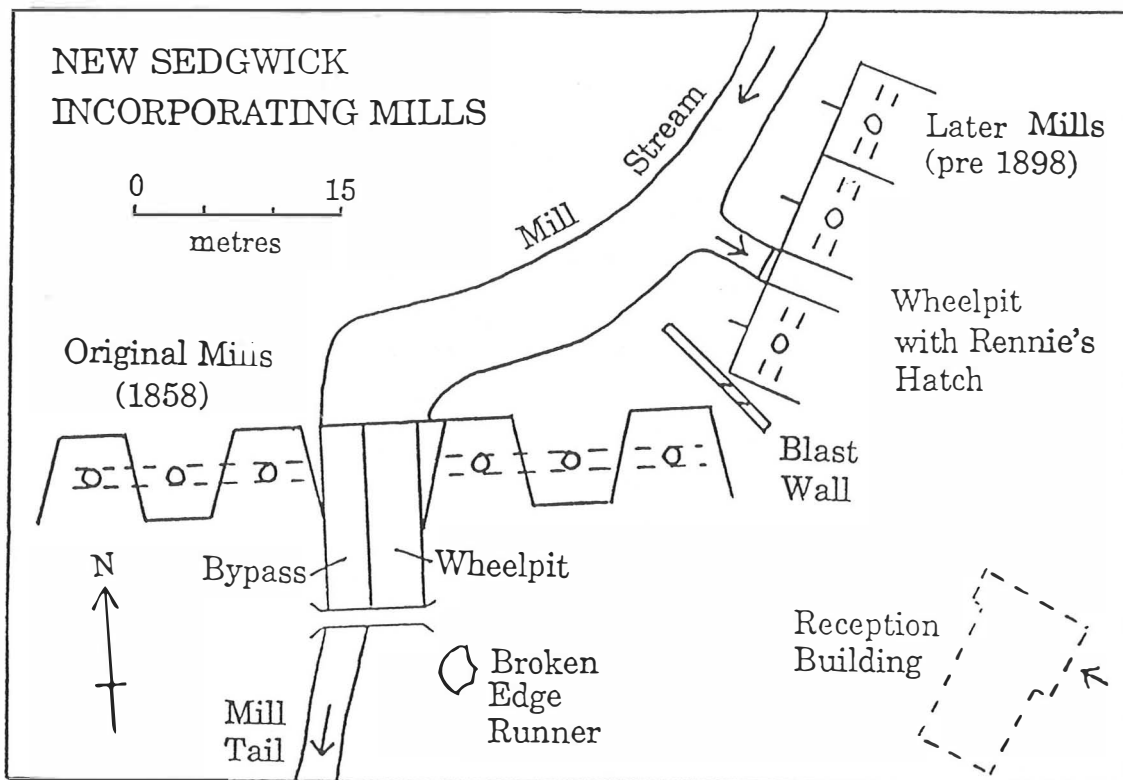


Figure 3. Plan of the New Sedgwick incorporating mills, based on a plan provided by the National Trust.

of each chamber is a trapezium and that alternate chambers face in opposite directions. This maximised the size of the light wall and was intended to minimise the chance of an explosion or fire in one chamber being communicated to its neighbours. The only other known example of the use of this type of chamber is in the first range of steam-powered incorporating mills at The Royal Gunpowder Factory at Waltham Abbey, which were also driven from below. They were built in 1857, one year earlier than those at New Sedgwick, and blew up in 1861. The later mills at Waltham Abbey were all rectangular!

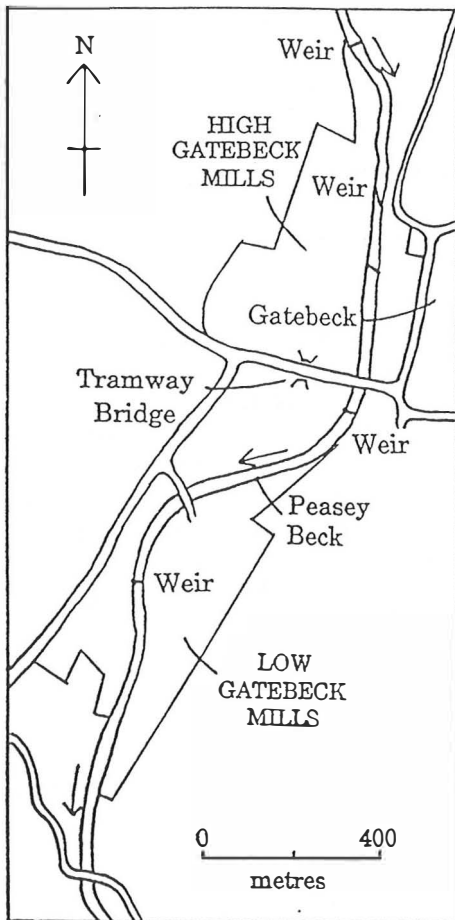
The second range of incorporating mills at New Sedgwick (see figure 3) was built between 1858 and 1896-8, when the 1st and 2nd editions of the 1:2500 OS maps were surveyed, and probably dates from the late 1860s. It has three approximately square chambers, one on the SW and two on the NE of the wheel pit. This housed a 15ft x 6ft wheel and the water supply was controlled by a 'Rennie's hatch', part of which survives. This was a close-fitting guide to a breast-shot wheel in which the sluice gate was lowered rather than raised, so that water could always be drawn at the top of the leat. It was first used by Smeaton at the Soho Works in 1784 and there is a working example at the Claverton pumping station on Rennie's Kennet and Avon Canal near Bath. The mills were driven from below but now only traces of the equipment survive. Each chamber has a massive external buttress at the rear.

The leat which is about 3.5m wide and 2m deep can be followed NNE for some 700m to a weir on the Kent (see figure 1). The path follows in part the tramway which serviced the site and passes many ruined buildings (see figure 2) some of which had water turbines (1884, 1902, 1923). In the opposite direction (downstream) the leat leads to the former mill workshops: joiners, fitters, blacksmiths, sawmill etc). This had a 15hp turbine installed in 1921.

The remains of the **Bassingill** incorporating mills are 1km S of New Sedgwick on the left bank of the Kent just downstream from Force Bridge (see figure 1). They can be viewed from the bridge or from across the river. They were established in 1790 as an extension of Old Sedgwick and continued in use until 1935 in conjunction with Gatebeck. The main feature of the site is a massive terrace of three stone chambers separated by two high blast walls. The large waterwheel pit, with the remains of a Rennie's hatch, is located between the N chamber and the other two. Nearer the bridge are the ruins of two pairs of earlier mills powered conventionally by central waterwheels. The water was channelled to these mills through vaulted tunnels. Bassingill was used only for incorporating and not the other processes of gunpowder manufacture. The 5km route to Gatebeck used by the gunpowder carts passes beneath Rennie's aqueduct on the Lancaster Canal in the village of Sedgwick. (see figure 1).

#### **The Low Gatebeck and High Gatebeck Sites**

The locations of these two interconnected sites on the Peasey Beck, one of the headwaters of the Bela, are indicated on the sketch map of figure 4. Much of the earlier Low Mills, established by John Wakefield in 1850-2, is now the Millbrook Caravan Park. The gate posts at the entrance (see figure 5) are re-used charcoal cylinders. Until the late 18th century charcoal for



**Figure 4. Sketch map showing the locations of the High Gatebeck and Low Gatebeck gunpowder mills.**

gunpowder manufacture was made in the woods in clamps or pitsteads but in 1786 Richard Watson, absentee Bishop of Llandaff, Professor of Chemistry at Cambridge and resident of Calgarth Hall, Windermere, developed a method of producing better quality charcoal in iron cylinders or retorts. It is interesting that eight cylinders remain at Gatebeck although charcoal making at the site ceased in about 1860, after which it was brought from elsewhere. No other charcoal cylinders for gunpowder manufacture are known to survive in Britain. The manager's house, on the left bank of the Peasey Beck has a stone in its gable inscribed 'I W 1852' (John Wakefield). The relatively flat area SE of this was occupied (see figure 5) by the blacksmiths' and joiners' shops, the mixing house, the saltpetre refinery and the boilers. A steam engine 'Garibaldi' was installed in 1863 and shortly afterwards Gatebeck became the first gunpowder works in Britain to produce saltpetre by converting sodium nitrate and potassium chloride into potassium nitrate and sodium chloride. Upstream were a stove, cartridge pressing houses, packing houses and a magazine. The weir for the 900m long, 5m wide and 1m deep mill stream, which runs along the east side of the valley (see figure 5), is 500m upstream.

The mill stream is overgrown and difficult to follow but a good path follows a section of the 5km of horse-drawn tramway (1875) which served the site. This continued SW for a further 5km to Milnthorpe railway station, connecting after 2km with the Lancaster Canal at Crooklands. The path, going S, passes in turn the remains of the mechanics' shop, a corning house, which had massive concrete walls similar to corning houses at Lowwood, Glyn Neath in South Wales and the Oare Works at Faversham in Kent, and a glazing house, before reaching four pairs of incorporating mills. When Gatebeck went into production in 1852 all of its powder was incorporated at Bassingill. It is interesting that, in order to use the available water power, the inconvenient practice of carting the prepared and mixed ingredients 5km from Gatebeck to Bassingill and then bringing back the incorporated mill cake for corning, glazing etc, continued until the mills closed in the 1930s. However the eight Low Gatebeck incorporating mills were constructed between 1858, when they do not appear on the 1:2500 OS map, and 1876, when one of them exploded. They may in fact be contemporary with the new saltpetre works of the mid-1860s or the tramway of 1875, which is also the date of the important Explosives Act which resulted in many gunpowder works being either closed or reconstructed.

The four pairs of incorporating mills are arranged in a row with gaps of 13 to 16m between the pairs. The central gap is occupied by steps leading upwards to the backs of the mills and the other two gaps by vaulted chambers which were charge houses, used for storing gunpowder temporarily before or after incorporation. To reach these mills the leat had to be extended some 170m downstream from the glazing house. The wheels worked in parallel and the water was taken away in an underground stream which formed part of the mill race for Kaker corn mill 650m down the valley. It seems that this stream was culverted to provide space for the tramway. The mills which are in a ruined state are rectangular in plan and openings in the walls of the wheelpits indicate that, unlike those at New Sedgwick, they were driven from above. Before the mills closed in 1936 three of the waterwheels were replaced by turbines and the fourth by an electric motor. Evidence for these conversions survives in the wheel pits.

The **High Gatebeck** mills appear on the 1898 1:2500 OS map but could only just have opened as the licence number (181) is higher than that of the Kynochtown Mills in Essex (176), which opened in 1897. The Low and High sites were linked by the tramway which passed through a surviving arch of steel and concrete beneath the road to Gatebeck (see figure 4). The High Mills consisted of two terraces of incorporating mills, mixing, pressing, corning, glazing and reeling houses, a stove and two magazines, all on the W bank of the Peasey

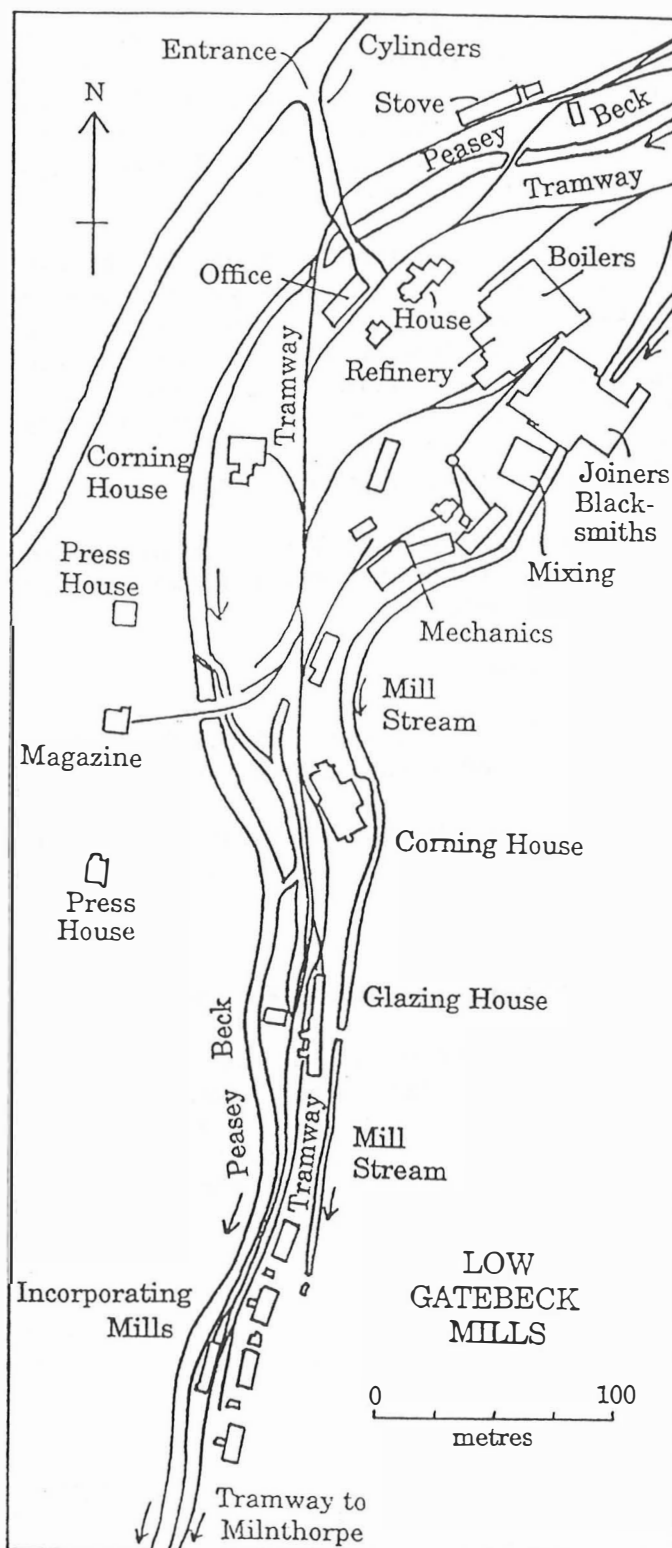


Figure 5. Plan of the central and southern parts of the Low Gatebeck gunpowder site, based on the 1898 1:2500 OS map and information provided by Mike Davies-Shiel.

Beck, and a sawmill, cooperage and boiler house on the E bank. Substantial remains of one terrace of water powered incorporating mills and of the magazines survive. The sawmill complex, which was converted from a former bleach works, is now used by an engineering firm specialising in second-hand parts for motor vehicles. The gate posts at the entrance (SD 548857) are a pair of charcoal cylinders.

The two Gatebeck sites continued in the ownership of the Wakefield family until 1918 when, like New Sedgwick, they became part of Explosive Trades Ltd, to become Nobel Industries Ltd in 1920 and ICI in 1926. They continued in use until 1936 when ICI concentrated their remaining gunpowder manufacturing facilities in Scotland. Some of the Gatebeck equipment was moved to the ICI explosives factory at Ardeer in Ayrshire which was licensed for gunpowder manufacture in 1935. Indeed some of it may form part of the surviving equipment at Ardeer but this has not been used since 1977.

We are indebted to Mike Davies-Shiel who has generously provided us with much information on the history and industrial archaeology of the gunpowder industry in Cumbria.

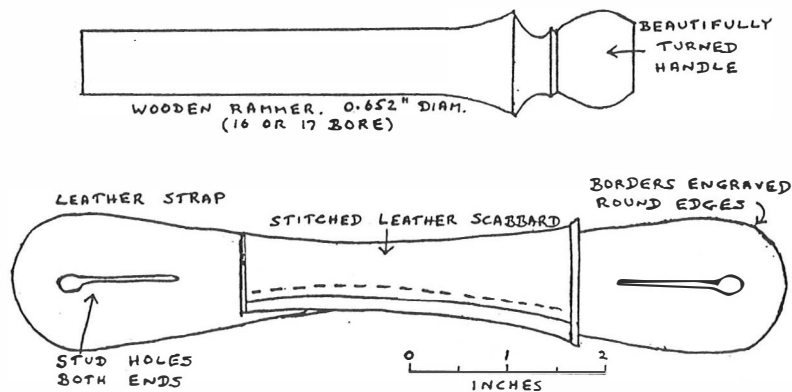
#### Further Reading

J D Marshall and M Davies-Shiel, *The Industrial Archaeology of the Lake Counties*, 2nd edition. Michael Moon, Beckermest, Cumbria, 1977, pp 75-88.

P N Wilson, 'The Gunpowder Industry of Westmorland and Furness', *Trans Newcomen Soc*, 36, 1964, pp 47-65.

#### WOODEN RAMMER WITH LEATHER SCABBARD

Ian Ostler of Colchester has sent us the drawing reproduced here in case any member can suggest what it was used for. He acquired it for his gun collection and has been told by a London museum that it might have been used as a pestle in the gunpowder industry during the 18th century. This doesn't seem likely to us but please contact Ian at 17 Belmont Crescent, St John's Estate, Colchester, Essex CO4 4LX if you have any ideas.



## WOORBURN (BOURNE END) GUNPOWDER MILL, BUCKINGHAMSHIRE

Alan Crocker

An appeal for information was made in Newsletter 5 (February 1989) about a mill known as 'Gunpowder Mill' on the River Wye at Wooburn in Bucks. Despite its name there was no evidence for gunpowder manufacture at this site. Douglas Pluck responded saying that he had made a study of mills on the Wye and the only additional evidence he had found for gunpowder manufacture was a field called 'Powder Mill Close' adjacent to the mill. This was reported in Newsletter 6 together with other negative observations. However I recently re-read a letter from Ken Bascombe of Waltham Abbey, written on 5 June 1988, and discovered that he had unearthed some crucial information several years earlier. On looking through a Powder Ledger of 1682-1686/7 at the Public Record Office (WO/1757) he had found a 1682/3 reference to Sir Polycarpus Wharton Bart 'for Wooburne Mills' and on 6 October 1684 for '1950 barrels of corn powder' to be made at 'Chilworth, Woburne and Susan'.

Recently Keith Fairclough has discovered further information about the mill in documents at the Public Record Office (WO 47/6 fo.54, WO 47/8, 8 Feb 1666, WO 48/11 fo.108, WO 51/12 fo.196, WO 51/13 fo.43, PROB 11/342(64)). In July 1671 the Ordnance paid James Lloyd of Wandsworth gunpowder mill £200 as compensation for losses sustained in erecting powder mills at Wooburn during the Second Dutch War (1665-7) only to find that they were not employed full time. By March 1673 a lease to the mills was in the hands of Robert Richardson, who also had mills on Hounslow Heath. On his death he left the mills to Polycarpus Wharton.

Luke Over has also provided information about the mill saying that the earliest mention seems to have been in 1667. It is also referred to in the marriage contract between Thomas Wharton and Anne Lee in 1673 (Bodleian Library) and in a document of 1676 at the County Record Office, Aylesbury. It was still called 'gunpowder mill' on the 1897 1/2500 OS map but by 1705 it had probably become a paper mill (see Newsletter 6, p 10). However because so many mills were crowded close together in the Wye valley there is confusion about the location of this mill. Luke gives SU 902873 but Douglas Pluck gave SU 898872, saying that Princes Mill at SU 901873 was a fulling mill which became a paper mill.

Sir Polycarpus's role at Sewardstone Mills (Susan) has been discussed by Keith Fairclough in his *Essex Journal* article (20(1), Spring 1985, pp 12-13). His troubled career at Chilworth is also well-known, having been recounted by John Aubrey in his *Natural History and Antiquities of the County of Surrey* (1718, 4, pp 58-65) and reproduced in the *Surrey VCH* (2, pp 325-6) and Hodgetts' *Rise and Progress of the British Explosives Industry* (1909, pp 299-302). However his link with Wooburn had not been realised previously. It is of particular interest because Aubrey states that 'in 1680 Sir Polycarpus successfully demonstrated before King Charles II some very strong powder he had made and the King encouraged him to erect mills and works near Windsor 'much differing from the common sort' sufficient to make 40 barrels of powder weekly. Now Wooburn is only 9½ miles from Windsor Castle so it seems likely that these are the mills referred to. It is also interesting to speculate about why these mills were so different. Were they the first edge runner mills in England?

REPORTS OF EXPLOSIONS FROM 'THE TIMES', 1791-1807

Jenny West has provided us with transcripts of 30 reports on gunpowder mill explosions which appeared in 'The Times' in the period 1791-1807. Notes on these are given below. The names of the sites in bold print are as used in the reports. In some cases these need clarification and the editors have made the suggestions given in brackets. The letter after each page number gives the column. Full transcripts of the reports (6 pages) can be provided to members on request.

**Ewell**. Sat 9 July 1791, p 3b. Powder mill of Mr Bridges; 4 killed.

**Faversham** (Marsh Works). Sat 19 Nov, 1791, p 2b. Horse powder mill at 'his Majesty's works'; little damage.

**Faversham** (Marsh Works). Mon 27 Feb 1793, p 3b. Stove containing 40 barrels; 3 killed; 2 nearby stoves damaged but survived.

**Dartford**. Fri 2 Jan 1795, p 3a; Tue 6 Jan 1795, p 4c. Tue 13 Jan, p 3c. Two stores of Pigou & Andrews; 26 cwt powder; 11 killed; £600 damage.

**Faversham** (Oare Works). Mon 19 Jan 1795, p 4b. Stove at mills of Pigou & Andrews; 1 killed.

**Hounslow Heath near Bedfont**. Mon 25 Jan 1796, p 2b; Tue 26 Jan 1796, p 3d. Two Government powder mills and punt carrying 30 barrels; 4 killed.

**Dartford**. Sat 13 Aug 1796, p 3b; Mon 15 Aug 1796, p 4b. Mill; 4 killed.

**Hounslow Heath**. Mon 1 Aug 1796, p 3b. Powder mill; 4 killed.

**Hatton near Hounslow** (Bedfont). Mon 8 Aug 1796, p 2b. Mill; 0 killed.

**Hounslow Heath near Whitten** (Hounslow). Sat 19 Nov 1796, p 2d. Two mills; 6 killed.

**Battle**. Thu 3 May 1798, p 3c. Mill, stove & store of Mr Harvey; 1 killed.

**Dartford**. Tue 22 Jan 1799, p 3d. Corning mill of Pigou & Co; 6 killed.

**Twickenham Common** (Hounslow). Mon 15 July 1799, p 3a. Corning house; 4 killed; 20 killed within 3 years.

**Twickenham Common** (Hounslow). Mon 22 July 1799, p 3a. Another corning house; 3 killed.

**Hatton** (Bedfont). Mon 19 Aug 1799, p 3c. Ten powder mill buildings of Taylor, Gardner & Co (not Mr Butts); 2 killed.

**Brede**. Thu 25 Dec 1800, p 3d. Mill; 1 expected to die.

✓ **Waltham Abbey**. Tue 21 Apr 1801, p 3b. Powder mill; several killed.

✓ **Waltham Abbey**. Wed 24 June 1801, p 3a. Stove; 0 killed.



**Cork** (Ballincollig). Mon 2 Aug 1802, p 3d. Mills; 7 killed.

**Faversham**. Sat 11 Sept 1802, p 3b. Grinding mill; 6 men & 2 horses killed.

**Dartford**. Wed 21 Sept 1803, p 2d. Composition house of Miles Peter Andrews; 0 killed; 5th explosion in 8 years.

**Stubbs** (Gorebridge). Wed 6 July 1803, p 3c. Corning house; 3 killed including Mr Hunter, the proprietor.

**Dartford**. Fri 14 Oct 1803, p 2c. Powder mills; 0 killed.

**Dartford**. Mon 17 June 1805, p 3c. Powder mill; 2 men and a horse killed.

**Roslin**. Tue 8 Oct 1805, p 3c-d. Corning house of this new mill containing over 40 barrels of powder; 2 killed.

**Battle**. Mon 12 Jan 1807, p 4b. Separate mills of Mr Harvey and Mr Lawrence exploded on successive days; 0 killed.

#### PAPER GUNPOWDER

Our member Bill Curtis has responded to the query about 'paper gunpowder' in Newsletter 10. He has sent us a copy of a Curtis's & Harvey invoice of 1852 listing the types of powder then available: Blasting, F, FF, FFF, Do. in 1 lb Papers, Tower Proof in Canisters; SS Single Seal, DS Double Seal, TS Superfine Treble Strong, TS No 2, TS Canister, TS in ½ lbs. TS No 2, TS [No 2] in ¼ lbs, TS for RIFLES, Extra Do. on Japanned Canisters hermetically Sealed, The Diamond Grain [DG], DG in ½ lbs, DG No 2, DG [No 2] in ¼ lbs. The 12 grades from SS to DG in ¼ lbs are bracketted as 'Sporting Powders' and the four grades from SS to TS No 2 are bracketted 'in 1 lb Papers'. It is clear from this that 'paper gunpowder' simply means 'gunpowder wrapped in small (1 lb) paper bags'. Incidentally the invoice gives the prices of FF, FFF and TS in 1 lbs Papers as 75s, 80s and 235s per barrel of 100 lbs respectively.

#### SWISS GUNPOWDER

Bill Curtis, who is treasurer and general administrator of the Muzzle Loaders Association of Great Britain, prompted by the article on the Aubonne gunpowder mills in Newsletter 10, has written as follows: 'The current Swiss powder is very popular in Europe today. It is reckoned to be 20%-30% stronger than any other that is available. Even at 1000 yards the Swiss shooter Rudi Eichelburger uses only 80 grains to get the same elevation I get with 90 grains of TPPH which is the best Proof Powder available. Personally I don't like it because it is too violent.'

**BOOK NOTICE:** Biddle, L, 'History of Leigh, Tonbridge', The Author, 1991. £16.00. A parish history which includes a chapter on the Tonbridge gunpowder mills.

## VISITOR CENTRE AT BALLINCOLLIG GUNPOWDER MILLS

Paula Cogan of Cork County Council's Ballincollig Office (tel. 021 870541) has informed us about the excellent progress being made on restoring parts of the mills and on establishing a Visitor Centre. Construction of the latter is due to begin in September 1992. It is a specially designed building including an audio visual area, an exhibition gallery, a coffee shop and a book shop. From the Centre visitors will cross a bridge leading to the gunpowder site, where the canal has been reconstructed and is due to be flooded. One of the incorporating mills is being rebuilt and it is intended to power this with a waterwheel. The Centre is due to open in April 1993 and will remain open until October (or all year round if enough visitors turn up). We hope to circulate brochures to members when these become available.

**BOOK REVIEW:** Earnshaw, Alan, 'Britain's Railways at War, 1914-1918'. Atlantic, Penryn, 1990, 48 pp including 72 photos plus card cover with 4 photos, £4.50, ISBN 0-906899-39-7.

I do not normally buy books on railways but I had 10 minutes to spare at Waterloo station and found this one remaindered for £1.99. I noticed two photographs of 'Gunpowder Vans' and as I had written notes on gunpowder wagons in Newsletters 2 and 3 I decided to buy it.

I do not normally read books on railways but I had 30 minutes to spare travelling from Waterloo station to Guildford and started this one from the beginning. Did you know that the First World War was 'the unexpected climax of the railway age' (A J P Taylor)? It seems that the Duke of Wellington realised in 1845 that in future the railway system would dominate warfare and Britain gradually built up its mobilisation plans from 1860. Germany did this more quickly and war was inevitable, or so the book claims. Certainly an hour after the war was declared the British government took control of 130 of the existing 176 separate companies.

Anyhow, the first of the two photographs of gunpowder wagons is on page 7. It shows five of them forming part of a train of 'special gunpowder vans' near Turton & Edgeworth station on the Bolton-Blackburn line in 1914. All the vans are 'L&YR dia, 3 conversions with the roof doors filled in' and are marked 'Return empty to Gathurst' where there was a chemical-explosives works. The second photograph, on page 39, shows a single van. It is GNR 8 ton van 23572 made at Doncaster in August 1915. These vans are not standard 'Iron Minks', which were introduced specifically to transport gunpowder, but simply ordinary vans converted for this use. The term 'gunpowder' at this time did of course usually mean modern propellants and not the traditional black powder or the more recently developed brown powder.

The text does not have much to say on gunpowder vans or indeed on gunpowder but does have much interesting information on other topics. These are: preparation for war, state control begins, mobilisation, troop trains, civilian traffic and travel restrictions, naval traffic, tank traffic, air raids, accidents and disasters, locomotives for abroad, prisoners and war refugees, women at war, munition works and traffic, railway workshops ambulance trains, demobilisation.

Alan Crocker

#### **GUNPOWDER MAKING ON THE BURMA-MANIPUR FRONTIER IN 1918**

Haslemere Museum in Surrey has provided us with a copy of a letter written in 1935 by H D Graham, Indian Police (Retired). He was depositing, at the Museum, three bamboo guns which he captured from the Kuki tribe (one of the Naga Chin tribes), which revolted against British rule in 1918. He states that 'the Kukis used home-made gunpowder and the method employed was most enlightening. The sulphur was obtained from some old sulphur mines which existed in the hills; charcoal was of course readily obtainable but the saltpetre was not forthcoming until they decided to obtain it from the animals urine. The Kukis huts, or houses, were all built on piles, the animals being kept below in an enclosure immediately below the house, so that it was only necessary to collect the crust which formed on the surface after the animals had urinated and evaporation had set in. This gunpowder was of a very coarse and slow-burning kind, but was extremely powerful and I was caught napping on more than one occasion by ignoring to flank parallel ridges, distant over 300 yards, thinking that no muzzle-loader would carry this distance.'

#### **GUNPOWDER WORKERS IN THE 1881 CENSUS OF THE FAVERSHAM AREA**

Laurie Avis of the Kent Family History Society has sent us information on the 75 gunpowder workers listed in the 1881 census of Faversham, Davington and Oare in Kent. These are described as follows: Manager 1, Foremen 2, Engine drivers 5, Engine fitters 4, Timekeeper 1, Millman 1, Tinman 1, Ram man (cartridge) 1, Coopers 2, Cratemaker 1, Canister maker 1, Charcoal burner 1, Hookmaker 1, Cartridge maker 1, Presser 1, Packers 3, Fuse & cartridge 1, Gunpowder manufacturer 1, Labourers 40, Works in gunpowder factory 6. Eleven of these workers were female. The age distribution was as follows: 15-19 = 23; 20-29 = 14; 30-39 = 19; 40-49 = 15; 50-59 = 8; 60-65 = 6, plus one pensioner aged 83 (but this adds up to 86). Laurie has provided us with the 70 surnames of these workers but we did not recognise any of them as being important in the industry. Also in the census was a 39 ton vessel 'Guy Fawkes' laying off Faversham. The master was Edmund Coe and the mate George Moss and they traded to London from Faversham with gunpowder. If you would like further details you can contact Laurie at 160 Henderson Drive, Dartford, Kent DA1 5LQ, but please enclose a s.a.e.

#### **BOOK BASED ON GMSG NEWSLETTER ARTICLES**

In Newsletter 10 it was reported that we plan to produce a booklet based on the significant material published in the first 10 issues of the Newsletter. Provisionally some 30 articles have been selected and these occupy about 53 A4 pages. It is also intended to include an introduction, a bibliography, a list of members, a list of meetings, acknowledgements and an index, so a 64 page booklet seems likely. We shall keep members informed of progress.

#### **LATE NEWS: CONGRATULATIONS TO BRENDA BUCHANAN**

We are very pleased to report that Brenda Buchanan has successfully completed a PhD of the University of London. Her thesis is on investment in the 18th century in north Somerset and contains material on agriculture, industry (including gunpowder) and transport.

## MILLWRIGHTING FOR CURTIS'S &amp; HARVEY DURING WORLD WAR I

Alan Crocker

Alan Stoyel, a past Chairman of the Mills Section of SPAB, has been sorting through some of the papers of the late Rex Wailes, the authority on mills and millwrighting. Amongst these he has discovered an 8-page booklet, plus several inserts, containing information on equipment, tools, materials and services provided to Curtis's & Harvey (C&H) at Faversham during the First World War. The cover has the inscription 'Arthur Martin, Westcombe Park, London SE. Vickers Ltd'. Attached to this is a list of tools sent to C&H and dated 17 April 1917. It consists of 3 reamers and 43 rosebits with sizes between 1.816 and 1.845 inches and weighing (in a box) 3 qrs 19 lbs. Some were made by Arthur Martin and some by Vickers. Inside is a photograph of two Amalot pellet presses costed at £450.12s.6d plus £43.15s.0d for measuring apparatus. These sums include a surcharge of 75%. There follows an unlabelled photograph of a piece of machinery with toothed rollers surmounted by a hopper. Then comes a handwritten memo headed 'Faversham Feby 20th 1918'. It concerns a large spur wheel, the cost of a mould and help being needed for turning up some mill beds which are 6 ft in diameter. There follows this memo:

'Messrs. Curtis's & Harvey, Faversham. 22nd Feb. 1918.

Require a turner to assist them in turning up about 8 C. I. beds for the runner mills. They would like to have Gunner, if possible. Would like us to supply any High Speed Steel that we think would do the work quicker than it has hitherto been done. It now takes about 8-9 days to do each bed, and it is suggested that a tool holder is made with a 2½" square shank carrying two tools 5/8" square with setting up screws at the end of each, and two holding screws to each, and provide suitable spanner for same.'

On the following page is a hand-written note headed 'No 3 Shear Press' and dated 'Dec 19th/16'. It concerns replacement screws and studs for holding down a cross girder. Finally on the back page is a hand-written note headed 'Faversham. Aug 23rd 1917'. It refers to a large spur wheel and wheels for corning mills. an engine, new pellet shops and new wheels not suiting their bed plates as they are 2 in larger than the old ones. At the bottom of the page is written 'Perkin Pippins (Beauty of Bath)!!

This rather scrappy information is probably not very significant but it made me realise that GMSG has largely neglected the whole area of maintenance of gunpowder mills and the millwrights and engineers who carried out this work. If anyone is interested in pursuing this topic, I'll let them have a copy of the notes.