

GUNPOWDER MILLS STUDY GROUP
NEWSLETTER 4, JULY 1988

MEETING AT WALTHAM ABBEY, 1 OCTOBER 1988

The next meeting will be held at the Royal Armament Research Development Establishment, Powdermill Lane, Waltham Abbey on Saturday 1 October. Malcolm McLaren has kindly arranged for the Group to have access to the Establishment and use of the lecture theatre for a meeting, and will conduct a tour of the site. This is a welcome opportunity to visit the site before the closure RARDE. The meeting will start at 11.00 a.m. and further details will be sent out nearer the time. It will then be necessary to have a list of names, nationalities and car registration numbers of those attending. We are asked to let members know that regrettably cameras are not allowed within the Establishment nor is smoking permitted in the open.

VISIT TO THE FREDERIKSVAERK GUNPOWDER MILL, DENMARK, 1989

At a meeting of the GMSG on 16 April at Gunnersbury Park Museum it was decided that we should look into the possibility of exploring a powder making site on the continent. I agreed to follow up an earlier visit to the powder mills at Frederiksvaerk, and a meeting with the eminent Danish molinologist Mr Anders Jespersen, to see what could be arranged.

It can now be reported that it seems likely that we shall be able to visit the former royal powder mill at Frederiksvaerk in the summer of 1989. These works were established in the mid-18th century to supply the army. A limited production of black powder for fireworks and explosives continued until the works closed down in 1965. Some 15 years later they were reopened as a Gunpowder Mill Museum. From my correspondence with Mr Jespersen I have learnt that there were other powder mills in Denmark, such as that at Donse which supplied the navy, but it is doubtful whether anything above ground remains of these sites. It is hoped however that other features of interest can be built into the itinerary.

The suggested visit would be at the end of July 1989, with the weekend of Friday 28 to Sunday 30 July reserved for Frederiksvaerk. It is anticipated that members would make their own travel arrangements. A convenient car ferry is operated by DFDS Seaways from Harwich and Newcastle to Esbjerg. Accommodation has not yet been investigated, but information on that and other aspects of the trip will be circulated later to those expressing interest in the project. If you think you might like to participate please write to me at 13 Hensley Road, Bath, Avon BA2 2DR
Brenda Buchanan

MEMBERSHIP MATTERS

When the notice of the GMSG meeting at Gunnersbury (16 April 1988) went out, members (59 in all) were asked to return £2 should they wish to be kept on the mailing list and receive the next Newsletter. We have received 32 replies and with outstanding monies from previous meetings (£12) the Group has been able to open a bank account with the grand sum of £76. A list of members is given on pages 13-14. At the business meeting on 16 April it was decided that the Group should raise a £3 individual (£4 joint) donation as from 1 April 1989, to cover the cost of future newsletters, postage, photocopies etc. This is to be reviewed at the next meeting (1 October 1988).

GEORGE KELLEHER. I am sad to have to report that George Kelleher died, following a heart attack, on 14 November 1987. George, who was only 41, had attended most of our meetings and made many valuable contributions to the discussions. For many years he had been researching the gunpowder industry, particularly the mills at Ballincollig where he was brought up and lived. A summary of his extensive and thorough research is contained in a thesis which he hoped would lead to a higher degree from University College Cork. The possibility of awarding a posthumous degree is currently being explored by Mick Monk and others but unfortunately there appears to be no precedent for this at the College. Discussions are also in progress about ways in which the thesis might be published as a limited edition, perhaps using microfiche for much of the material. I wrote to George's mother when I heard of his death and she subsequently visited me with his brother John. They are very supportive of research into the gunpowder industry and indicated that they would be happy for members of the Group when visiting the area to stay in George's cottage overlooking the Ballincollig site. Please let me know if you would like to take up this generous offer.

THE GAZETTEER. Those who attended the Group's first meeting in 1985 will remember that it was decided that the first project should be to produce a gazetteer of black powder manufacturing sites. This has now been published and thanks are due to Glenys Crocker who compiled the book, to those who contributed material, and to the Society for the Protection of Ancient Buildings, Wind and Watermill Section, who agreed to publish the Gazetteer. Copies may be obtained from SPAB, details as follows:

Gunpowder Mills Gazetteer: black powder manufacturing sites in the British Isles, compiled by Glenys Crocker for the Gunpowder Mills Study Group. Occasional Publication 2 of the Wind and Watermill Section, SPAB, 37 Spital Square, London E1 6DY.A5, vi, 57pp, 2 maps, 15 line drawings, ISBN 0 903090 97 X, £2.00 plus 35p post and packing.

As the Gazetteer is arranged by region and historic county, it was decided not to provide a topographical index. However Gerry Moss has prepared one and members may find this useful. Please contact him if you would like a copy.

For those who have obtained copies of the Gazetteer, please note correction on page 34: the second heading should read *MORETON*.

RECENT MEETINGS

Since the last full Newsletter (no.3) was issued in May 1987 the Group has held a weekend visit to Cornwall and Devon, and meetings at Faversham and in London. The Cornwall-Devon and the Faversham meetings have been reported in the Association for Industrial Archaeology *Bulletin* 14[4] and 15[2] and in the SPAB Wind and Watermill Section *Newsletter* 34.

Seventeen members and guests stayed in Truro. We were shown around the very impressive Kennall Vale site by members of the Cornwall Archaeology Unit, which has produced a detailed report, and the Cornwall Trust for Nature Conservation which is managing the site. Members then explored the smaller Bishop's Wood site north of Truro and held an evening meeting at the Brookdale Hotel, Truro where the party was staying. John R Smith showed slides of the Kennall Vale project and Russell Jones gave a talk on the former Stithians paper mill which is immediately upstream from the powder mills at Kennall Vale. On the Sunday we visited Herodsfoot near Liskeard, now occupied by the Forestry Commission's Deerpark Forest Cabins, and Powdermills on Dartmoor, where we were joined in our attempts to interpret

the structures by local archaeologists.

At the Faversham meeting in September an introductory talk by Arthur Percival was followed by visits to the Chart Mills, the Stonebridge Pond area and the Oare Works. Following tea at the Fleur de Lis Heritage Centre David Hansell gave an illustrated talk on the Leigh Mills at Tonbridge.

About 20 members attended the meeting at Gunnersbury Park Museum on 16 April. The first talk was given by Gerry Moss on "Some sources for the study of Gunpowder Mills", showing the kind of information which is contained in reports of explosions in the *Gentleman's Magazine* and the reports of the Explosives Inspectorate in *Parliamentary Papers*. He has prepared indexes to these two valuable sources and these are printed below on page 5.

Brenda Buchanan then gave a talk on "Gunpowder in the Bristol Region", in the context of her wider interest in the economic history of north Somerset. She also made the point, illustrated by several slides of powder houses, that gunpowder magazines would make a rewarding study. Malcolm Tucker followed by showing slides of the site of the Woolley powder mills in Somerset which he has surveyed.

Short talks were then given by Glenys Crocker on Thelwall, Cheshire, and Alan Crocker on Tyddyn Gwladys, Merionethshire, both of which are summarised below on pages 10 and 13.

RECENT PUBLICATIONS

Ballincollig Royal Gunpowder Mills, Co Cork. Cork County Council, County Hall, Cork, 1988. This four-fold leaflet, with text by Dermot Lucey and illustrations by Colin Rynne, contains a history and description of the Ballincollig mills and a short explanation of the project, with a map of the site and reconstruction drawings of mill buildings c.1870 and charge house number 1, c.1850.

✓ *Waltham Abbey 200, 1797 - 1987. Explosives - OHMS Bicentenary.* An attractive 16-page illustrated booklet outlining the history of the Royal Gunpowder Factory and the subsequent research departments at Waltham Abbey.

The Newcomen Bulletin no 140, April 1988, contains two book reviews which will be of interest to members:

Science and Civilisation in China vol V "Chemistry and Chemical Technology": part 7 "Military Technology - The Gunpowder epic", by Joseph Needham *et al*, Cambridge University Press, 1986, pp. xxxiii + 703, ill., £50.00. Reviewed on pp 15-17 by R A Buchanan.

Accounts of European Science, Technology and Medicine written by American Travelers abroad, 1735-1860, in the collections of the American Philosophical Society, by Darwin H Stapleton. American Philosophical Society Library Publications 9, 1985. ix, 48pp. Price not stated. Reviewed by A P Woolrich on p19. The selection of examples discussed includes the diaries of Robert Hunter Morris who was in London in 1735-6 and described gunpowder mills at Faversham and Guildford as well as Chelsea Waterworks and Chatham Dockyards.

SEVERAL GERMAN GUNPOWDER TREATISES

The 17th century German manuscript treatise on the manufacture of gunpowder purchased by Bernard Quaritch Limited, antiquarian booksellers of London, from Sotheby's in November 1985 (see Newsletters 1 and 2) is still

available. Dr Lehmann of Ewell has transcribed some of the contents but has agreed not to publish this information until the treatise is sold and the new owners have agreed. However he has discovered that two similar treatises are housed at the Tower of London. He is planning to examine these and to compare the recipes and technology described in the three manuscripts. As Quaritch's treatise is priced in dollars it is now cheaper in sterling than it was a few years ago!

Alan Crocker

THE ICI ARCHIVE

I know that some members have used the ICI Archives held at Millbank London but others will probably be interested in my recent experiences in gaining access to them. I wished to see the paper on The North of England Gunpowder Industry in The ICI Magazine for 1929 and having failed to get it through Inter-Library Loans contacted ICI directly. I spoke to Philip Winterbottom an archivist who has been seconded to ICI for at least two years from the Business Archives Council. His role is to generate computer held data-bases for all the ICI records and he seems to be doing a marvellous job. He invited Glenys and me to spend a day at his office and provided us with copies of several relevant data-bases, produced far more records than we could cope with and of course the 1929 article. We saw for example documents relating to Blackbeck in Cumbria, including magazines they held at Bedlington and Seaton Delaval in Northumberland, Darlington, Findon Hall and Castle Eden in Durham, High Blantyre in Lanark, Eglwysilan in Glamorgan, Norton in Stafford, Astley in Lancashire, Rockwardine in Shropshire, Northop Hall in Flint and Wolverhampton in Staffordshire. There was also an inventory taken at Clachaig in 1835 including for example 'Mill: two oil cans, two hair brooms, two copper ladles, five screw keys, one watering can. Fixtures: one water wheel, one set of lying shafts, two pinions, two crown wheels, two upright shafts, two maleable iron shafts, two bed plates'.

We found Philip Winterbottom and his assistants to be extremely helpful. The ICI telephone number is 01-834 4444.

Alan Crocker

PHOTOGRAPHS OF FERNILEE POWDER WORKS

In November 1987 *The High Peak Courier* published an article about a collection of local photographs held by Frank Armstrong, manager of Arnold & Platt's TV shop at Whaley Bridge, including some of the Fernilee powder works. I contacted Mr Armstrong and called at his shop but unfortunately missed seeing him as it was early closing day. However his enthusiasm for local history and photography was clear from the large number of prints displayed in the window amongst the TV sets, video equipment etc. In his letter he says: 'I have about ten or twelve shots of the powder works, most of them - though not all - are of reasonable quality. They are mainly concerned with the employees working at the mill and include shots of the coopers, powder men and fire-brigade'. I look forward to seeing these at some time and I am sure that Frank Armstrong would be delighted to show them to other members of the Group. His phone numbers at the shop are Whaley Bridge 2416/3655.

Alan Crocker

THE "GUNPOWDER" WINDMILL PLATE

In Newsletter 31 of the Wind & Watermill Section of SPAB, R Hawksley notes that the windmill depicted on a plate illustrated in Newsletter 30 (see GMSG Newsletter 3) is not Fairlight near Hastings but must be the one at the Battle powder mills. There is no evidence however that it was used to manufacture gunpowder.

Explosion Special Reports (1876-1915)

Index to Special Reports by HM Inspector of Explosives on explosions in gunpowder factories published as a *Parliamentary Paper*. The number refers to the report, and is often quoted in Roman numerals (202 and 216 not examined), the date is that of the explosion. Note:

B = building plan	b = breaking house explosion	l = lightning
D = drawing of equipment	c = corning mill explosion	m = cartridge machine explosion
M = map of site	d = dust house explosion	p = press house explosion
P = 'photo'	e = extracting house explosion	r = granulating house explosion
	g = glazing house explosion	s = drying stove explosion
	i = incorporating mill explosion	x = mixing machine explosion
	k = killed	

Bassinghyll **53** (15.6.1883)15ik
 Blackbeck **33** (19.3.1881)pc, **64** (26.7.1884)lc4k, **127** (19.1.1898)Bs, **138** (26.5.1900)Bp2k, **143** (27.8.1900)c4k, **177** (30.4.1906)c2k, **189** (15.7.1909)c2k, **202** (14.12.1911)c2k
 Chilworth **21** (10.2.1879)p2k, **57** (15.11.1883)3Di, **146** (12.2.1901)c6k
 Dartford **23** (11.3.1879)e, **72** (21.8.1885)2B3Dmk, **165** (2.2.1904)
 Elterwater **19** (29.11.1878)c3k, **149** (23.10.1901)Dck
 Faversham (Marsh) **22** (21.2.1879)Mgk, **31** (11.12.1880)g, **165** (2.2.1904)B2Dx3k
 Fernilee **84** (21.3.1888)BDp2k, **190** (12.8.1909)e2k
 Gatebeck **37** (21.7.1881)BPp2k
 Herodsfoot **2** (12.5.1876)M5Pbpi3k, **5** (14.10.1876)r2k
 Hounslow **78** (3.5.1887)BM3Pgk, **216** (9.7.1915)gk
 Kames **96** (11.9.1891)pk, **115** (12.9.1895)p
 Kennall Vale **83** (7.11.1887)BDMPP2k
 Lochfyne **56** (29.9.1883)M4Psk
 Lowwood **82** (6.9.1887)i2k, **159** (12.3.1903)p2k
 Roslin **71** (9.7.1885)B4m2k, **91** (22.1.1890)Dx6k, **95** (22.10.1890)g2k, **101** (17.9.1892)Dik
 Sedgwick **52** (12.4.1883)B2Dm3k, **160** (30.3.1903)BDMgc2k, **179** (23.6.1906)p4i
 Worsboro' Dale **66** (15.10.1884)mk, **147** (25.5.1901)p, **181** (12.12.1907)pc2k

Gentleman's Magazine (1731-1850)

Index to references to gunpowder factory explosions. Note:

Plain type incorporating mill explosion or unspecified	Outline type stove
Bold type magazine explosion	Shadow type corning mill
<i>Italic type</i> dust house explosion	Bold italic type press house

Ballincolig 845 (25.8.1808)
 Battle 1189 (**21.12.1787**), 436 (**25.4.1798**), 367 (**20.3.1801**), 1155 (8.12.1802), 360 (2.4.1808)
 Dartford 948 (**12.10.1790**), 1203 (**31.12.1794**), 696 (11.8.1796), 574 (15.6.1805), 362 (**12.10.1827**), 77 (21.6.1833)
 Ewell 335 (18.7.1757), 245 (25.5.1768), 891 (21.10.1783)
 Faversham 238 (**17.4.1781**), 950 (**3.10.1789**), 880 & 968 (**18.9.1807**), 183 (13.8.1813), 306 (14.6.1847 guncotton) see also Ore
 Hounslow 141 (11.3.1758), 391 (5.8.1758), 610 (**20.12.1758**), 190 (3.4.1762), 440 (27.9.1770), 444 (27.9.1774), 490 (25.9.1774), 76 (24.1.1796) & 118 & 184, 962 (17.11.1796), 429 (22.1.1797), 285 (16.3.1812), 77 (4.7.1812), 183 (21.8.1813), 623 (27.11.1815), 478 (15.5.1819), 170 (25.7.1826), 554 (**10.6.1829**), 312 (5.8.1835), 426 (**11.3.1850**) see also Twickenham
 Littleton 473 (22.3.1800)
 Maidstone 309 (23.7.1731)
 Malden 49 (2.1.**1742**), 591 (3.12.1760)
 Moulsey 481 (**19.10.1754**), 423 (19.8.1771)
 Ore (Faversham) 463 (**3.10.1817**) ✓
 Roslin 78 (14.7.1812)
 Twickenham 171 (23.8.1827)
 ✓ Waltham Abbey 613 (1.12.1763), 525 (**13.4.1843**) ✓

THE CONTINUED USE OF COVERED NITRE BEDS IN THE 18th CENTURY

The continued use of covered nitre beds after the introduction of relatively cheap saltpetre from India would at first sight offer an anachronism, particularly as the system had failed to become established in England as a major source of saltpetre in the 17th century.

In 1630 a David Ramsey had obtained a licence to make saltpetre "in an open field of four acres sufficient to serve the Kingdom" but his efforts came to nothing. I can find no further attempt, independent of the gunpowder makers, in either the rest of the 17th century or the next.

The industry of extraction of saltpetre by the saltpetre men working the natural resources of pigeon lofts, stables, cellars etc appears to have died out by the 1700s due to competition from the plentiful and cheap supplies from India - the price difference being £3-10-0 per cwt as against £2-5-0 in 1672.

The gunpowder makers however continued with their nitre beds and being competent businessmen must have had sound commercial reasons. These commercial reasons were I suggest the peculiar advantages accruing to the gunpowder makers and them alone. There were no transport costs, no site repair and reinstatement costs, no fees or bribes necessary, only one profit taken, and no need to concentrate the saltpetre liquors to crystals.

There is one other most important consideration. The gunpowder makers usually received their saltpetre unrefined. On refining, between 14% and 16% of impurities were removed in the form of common salt, other chlorides, sulphates and a small percentage of nitrates. This considerable waste, excluding the salt, when added to the nitre bed would create a substantial advantage for the gunpowder men, as the biological action of the nitre bed would convert much of that waste into nitrates, which in their turn could be converted to potassium nitrate. Taking all these advantages together, the production costs and the higher percentage extracted, must have made the costs comparable with those of the imported Indian saltpetre.

It is interesting to note that Marshall (*Explosives*, London, 1917, p.61) records a similar practice continuing in his day in India:

"In the refinery . . . there is always a large heap of saltpetre earth, which is worked over and over again . . . The insoluble matter and all weak liquors are added to the heap of earth, which steadily grows from year to year. The mother liquor from the crystallization of the saltpetre is also added to it after it has been used three or four times, as it is then too impure."

The principles and processes of the nitre bed continue to this day in the production of mushroom compost from horse manure where a small addition of nitrates and other compounds greatly accelerates the rate of fermentation and production of more nitrogen compounds.

Charles Trollope

POWDER MAKING IN LICHFIELD, 1645

In Howard Clayton's *Loyal and Ancient City: the Civil War in Lichfield* (ISBN 0 9503563 2 8) there is a reference to the accounts kept by Jeffery Glasier, a member of the Royalist Garrison besieged in the Cathedral Close, which mention the production of guns, mortars, ammunition and gunpowder. (Lichfield Cathedral Library, MS 24). For the production of powder, coal appears to have been brought under guard from Cannock Chase as fuel for the boiling of saltpetre:

"Payde for coals already since our first coming for the saltpetre man,
and guards, £30
Payde saltpetre men, they costing us £8 a wicke, 27 wickes £216
Payde for a furnace to boil saltpetre in and setting it up, £18 0s 0d"

Sulphur was purchased at £32 per ton. As well as employing two saltpetre men and setting up a furnace, Glasier "Payde for making a cornmill and a gunpowder mill, £87 0s 0d"

The mill appears to have been worked by horses: ". . . a mill-horse and other necessaries about the mill £1 15s 0d "

A perusal of Glasier's original manuscript might well reveal further details about powder manufacture at that time. The brief account outlined above is in Clayton, available from the Tourist Information Centre, Donegal House, Bore Street, Lichfield, Staffs WS13 6NE (0543 252109), price £6.00 plus p&p.

Phil Philo

WILLIAM SIM'S METHOD OF BLASTING, 1853; GUNPOWDER DISTRIBUTION.

Mr Tim Smith of 30 Gaveston Drive, Berkhamsted, Herts, HP4 1JF would be glad to hear from anyone who has information on a method of blasting using huge quantities of gunpowder (5 tons or more) introduced by a certain William Sim in 1853.

Also Mr Smith has found a reference in the minutes of the Leeds & Liverpool Canal Company (PRO:RAIL 846/17) to an application by Mr Wakefield of Kendal to erect a powder magazine at Hawbank Rock, Skipton, on 7 July 1858, apparently as a wholesale store for the area. (It was rejected). He would also be grateful for information on the transport and distribution of gunpowder.

EXPLOSIONS

HOUNSLOW, 1772: Journals of Gilbert White, edited by W Johnson, published by Heritage p.b. 1982. Chapter 5:

"1772 January 5th . . . An extraordinary concussion in the air which shook peoples windows and doors round the neighbourhood . . ."

Footnote: The concussion felt (January 5th (Q'Y January 6th)) was occasioned by the blowing up of the powder mills at Hounslow. Incredible damage was done in that neighbourhood.

J K Major

ERITH AND CHILWORTH, 1864: Diaries of James Simmons, Papermaker and Farmer of Haslemere, Surrey, deposited at Guildford Muniment Room.

"1864 Saturday Oct 1st. This morning about 7 o'clock a sudden tremendous noise alarmed the house. I was dressing and look'd out of the window and a volume of smoke in the air at a distance off - since then we have heard it was the Dartford Powder Mills - that the windows around the neighbourhood were broken and was fear'd some lives lost."

This entry must refer to the explosion of about 57 tons of powder at magazines belonging to Messrs Hall and to the Lowwood Gunpowder Company at Erith, causing immense damage to property and considerable loss of life. At first I thought that Simmons had heard this explosion from Haslemere which

is 85 km from Erith but then realised that he was staying with his daughter in Bickley only about 15 km away. He was at home on 5th August 1864 but did not record the explosion that day at the press house of the Chilworth gunpowder works which was 22 km from Haslemere. This was observed from Hindhead about 2 km from his house and described as follows in Murray's *Handbook of Surrey*, 1865, p.56:

"A small cloud of marble-like whiteness, solidity, and sharpness of outline rose slowly from the valley and gradually expanded into a well-defined cumulus-like mass resting on a stout column. The phenomenon was as surprising as it was beautiful and it was only after the cloud had attained its full development and was beginning to break up that the dull heavy boom reached the ear and confirmed but too painfully the vague suspicion of its true character."

Alan Crocker

A LIST OF EARLY EXPLOSIONS

"A list of some remarkable and important explosions of gunpowder which are reported as having occurred previous to 1864" by Major V D Majendie (H M Inspector of Gunpowder Works). *Proceedings of the Royal Artillery Institution*, no 4 vol 9, 1875. Reprint in ICI Archive BSCL/O8E/0001. Lists 91 incidents all over the world.

GUNPOWDER WEIGHTS AND MEASURES

The Truro conference in May 1987 provided a welcome opportunity to raise the question of the weight of gunpowder implied by certain measures such as the barrel, cask, keg and quintal.

The response of members both at that time and later has served to show that apparently simple questions do not elicit simple answers. However it seems safe to conclude that in general a barrel of gunpowder weighed 100 lbs and a quintal of saltpetre weighed one hundred weight or 112 lbs. A cask was possibly an alternative term for a barrel.

But what of a keg? Information already received on this measure, which was much used in the trade of Bristol in the 18th century, suggests a weight of 5½ lbs or 6¼ lbs. It would be useful to have more evidence on the keg, in order to establish its weight more precisely, to ascertain how widely it was used as a container for powder, and to discover the circumstances under which this measure was preferred to the possibly more usual half- and quarter- barrels. Could a keg have been one-sixteenth of a barrel?

More generally, it would be both interesting and important to establish the extent to which the weight of this and other measures may have varied from region to region, at different times, and according to different uses, for example commercial, mining, and military.

All contributions towards the solving of these problems would be most gratefully received and acknowledged.

Brenda Buchanan

FAMILY HISTORY

One of the sources of information for the *Gazetteer* entry on Kames - Millhouse, Argyll, was an article on the history of the works by Kennedy J McConnell, who had approached the subject through his interest in family history and the workers at the mills. Mr McConnell suggests that it would be worthwhile publicising the *Gazetteer* among family history societies in

appropriate areas, with a note that with few exceptions, the collective history of the people who worked at these establishments has not been recorded and genealogists who are researching their powder mill ancestors will find the gazetteer useful as an additional reference source. This I propose to do but if any members are interested in taking up the matter locally I can supply the relevant addresses from the list Mr McConnell has provided. It seems possible that there could be a useful exchange of information.

Glenys Crocker

METHEGLIN

In Newsletter 1 it was noted that C R Baker, Assistant Curator of Dartford Museum, had drawn attention to a short description of a visit to Metheglin powder mills, followed by a more detailed account of those at Faversham, in *London Society*, 4, July 1863, pp.66-76. Efforts to identify Metheglin have failed and it seems possible that it is a misprint or corruption of some kind. Alan Crocker suggests the following solution:

METHEGLIN = METHE GLIN = GLIN METHE = GLYN NEATH

The reversal may have arisen because nouns precede adjectives in the Welsh language. An example is provided by the name of the village of Pontneddfechan (Bridge Neath Little) where the gunpowder works are located.

WOMEN MUNITIONS WORKERS. An American visitor who spent last summer in England, Angela Woollacott, was pursuing research into the subject of women in munitions during World War I. If anyone has information they would like to exchange, Mrs Woollacott can be contacted through Brenda Buchanan (see list of members, p.14)

RECORDING GUNPOWDER MILLS IN COWAL, ARGYLL.

The Royal Commission on the Ancient and Historical Monuments of Scotland has begun work on the recording of three gunpowder mills in the Cowal area of Argyll, beginning in April 1988 with the Kames Powder Works at Millhouse near Tighnabraich (NR 95 70), dating from c.1836 to 1921. Preliminary research has been completed for the Clachaig (Glen Lean, NS 120 814) and Loch Fyne (Furnace, NN 023 004) sites, and survey work will resume once the vegetation has died down in late 1988. The purpose of the surveys is not only to generate record material for the National Monuments Record of Scotland, but also to provide appropriate entries for the Royal Commission's last Inventory volume, *Argyll 7*.

The Kames Powder Works was well endowed with substantial remains, particularly in its southern half (to the south of the main road), where three powder mills with centrally placed waterwheel pits are clearly identifiable. However, all machinery had long since been removed, and the buildings throughout the site ranged in condition from roofless but impressive structures through to grassy lumps and bumps. The north half of the site was in far worse condition, with most of the buildings reduced to their foundations. This may relate to a period of army occupation during World War II. An unexpected bonus was the discovery of a powder-tester and range in a neighbouring field. The small, round-shaped cast-iron cannon has a test-shell or cannon ball rusted into its barrel, and is a single casting including its base.

The great advantage for the Kames Powder Works site was the

availability of 1:2500 Ordnance Survey coverage, particularly 2nd edition maps (1899), which revealed many details, including a sophisticated tramway network on both sides of the road. Better still has been the discovery in the Strathclyde Regional Archives of an itemised works plan of 1869. This not only provides details of the gunpowder works but also of the saltpetre refinery, of which little remains, nearby at Kames Pier.

Kames was one of two large Argyll gunpowder works operated by Messrs Curtis's & Harvey. Unfortunately the larger, more impressive remains at Clachaig have no large scale map coverage, and no itemised site plan. Survey and interpretation later this year will therefore be more difficult than at Kames. The Loch Fyne site is much smaller and a site plan is said to exist in addition to good 1:2500 O.S. coverage. The major item of interest there will be the linear arrangement of six under-driven water-powered incorporating mills in a single block. Both Clachaig and Loch Fyne are already overgrown and are as ruinous as Kames. Waiting until autumn to carry out surveys will consequently be safer and more rewarding.

Miles Oglethorpe
Investigator, RCAHM Scotland

MELFORT, HARRISON AINSLIE & CO AND CHARCOAL BURNERS

Further information on the Melfort powder mills has been collected by John Robertson of Glasgow, who is investigating the complexities of wood leases and land purchases by the iron manufacturing firm of Harrison Ainslie & Co, who bought the entire Melfort Estate in 1838 for charcoal supplies.

Mr Robertson provided much of the information on the Argyll mills for the *Gazetteer*, and in particular corrected the received knowledge about the dates of operation of the Melfort mills, which have been assumed to be 1838-67, by finding contemporary articles in the *Oban Times*. These showed that the powder mills were not established until 1853 and that after the explosion in 1867 the mills were repaired and manufacture was resumed later that year. They then continued to 1874. He has since studied the census enumerators' returns, which show that there were indeed no powder makers at Melfort in 1841 and 1851.

Charcoal burners do not appear in the Melfort census enumerator's returns. He raises the question as to whether charcoal burners are included in figures for the numbers employed at gunpowder works, pointing out that it was seasonal work, they may have been itinerant, or might appear in the census under some other occupation according to the time of year, perhaps as labourers.

Mr Robertson has deposited a summary of his findings with Professor John Butt, Department of Economic History, Strathclyde University, Glasgow.

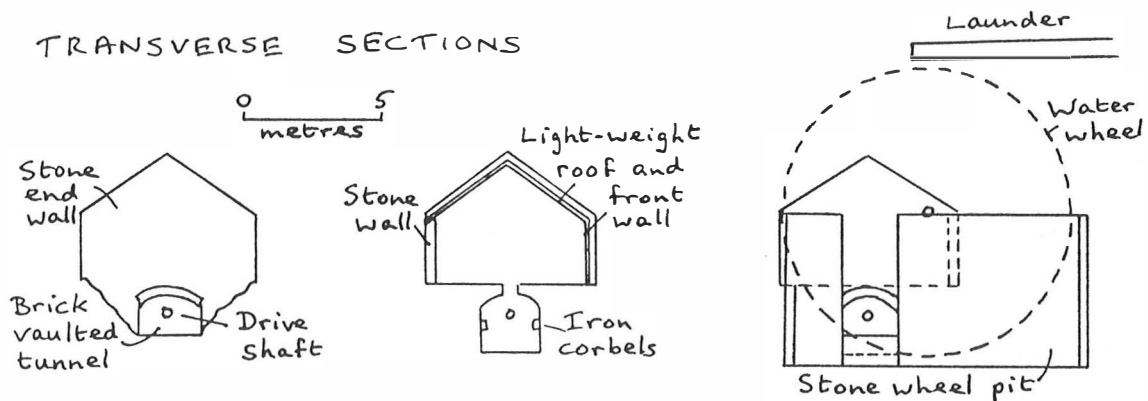
TYDDYN GWLADYS, DOLGELLAU

Little is known about this gunpowder mill which had close links with the local gold mines. Gold was discovered at the nearby Cwm Heisian mine in 1844 and two years later the North Wales Mining Co which included Tyddyn Gwladys was floated but soon failed. Gold was discovered in California in 1848 and in New South Wales in 1851 and this created renewed interest in Wales leading to the Great Welsh Gold Rush of 1862 when eleven new companies including Tyddyn Gwladys and Cwm Heisian were established. These had all ceased to work by 1870. However Gwynfynydd, adjacent to Tyddyn Gwladys, was opened in 1869 and re-opened in 1883. It was here that in 1887

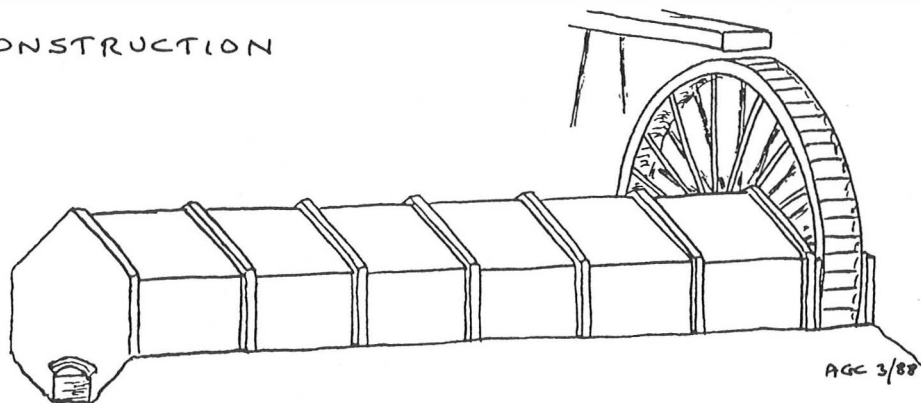
William Pritchard Morgan, a Welshman who had made a fortune as a farmer, solicitor and businessman in Australia, found a rich lode of gold. In the same year the Tyddyn Gwladys gunpowder works was licensed. It is shown on the 6 inch Ordnance Survey map of 1900 and explosions are recorded in 1891 and 1900. It closed in 1901. However in the 1890s it appears to have been called 'The old gunpowder works' (M C Harris, "The mineral wealth of Llanfachreth parish", *J. Merioneth History & Record Society*, 5, 1965-8, 147-154), which suggests that the 1887 license was issued when an earlier powder mill re-opened. If so, this must have closed before 1876, the date of the first continuing certificates.

The main surviving feature at the site is the ruined incorporating mill shown in the accompanying reconstruction drawing. The mills in the six chambers were driven by a line shaft in a tunnel below the building and powered from the rim of a 35 ft diameter 5 ft wide overshot waterwheel. The arrangement is very similar to that at Loch Fyne.

TYDDYN GWLADYS GUNPOWDER INCORPORATING MILLS



RECONSTRUCTION



At Tyddyn Gwladys the water was taken from the top of Pistyll Cain, a dramatic waterfall which is featured on the front of the current Welsh Tourist Board publicity booklet. The first section of the leat is hewn from the rock and still carries a torrent of water. The other surviving buildings are all much smaller but the magazine which was barrel vaulted is also very impressive. Some of the buildings could have been re-used by the

Gwynfynydd gold mine after the powder works closed, but claims that the mill was used to house Britten pans seem unfounded.

Pritchard Morgan, the 'Welsh Gold King' who was well known for his oratory and penillion singing became Liberal Member of Parliament for Merthyr Tydfil in 1888 but lost his seat to Keir Hardie in 1900.

Alan Crocker

LAKE DISTRICT

The Lowwood Gunpowder Works Wagons.

In Newsletter 3, I noted that I had been in touch with Tim Owen of the Lakeside Railway Society about the possibility of rescuing the remains of the gunpowder wagons from the Lowwood gunpowder site. This project was carried out on 25 October 1986 and is described by Steve Lister in an article entitled "The Gunpowder Works Job" in the Spring 1987 issue of *The Iron Horse*, the LRS Journal. Two 3 ft 6 in gauge wagons, or box vans, were rescued complete together with the running gear of a third. They are being stored awaiting conservation half a kilometre away in the grounds of "Busca". This is the factory magazine which has been converted into a cottage now occupied by Bill Oakes, who was very helpful when we visited the site. It is rumoured that after it has been restored, one of the wagons will be displayed near the Lowwood clock tower, the heart of the site. The tramway at Lowwood was described by Howard Quayle in the Summer 1971 edition of *The Iron Horse*. In addition he wrote an article on "Gunpowder Railways in Southern Lakeland" in *The Railway World* in 1973. Finally the last chapter of *Lakeside and Haverthwaite Railway* by H I Quayle and S C Jenkins, Dalesman 1977 pp 69-71, is on "The Gunpowder Tramways", describing both the Lowwood and Blackbeck systems.

The Lowwood Gunpowder Works Clock

There appears to have been a tradition, reported in the article "The North of England Gunpowder Group" in the ICI Magazine, October 1929, that the clock in the Lowwood works clock tower was made by the original proprietor Daye Barker who had a reputation for mechanical ingenuity. Since Daye Barker died in 1835 and the clock tower was built in 1849, we decided to investigate. By invitation of Robert Harvey who occupies that part of the old works complex, we visited with a local clock maker, Ian Haigh of Ambleside. He considered that the clock was considerably earlier than the tower but that it was clearly the work of a professional clock maker, the most likely being William Bellman of Broughton in Furness.

The Chilworth barrel stencil in the Lake District

As reported in Newsletter 3 a rubbing of a barrel stencil with the words 'CHILWORTH GUNPOWDER CO LTD / 20 lbs / GUNPOWDER / LONDON' survives in the papers of the late Paul Wilson, Lord Wilson of High Wray, who researched the gunpowder industry of Westmorland and Furness (*Trans. Newcomen Soc.* vol.36, 1964). The probable reason why a Surrey stencil was apparently used in the Lake District has now been discovered. Some records of the Blackbeck manufacturing site at Bouth near Haverthwaite are held at ICI Head Office in Millbank, London (WHWC/03A/0002). They reveal that the works were sold in March 1916 by Frederick Morris Dickson to the Chilworth Gunpowder Company. They ran the business until May 1921 when it was assigned to W H Wakefield & Company Limited who were at Gatebeck and Lowwood.

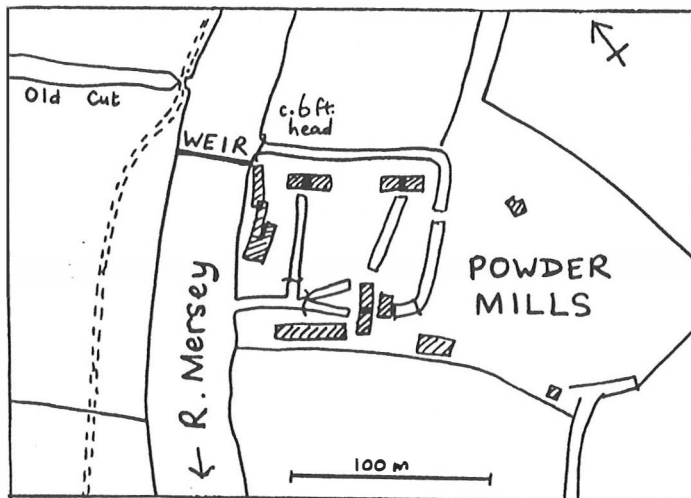
Alan Crocker

THELWALL GUNPOWDER MILLS, CHESHIRE

In Newsletter 3 an account was given of the documents held by the Derbyshire Record Office (Stanton of Snelston Hall Papers, D157m/3554) relating to the early operation of the mills at Thelwall (SJ 65 88) on the River Mersey near Warrington. The documents consist largely of accounts from 1760 to 1779 and an inventory of 1797, which show that the land was acquired in 1757 by John Stanton, Sir Ellis and Robert Cunliffe and John Craven, and the building began in 1758.

Further information has now been found on the subsequent history of the mills. The site is shown on the 1871 25" O.S. map on the south bank of the Mersey at Woolston Weir (SJ 654 875) and the mills are referred to in *A pictorial history of the Mersey and Irwell Navigation* by J Corbridge (Manchester, E J Morten, 1979) where it is stated that they were destroyed in an explosion in 1855 and never rebuilt. Corbridge also states that the river company would not carry gunpowder at all at first but relented in 1805, quoting terms of 1/- per barrel, and under no circumstances would they carry gunpowder up to Manchester.

Acknowledgement is due to Roger Kenyon, a teacher at Chaigeley School



in Thelwall, whom Alan and I met when we went to investigate, for providing the above information and taking time to show us around. The school occupies the Stanton's house, which was named "Greenfield" on the Thelwall tithe map (PRO Kew IR30/5/389; schedule IR29/5/389). The tithe map also shows the layout of the mills, as shown on the left.

Further information comes from Alice Palmer's thesis (1970) *The Lowwood Gunpowder Company: its inception and early growth, 1798-1808* (deposited with the Lancashire County Record Office which holds the Lowwood papers, D.D.Lo.) This quotes from a letter, received by Daye Barker of Lowwood on 21 Sept 1798, describing the mills at Thelwall (Palmer pp 2,16). There were 8 mills attended by one man for 18 hours a day for 3/6d. They made 10 to 12 cwt of powder per day. The runners were 6'3" in diameter and weighed about 3 tons each.

The Lowwood mills in Furness, like Thelwall, were established primarily to supply powder for the triangular slave trade between Liverpool, West Africa and the Americas. William Peers at the Liverpool magazine regularly sent details to Lowwood of the amount of powder dispatched on behalf of different companies. The figures for 1801-7 show that Stanton's accounted for about 14% of sales and the two Lake District firms of Wakefield's of Kendal and Lowwood for nearly 70% between them. Five London firms supplied another 14% and the rest was from Bristol (Elton, Ames & Co), Cork and Greenock. It would be interesting to know where the Greenock powder came from as the west of Scotland powder mills did not start until the 1830s.

After the abolition of slave trading in British ships in 1807 Lowwood's sales at first declined sharply and then began to recover, particularly as they developed their 'country trade' in blasting powder (Palmer, p.75). The fortunes of Thelwall at this period would be worth investigating. The mills continued in the hands of the Stanton family with John, James, James & Son, and finally James Stanton shown as proprietors in Gore's *Directory of Liverpool*. The firm was no longer listed in 1859.

It is understood that some information on the mills is held by Warrington Public Library (Palmer, vi). Also the Lowwood papers at Preston, which cover the period up to 1846, probably contain much useful material, but they have not been fully catalogued.

Glenys Crocker

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