

NEWSLETTER 9, JULY 1991

AUTUMN MEETING AT BIRKBECK COLLEGE, LONDON
SATURDAY 12 OCTOBER 1991

This year's Autumn Meeting will follow the pattern established in the past two years. Coffee will be provided at 10.30 to be followed by three or four invited talks, members' contributions and a short, informal business meeting. There will be an hour for lunch (not provided), a brief break for tea, and we should finish by 4.30. There will be a fee of £3, payable on the day.

The programme has not been finalised, but we plan to have several talks on the industry in the 17th and 18th centuries, including an analysis of a 1753 inventory of Faversham and Chilworth, a report on a visit to the mills at Aubonne in Switzerland, a discussion of the spring visit to Cumbria, and an account of the government magazines at Purfleet. A detailed programme will be circulated in September.

BRITAIN'S WORLD WAR II DEFENCES

Saturday 2 November 1991 at the University of Surrey, Guildford

A Symposium on the remaining physical evidence of this country's anti-invasion preparations is being organised by the Surrey Industrial History Group in association with the Fortress Study Group, The United Kingdom Fortifications Club and the Kent Defence Research Group. Speakers will include Henry Wills, author of *Pillboxes: a study of U K defences 1940*, Terry Gander on ordnance and Brigadier J R E Hamilton-Baillie on construction.

It is also planned to hold a field visit on the following day to local sites of interest, but this will not be a formal part of the Symposium and participants should make their own arrangements for overnight accommodation.

The cost of the Saturday meeting will be £6.00. Further details may be obtained from Gordon Knowles, 7 Squirrels Green, Great Bookham, Leatherhead, Surrey KT23 3LE (tel. 0372 458396).

JOHN ROBERTSON

Members will be saddened to hear of the death of John Robertson, whose article 'The powder mills of Argyll' (*Industrial Archaeology Review*, 12[2], Spring 1990) was noted in Newsletter 8. An obituary in the *IA Review* for Spring 1991 refers to his wide circle of friends, his willingness to help serious students of Scottish history and the many projects which benefitted from his detailed knowledge. Among these was our own *Gunpowder Mills Gazetteer*, for which he provided much of the information on the mills of the west of Scotland.

GMC

Our Spring Meeting in Cumbria was hosted by our member Mike Davies-Shiel who has made a detailed study of the gunpowder mills in the area during the past 30 years and published a valuable summary of his early findings in his *Industrial Archaeology of the Lake Counties* (with John Marshall). Only five other members, Alice Palmer, Gerry Moss, Malcolm Tucker and Glenys and Alan Crocker took part but we were pleased to welcome Jenny Moss and Margaret and Peter Tarplee for parts of the meeting. There were seven gunpowder mills in Cumbria, Old Sedgwick (1764-1850), Bassingill (1790-1935), Lowwood (1798-1935), Elterwater (1824-1928), Gatebeck (1850-1936), New Sedgwick (1857-1935) and Blackbeck (1860-1928). Their locations are shown on the map in figure 1. Mike provided us with copies of detailed plans he had prepared of all of these sites. These were based on Board of Trade and other historic information and annotated with notes and drawings which he had made during the 1960s and which he is currently revising as part of his project on all the water powered sites in the area.

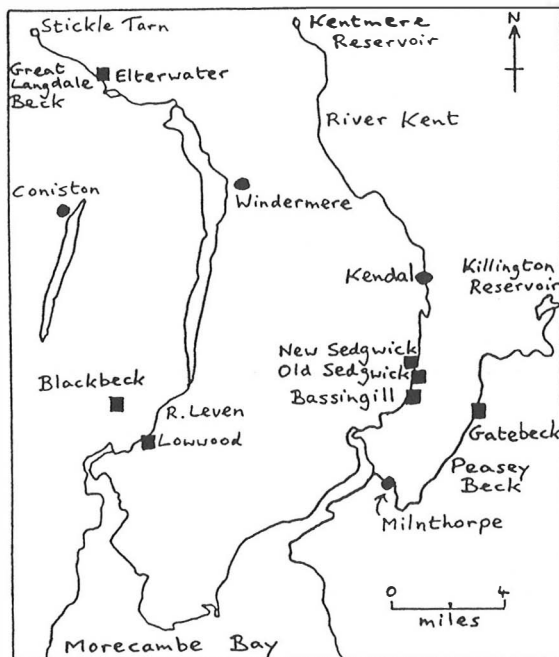


Fig 1.

Most of us were staying at or near Elterwater and we started our tour on the Wednesday afternoon with a visit to this site, which has been developed as the Langdale timeshare estate. This has been done quite sympathetically, surviving gunpowder buildings, wherever possible, being converted into timeshare lodges, apartments and service buildings. The original mill-streams and wheelpits have also been retained and a feature has been made of edge-runner stones and bedstones. The mortar used to test the gunpowder is on show in the main restaurant. Technologically Elterwater was a very backward site so that, for example, iron edge runners were never introduced. Indeed the October 1929 *ICI Magazine* article on 'The North of England Gunpowder Group' suggested that Elterwater be turned into a museum. Regrettably this did not happen. However one of the waterwheels has been replaced and the earliest incorporating mill has not been redeveloped and it is understood that the timeshare architect has recommended that it be restored so that lodge owners can appreciate more fully the history of the site. After dinner we all retired to the timeshare apartment where Glenys and I were staying and Mike treated us to a very informative slide show on all the Cumbrian sites and this provided a sound basis for the rest of our tour.

On Thursday morning we visited Bassingill by permission of the National Rivers Authority. Two water bailiffs met us at the site to unlock the gates and tell us fascinating tales about poachers. The site which is on the east bank of a pictureque limestone gorge on the River Kent was an extension of the Old Sedgwick site 800 metres upstream. It consisted of incorporating

mills only and the ruins of these are overlooked by the remains of a terraced garden path which must have been in the grounds of Sedgwick House, the home of the Wakefield family who owned the mills. The main feature of the site is a massive terrace of three stone chambers with one mill in each. These are separated by two high stone traverses and the large waterwheel was located between chambers 1 and 2. We recorded these mills and excavated a bedstone in one of them. Just upstream are the ruinous remains of two pairs of earlier mills powered conventionally by central waterwheels. The water was channelled to these mills through vaulted tunnels.

We drove past the site of Old Sedgwick, on the east bank of the Kent, which closed in 1850 and is now largely occupied by houses. New Sedgwick is just upstream on the west bank. It closed in 1935 and is now a caravan park owned by the National Trust. The site is about 1 km long from the office at the entrance to the weir which channels water from the river into a large well constructed leat. There was also a tramway and we followed the route of this around the site examining in particular the sites of the saltpetre house, the glazing house, the weir, the 'new' stove, the corning house and finally the very impressive incorporating mills. There are two terraces of these. One has three approximately square chambers with a wheelpit between the first and second, rather like the Bassingill mills. The other has six mills driven from below by a shaft linked to a large central waterwheel. As shown in figure 2 the plan of each chamber is a trapezium, with mills 1, 3, 4 and 6 facing in the opposite direction to 2 and 5. This unusual arrangement maximised the area of the lightweight wall at the front of each mill and minimised the risk of a blast in one mill being communicated to its neighbours. Parts of the structure are in a dangerous condition but fortunately detailed plans are available.

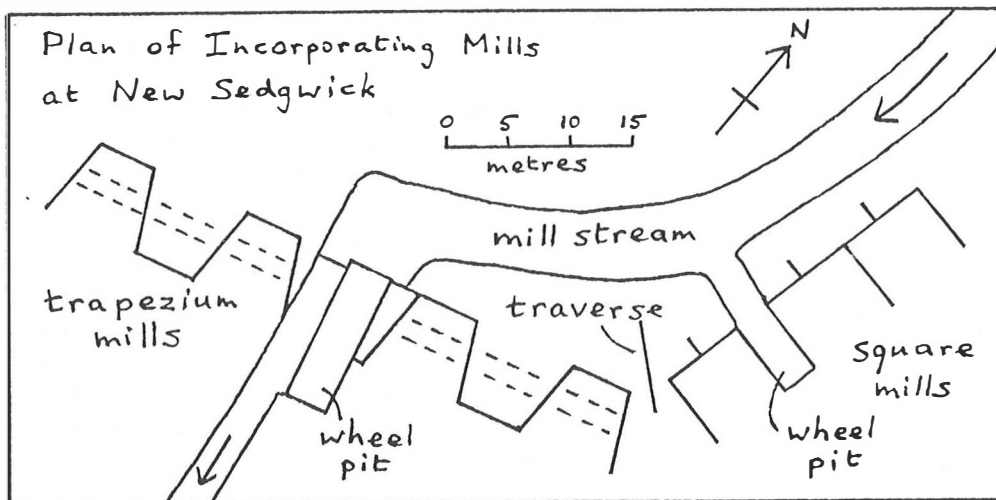


Fig 2.

On Friday morning we visited the Lowwood site which again is a caravan park, but a rather neglected one. Mike had arranged the visit with the owner who lives at Birk Dault, the nearby house built by Daye Barker who established the works in 1798. Alice Palmer has researched the extensive early documents relating to this site, which was reconstructed by ICI in 1928. In particular they converted five pairs of stone mills into single

suspended iron edge runner mills and we were able to interpret these changes. We again followed the tramway around the site and examined the glazing and corning houses. The latter reminded us of similar structures at the Glyn Neath and Faversham Oare works. After lunch at Haverthwaite Station, terminus of the restored Haverthwaite and Lakeside steam railway, we returned briefly to the site before visiting the factory magazine 'Busca', which has been converted into a house, to see the gunpowder railway wagons rescued from the site in 1986 (see Newsletter 4, July 1988, page 12). They had disappeared but on enquiring at the house we discovered that they had been taken to Barrow Technical College for restoration.

We moved on to **Blackbeck**, which is yet again a caravan park with some of the gunpowder buildings converted into service buildings for the visitors. It was a steam powered mill and there are remains of the flue which linked the boiler house to a chimney on the hill side. We were able to locate the remains of many of the buildings on Mike's map. Some of these are being revealed by work carried out by the owner who is levelling areas to create additional caravan pitches. Back at the cars, Mike brought out a collection of interesting barrel stencils which the owner had recently discovered and given him together with a cover of a railway powder canister.

Saturday was a free day so several of us attended the annual conference of the **Cumbria Industrial History Society** at Ambleside, which had the theme of transport. There were interesting talks on railways and World War II aircraft archaeology, displays on current projects and Chris Irwin's bookstall from *The Book House* at Ravenstonedale.

Finally on Sunday morning we visited **Gateback**, which is really two sites, the original Lower Mills, to which Wakefields' moved from Old Sedgwick in 1850, and the later Upper Mills. A feature of both sites today is the use of charcoal cylinders as gate posts. We started at the Upper Mills visiting the cooperage, now occupied by an enormous second-hand car parts business which seems incongruous in a country village. The owner explained how we could get access to the manufacturing buildings on the other side of the Peasey Beck. We noted the surviving tramway tunnel under the public road separating the two parts of the site and two magazines still apparently used for something dangerous. There were other foundations but the main structure was the massive water-powered range of incorporating mills still standing and easily recognisable from a photograph in the 1929 ICI Magazine article. At the Lower Mills we noted the date stone 'IW 1852' (John Wakefield) on the manager's house and, after some delicate negotiations with the site supervisor (yes, another caravan park), we were given permission to explore. There are several substantial buildings either derelict or re-used but again the most interesting were the water-powered incorporating mills. There are four pairs of these in a row linked together by barrel vaulted charge houses, as shown in the sketch plan of figure 3. It is a site which deserves much further study.

In conclusion, those of us who took part had a very enjoyable and instructive few days. It is a shame that more members did not come but at least it meant that we were all able to benefit individually from Mike Davies-Shiel's wealth of knowledge of the industry in Cumbria and indeed of many other aspects of local life. We are greatly indebted to him for devoting so much of his time to us.

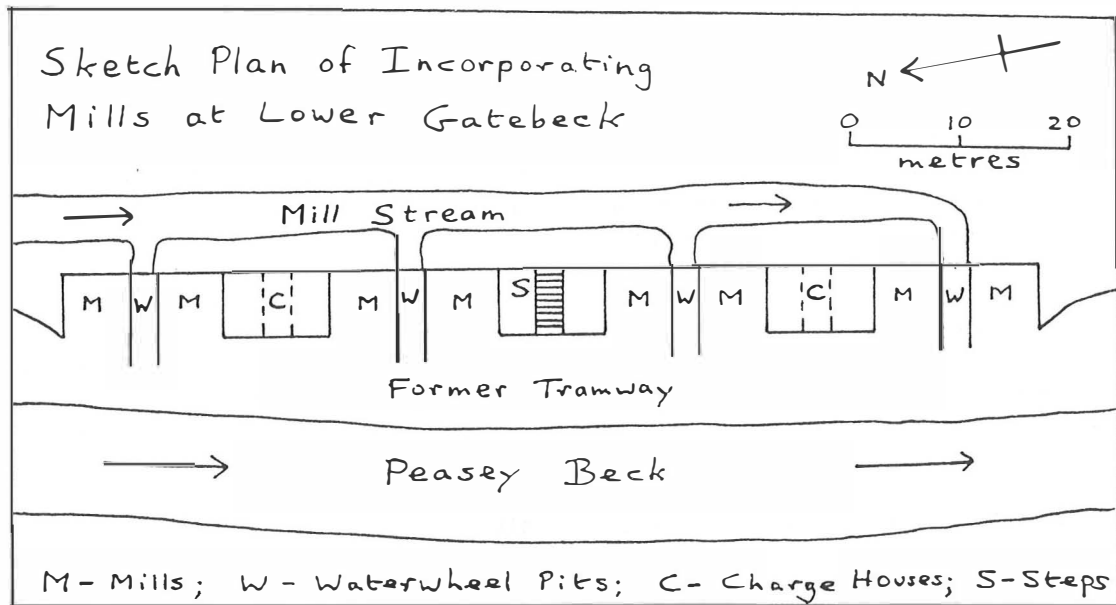


Fig 3.

PROPOSED SURVEY OF THE OARE WORKS, FAVERSHAM

Alan Crocker

At Brenda Buchanan's suggestion, the Kent County Archaeologist, John Williams, contacted us in February about a threat to the Oare gunpowder mill site at Faversham. This mill was operating by 1719 and like the nearby Home Works and Marsh Works closed in 1934. Some members of the Group will remember visiting the site, which is 2km north-west of the town centre, when we held a meeting at Faversham in September 1987. It has several standing buildings and many interconnected watercourses. The most dramatic structure is a massive concrete wall, perhaps 10m high, in an enclosure excavated out of the hillside. This looks rather like the corning house built in the 1920s at Glyn Neath.

The threat to the site is the proposed creation of a permanent gypsy settlement at its south-west end, where there are some brick buildings, several substantial but dry watercourses and small mounds which may indicate the location of ruined buildings. We revisited the site on 3 March and examined the remains with John Williams and Paul Everson, an officer with the Royal Commission on the Historical Monuments of England who is based at the University of Keele. Fortunately John had walked through the site a few days earlier with Keith Falconer, who is the Royal Commission officer with special responsibility for industrial sites. He was therefore able to locate several interesting features which otherwise we might have missed. We had available a 25 inch Ordnance Survey map of 1906, which does not label the buildings, and of course Arthur Percival's booklet on the history on the Faversham industry. However it is not easy to interpret the site and we concluded that a detailed survey would be very valuable. Ideally this would follow a detailed examination of further documentary information including for example the tithe map of about 1840, other large scale OS maps and relevant records of The Explosives Inspectorate. This would take a considerable amount of time so we concluded that we would recommend to the Royal Commission that they carry out a levelled survey of the threatened area as soon as possible with a view to extending this to the rest of the site at a later date. We have since been informed that the

main part of the site forms the main subject area of an outstanding planning consent for mineral extraction. This consent was given in 1984 and work is programmed to start within the next twelve months. The RCHME will therefore now be carrying out a survey of the whole site and it is also hoped that there may be some excavations.

It is most encouraging that the Group is now being consulted about threatened gunpowder mill sites. It was clear that our expertise was appreciated by both John Williams, who was trained in Romano-British archaeology but now has to deal with archaeological sites of all periods, and Paul Everson, who normally surveys medieval or earlier earthworks.

CONSERVATION OF THE CHILWORTH GUNPOWDER MILLS

Guildford Borough Council, which owns the part of the Chilworth site scheduled as an Ancient Monument, is taking steps to conserve the surviving industrial features and is considering the future management of the site. The Council has been proceeding carefully in order to reconcile archaeological and natural history interests. However much clearance work has now been carried out of the tree growth which has been encroaching upon the industrial structures and this has exposed a number of features which were previously hidden. In May, Alan and I were invited by the curator of Guildford Museum to accompany him and a member of the Borough Parks Department on a visit to the site to consider both conservation issues and the presentation of the site to the public.

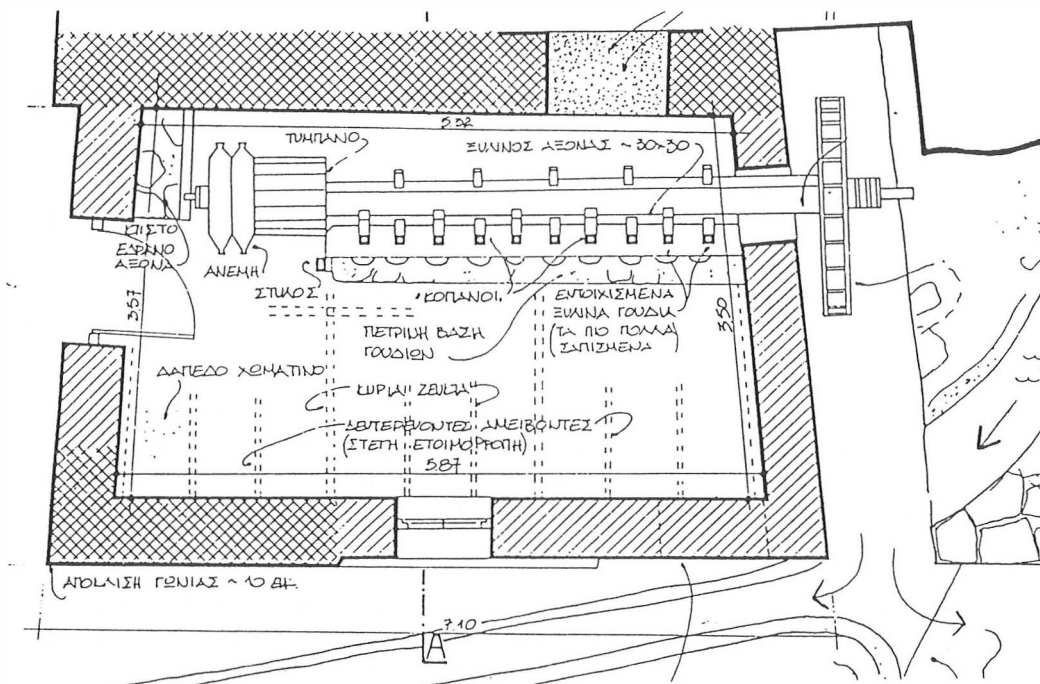
Plans had already been made to repair the main sluice-gate at the top of the site and thus restore the flow of water through the leat system. We recommended repair of a water wheel-pit and a tramway swing bridge, and conservation of the surviving bedstone of the 1860s steam-powered mills and of the range of six incorporating mill buildings of the 1880s. We suggested that presentation should be low-key, with some areas kept reasonably clear of vegetation and an additional footpath provided. As in the case of the Oare Works at Faversham, reported above, it was encouraging that advice was sought from the Group on the management of this site.

GMC

MUSEUM AT DIMITSANA, GREECE: PROGRESS REPORT

Dr Stelios Papadopoulos, Director of the ETBA Cultural Foundation, reports that restoration of the old buildings for the museum is now complete and his unit is going ahead with the reconstruction of a flour mill and a fulling mill. They have started researching and collecting the material necessary for the reconstruction of the equipment in the gunpowder mill. This was of the stamp mill type (see plan opposite) and was restored in 1970, thirty years after it was last operated, on the basis of information provided by older villagers who remembered it working before 1940. The problem now is to restore it so that the machinery can be operated at limited times, for visitors to the museum. An exhibition of documentary illustrations is also planned to help visitors to understand the history of the development of gunpowder manufacture. The results of the unit's research into the watermill installations in the district surrounding the museum are to be published shortly.

Plan of gunpowder mill at Dimitsana, Greece.



THE ARCHIVES OF IMPERIAL CHEMICAL INDUSTRIES

Brenda Buchanan

A recent number of *Business Archives*, 60, (November 1990) contains an article which will be of interest to readers of this *Newsletter*. It is entitled 'ICI - A brief history and guide to the archives', pp.1-30, and is by the archivist Karen Jane Mitchell. After a brief introduction to the firm the article goes on to describe the range of material held by ICI, and the system of cataloguing, storage and retrieval.

From our point of view it is most appropriate that in the Appendix, the firm of Curtis's and Harvey Ltd should have been taken as a case study, to illustrate the method of cataloguing. Here we see an indication of the range of corporate, financial, legal, personnel, sales and marketing, and production documents available. These include, for example, correspondence with Kames Gunpowder Co Ltd, 1880-81; copies of their labels, 1876-7; trust deeds relating to Langley Mill (Derbyshire?) explosives magazine, 1904; the measurements of a magazine at Newport, Monmouth, 1864; certificates amending licences for a gunpowder magazine at Shincliffe, Durham, 1868-1903; C B Curtis's will of 1876; and material relating to gas explosions at gunpowder magazines at Erith and Faversham in Kent, 1864.

It is stressed that the work is still in progress on the task of identifying and processing the records, and that access to the archives is at present at the discretion of the archivist and Company Secretary. Furthermore, a system called ASSASSIN will guard confidential material from prying eyes, but within these limitations researchers are invited to enquire about material likely to be held in the archives.

A NEW GUNPOWDER SITE

Gerry Moss

The book by P J T Morris and C A Russell, *Archives of the British chemical industry 1750-1914*, British Society for the History of Science, 1988, includes information on a number of well-known sites - Chilworth; Cosawes; Curtis's & Harvey, Dartford; Kames; Lowwood; Melfort; Royal Powder Mills, Faversham; Tonbridge Powder Mills. Three records were of greater interest:

Carmarthen Chemical Works at Pantyffynnon, near Ammanford, Carmarthenshire, owned by Caleb Chivers, was active 1871 and had finished by the 1880s. It made gunpowder, charcoal and chemicals from wood [Carmarthen Area Record Office, Carmarthen, Bishop 22/1, 25/1 deeds of 1878, 1879 and lease of 1879].

Harrison, Ainslie & Co Ltd, Backbarrow, Lancashire is listed as producing iron and gunpowder. It is more likely that it stocked gunpowder produced at Lowwood as among the records at Cumbria Record Office there was a 'gunpowder stock book, Lowwood works, 1875-7'. The company was also linked to Melfort.

Ramshurst Gunpowder Works, Tonbridge, Kent, now Ramshurst Farm. It is not clear if this is associated with Tonbridge Powder Mills but it is listed separately. Kent Archives Office, Maidstone has deeds from 1717-1927 (U443 T8) including a plan of Tonbridge Powder Mill 1916 (TR 1133).

Anyone interested in further research on any of these sites might find useful record office material listed here. Let me know if you have any difficulty in consulting a copy.

SUPPLY OF ELTERWATER GUNPOWDER IN 1841-43

Alan Crocker

Canon and Mrs Hayman of Cocking in West Sussex have kindly provided photocopies of eight letters addressed to the 'Elterwater Powder Mills, Westmoreland', and dated between July 1841 and November 1843. These letters came into Mrs Hayman's possession through her aunt's husband Arthur Green, a timber merchant of Ilkley, Yorkshire. He purchased the standing timber at the Elterwater site after it closed in 1928 and must have acquired the letters while working there.

Mrs Hayman and her parents, who lived at Habergham near Burnley, visited the Elterwater site on 28 August 1931 to collect some barrels. She recorded the trip in her journal writing 'we walked all round Uncle Arthur's gunpowder place - a most enchanting place - a lovely river with trout in it & loads of streams & gullies & ponds & lakes. All the buildings were dynamited when it was abandoned, but practically all are still standing & Nature has cast a mantle of verdure over everything.' The barrels were used for garden plants and one survived until about 1970.

The contents of the letters, which are of considerable interest, are described briefly below. I shall be pleased to provide copies to anyone interested in researching them in greater depth.

Supply to Durham and District Three letters dated 30 July, 6 August and 24 September 1841 are addressed to D Huddleston & Co and are from William Watson of Gateshead* who is clearly an agent. They contain orders for a total of 51 barrels of gunpowder (5 whole, 34 halves, 116 quarters) for 16 customers. The quality of the powder is unspecified apart from '3 halves F' and '1 half FB' and a request for '2 lbs of finest powder for sporting' as a present for a good customer. The powder was to be delivered 'next week'. Watson recommends a new local carrier, who was already delivering Wakefield's powder from Durham to any place on the Wear for 3d per barrel. Some of the customers were collieries but others appear to have been local dealers. It should be remembered that there were no gunpowder mills in North East England.

Supply to Liverpool Two letters dated 10 and 12 January 1842 are to Messrs D Huddleston & Co from Robert Heywood, who seems to have been their Liverpool agent. They concern payment of £377 8s 11d for saltpetre, the shipment of 1400 half and 400 quarter barrels of powder from Liverpool and a prediction of a heavy future demand for 'quarter large'. Enclosed with the second letter were halves of six Bank of England notes, the other halves having been forwarded the previous day. A further letter was sent on 24 November 1843 by W Sandbank of Liverpool to John Robinson who had taken over the Mills from David Huddleston. It reports how Elterwater powder is being taken on the Greyhound from Greenodd across the estuary of the River Leven to the Canal Foot at Ulverstone, where it is to be transferred to the Victoria and the Galiot-Dee, and hence taken to Liverpool. He mentions that he is in touch with Heywood.

Supply to North Wales A letter dated 21 February 1843 to Messrs D Huddleston & Co from Messrs Davies & Sons of Menai Bridge contained £150 and stated that 'the distressing state of the slate quarries has quite ruined the sale of gunpowder'. This letter was sealed with wax and has a strip of four penny red stamps rather than the single penny stamps of the other letters.

Supply to Kendal The final letter dated 21 February 1843 is from J Bousfield of Kendal and addressed to Mr Robinson of Elterwater Hall. It contained a £55 bill to the credit of D H & Co and requests a little more charcoal dust.

* Note: Copies of the letters relating to the Durham area have been sent to Tom Hay, who has contributed information in previous issues of the Newsletter on gunpowder supplies to North East England (7, p.12; 8, p.7). He has searched for the customers' names in local Directories and has found entries for William Watson and for seven of the customers for whom he placed orders for gunpowder:

William Watson of 32 Bridge Street, Gateshead, Grocer and Tea Dealer.
Edward F Boyd, Viewer (i.e. Colliery Superintendent) at Urpeth Colliery.
(This was near Chester le Street and was owned by Bell Morrison & Co).
Edward Moor, Grocer and Tea Dealer, Wallsend.
Thos Young, Grocer and Tea Dealer, Fatfield
Robert Tinkler, Grocer and Draper, Easington Lane (by Durham).
Thomas Westgarth, Grocer and Bacon Factor, Sherburn.

William Pickering, Grocer and Draper, Sherburn Hill.
Thos Jobling, Grocer and Tea Dealer, Newgate Street, Bishop Auckland.

Tom Hay points out that the Newcastle and Carlisle Railway was completed in 1836 and may have been used to bring gunpowder over the Pennines from the Lake District. The Stainmoor line from Durham to Tebay and Cumbria came later in 1861.

JOHN SMEATON'S DRAWINGS OF GUNPOWDER MILLS

Alan Crocker

The Royal Society holds in its collections about 1200 drawings by the great civil engineer John Smeaton who died in 1792. These are bound into six volumes measuring about 580 mm by 410 mm and entitled: I. Windmills and Watermills for grinding corn. II. Mills for various Purposes and Machines for raising Water. III. Fire Engines for raising Water. IV. Bridges and Buildings. V. Canal Works, Sluices, and Harbours. VI. Canals and River Navigations. A catalogue of the drawings was published by the Newcomen Society in 1950 (Extra Publication No. 5). Volume II contains nine 1771 drawings of powder mills, associated waterwheels, mill buildings and gearing for Bouchier Walton's powder mills at Waltham Abbey in Essex, two undated drawings for Samuel Underhill's powder mill on Hounslow Heath, Middlesex (Underhill was at Bedfont by 1755 and left in 1761) and six 1771 drawings of a powder mill and its waterwheel and gearing and a 1772 drawing of a steam drying house at Worcester Park in Surrey. Glenys and I are using the sectional elevation of the edge runner mill at Worcester Park as an illustration for an article entitled 'The Gunpowder Mills of Surrey' to be published in *Surrey History* in November 1991.

GUNPOWDER WORKERS AT DARTFORD, KENT IN THE 1881 CENSUS.

Jean Stirk of Igham has kindly supplied entries for gunpowder workers in the 1881 Dartford census enumerators' returns which have been transcribed by a member of the North West Kent Family History Society:

Lisney, Alfred, married, 41, labourer at powder mills, born Sevenoaks, Kent
Standen, Alfred, unmarried, 17, labourer at pm, b. Dartford
Laurence, Charles Thos, mar, 55, gunpowder manufacturer, b. Battle, Sussex
(see footnote)
Farrell, George, lodger, unmar, 45, storekeeper at pm, b. Ireland
Hill, Joseph, mar, 25, labourer at pm, b. Dartford
Chester, Edward, mar, 53, labourer in gp works, b. Shropshire
Chester, Julia Mary, unmar, 18, employed packing gunpowder, b. Dartford
Chester, Alice, unmar, 16, employed packing gp, b. Dartford
Chapman, Emma, unmar, 15, employed packing gp, b. Swanscombe, Kent

The following lived at the Powder Mills:

Comyer, Wm Geo, mar, 58, manager of gunpowder works, b. Helston, Cornwall
Coleman, Charles, unmar, 19, labourer in gp works, b. Dartford
Coleman, William, unmar, 17, cooper in gp works, b. Dartford
Coleman, Jessie (male) unmar, 15, labourer in gp works, b. Dartford
Gausden, Charles Richd, mar, 51, foreman in gp works, b. Dartford

The following lived at Powder Mill Cottages:

Head, Louisa, widow, 86, pensioner, b. Dartford
 Spurgin, George, mar, 52, gatekeeper at gp works, b. Southminster, Sussex
 Elsey, George, mar 62, labourer at gp works, b. Dartford
 Harding, William, mar, 46, labourer at gp works, b. Eynsford, Kent
 Harding, Henry, unmar, 17, cooper at gp works, b. Dartford
 Hawes, John, lodger, widower, 77, labourer at gp works, b. Brill, Oxon
 Wren, James, mar, 40, coachman at gp works, b. Watton, Norfolk

Note: Charles Laurence, proprietor of the Peppering-Eye and Crowhurst works, amalgamated the entire group of mills in the Battle district in the early 19th century (see the entry for Battle and Seddlescombe in the Gunpowder Mills Gazetteer, pp 26-7). However the starting date of his involvement is unknown. Charles Laurence probably followed Mr Gill (probably Henry Gill, previously of Kennall Vale, Cornwall) who succeeded W G Harvey after the latter moved from Battle to Hounslow in 1817. Charles Laurence was evidently at Battle by about 1826, the approximate year of birth of the Charles Thomas Laurence who was 55 in the 1881 Dartford census. Charles Laurence & Son amalgamated with Pigou & Wilks of Dartford c.1850 (when Charles Thomas would have been about 24) and the Battle works closed in 1874.

DOCUMENT IN THE BIBLIOTHEQUE ROYALE ALBERT Ier, BRUSSELS

The document reported in *Newsletter* 8, which listed commodities including saltpetre, sulphur and gunpowder, has been identified by a Dutch-speaking colleague as an ordinance regulating the wages of labourers in Antwerp for the unloading and handling of various goods arriving there by water.

BOOKS

Bill Curtis, a member of the Curtis family of Curtis's & Harvey, who joined the Group recently, has brought two old publications to our attention:

Practical hints on the proof of gunpowder, by Major William Jacob, Bombay Artillery. The Bombay Government, 1846.

The author was the brother of the celebrated rifle expert and Indian Army hero John Jacob, inventor of the Jacobs Rifle, and founder of Jacobs Rifles. The title page bears a quotation from Braddock on Gunpowder: "The practical artillerist, on whom usually devolves the office of ascertaining the proof range of gunpowder, will perhaps wish for simplicity, and for the specification of some easy trial, by which he may ascertain not only the actual range of powder, but judge of its quality or capability of producing any particular given effect he may require - I know of no such trial."

Notes on gunpowder prepared for the use of the gentlemen cadets of the Royal Military Academy, by Captain Goodenough, R.A., instructor in artillery, Royal Military Academy. London, 1868.

The book contains 7 chapters on: General description of gunpowder; Explosive effect of gunpowder, Bunsen and Schischkoff's theory; Ingredients; Manufacture; Proof etc.: government powder, merchant's powder; Gun cotton; Explosive compounds.

THE POWDER MAGAZINES AT PURFLEET.

Alan Crocker

Recently I was asked to review John Greenwood's *The Industrial Archaeology and Industrial History of South-East England: a Bibliography* (Kewdale Press 1990) 372 pp, £39 (ISBN 0 9510389 3 1). It lists over 5000 books and articles of which 16 are on gunpowder making (7 for Essex, 6 for Kent, 2 for Sussex and 1 for Herts). Surprisingly there are no entries for Surrey and no mention of the Gazetteer! Still I did not know about some of the articles included and in particular have since acquired a copy of 'The Powder Magazines at Purfleet' which appeared in *The Engineer* of 21 October 1864, page 252 (reprinted from *The Times*). This describes a visit to the Government magazines at Purfleet in Essex, following the explosion of 50 tons of gunpowder across the Thames at Erith. The Purfleet magazines contained 2300 tons of powder and there was clearly concern about the possibility of an explosion there. Other magazines were just as large but were simply used for storage and rarely opened. By contrast Purfleet was the great receiving house where all powder for the Government made at Waltham Abbey, Dartford, Faversham and Hounslow was landed from barges, examined, tested, approved and stored, or rejected and returned. The site had been established a century earlier and covered 25 acres. It had a large workforce but only 19 worked in the magazine area. The guard consisted of two officers and 80 men.

The author describes how he put on flannel dress and soft leather boots in the changing room and was then conducted by Mr Cleeve, the superintendent, to a spacious grass enclosure with, at its centre, five large magazines with no windows, many lightning conductors and open doors, revealing tiers of powder barrels. The enclosure was crossed by little wooden pathways along which the powdermen wheeled copper barrows each containing two barrels of powder. The barrels, some of which had been in use since 1808 were marked with the maker's name, the date of reception and the codes LG (large grain), FG (fine grain), LGR (large grain rifle), or ER (Enfield rifle). The powder was tested with a Gomer mortar loaded with a 68 lb solid shot. Two ounces of LG, FG and ER powder projected this shot 268 ft, 276 ft and 320 ft respectively and 3 ounces of LGR 266 ft. The author makes several suggestions for improving the safety of the site including using stronger barrels, stopping the practice of storing rifle ball cartridges in the magazines, testing the powder farther from the magazines and controlling more effectively the transport of powder to the site on Thames barges. He also criticises the Curtis's and Harvey practice of opening and closing barrels in their magazines and recommends an inquiry into conditions at the Isleworth powder wharf. I found the article most interesting and can provide copies on request.