

Gunpowder Mills Study Group

## NEWSLETTER 18, FEBRUARY 1996

### MEETING IN PARIS WEEK-END OF 11-12 MAY 1996

#### PROVISIONAL PROGRAMME

##### **Saturday 11 May: L'Arsenal, Essonnes, Le Bouchet**

The central offices and laboratories of the Gunpowder Administration and the Saltpetre Refinery were housed in the Arsenal up to the end of the 19th century, whereas the nearest gunpowder mills were a few dozen kms south at Essonnes (1694-1820) and then in Le Bouchet (from 1824), which now houses a research centre of the National Society for Powders and Explosives (SNPE).

**13.30-14.00** Meet in front of the Bibliothèque de l'Arsenal (Metro: Sully- Morland).

**14.00-14.30** Brief tour of the Arsenal district and the offices of SNPE (Paul Vieille's Laboratory).

**14.30-18.00** Coach to Essonnes and Le Bouchet: Visit to the former Essonnes gunpowder mills site and the remaining Gothic St John's priory church (which housed the Revolutionary gunpowder works). Visit to Le Bouchet gunpowder works (an old wheel mill). Return to Paris.

##### **Sunday 12 May: Sevrans-Livry**

In Sevrans-Livry (15 km NE of the centre of Paris) are the remaining buildings of the national gunpowder works (1865/73-1971), now housing a museum (founded 1982), and the former house and laboratory of Alfred Nobel, now the Town Hall.

**09.15-09.30** Assemble at Sevrans-Livry RER station. Take the underground Line B of the RER - express regional net (20-25 min from Châtelet or Gare du Nord, direction Mitry-Claye (not Roissy).

**09.30-10.15** Walk to the gunpowder works and museum, via Nobel's house and laboratory and the former Laboratory of the Navy.

**10.15-10.30** Coffee.

**10.30-11.45** Guided tour in the gunpowder works park.

**11.45-12.30** Main building (Centre Gustave Maurouard). Introductory talk by René Amiable (former Director of the factory and Head of the ministerial Technical Service of Powders and Explosives): "Gustave Maurouard and steam power in gunpowder manufacturing". Unveiling of a commemorative plaque of Gustave Maurouard. Wine party (Vin d'honneur).

**12.30-13.30** Guided visit to the museum.

**13.30-14.15** Lunch.

**14.15-16.00** Group Meeting. Talks will include René Amiable on "Alfred Nobel in Sevrans" and Louis Médard on "Paul Vieille" (provisional).

## **The Paris Weekend: Further Notes**

The meeting has been arranged by our member Patrice Bret and we shall be the guests of the Société Nationale des Poudres et Explosifs (SNPE), the Office National des Forêts (ONF), which manages the Sevran-Livry Park, and the Association des Amis du Patrimoine Poudrier et Pyrotechnique (2A3P), which manages the Musée Technique des Poudres.

It is anticipated that we shall not be charged entrance fees but we will want to make appropriate donations. The fee for the meeting will therefore be about £10.

We expect that some members will wish to spend some days in Paris either before or after the meeting and we have not therefore attempted to make party travel arrangements.

On Saturday 11 May the Eurostar trains which leave London (Waterloo) at 07.53 and 08.23 arrive at Paris (Gare du Nord) at 11.53 and 12.23 respectively. On Sunday 12 May those which leave Paris at 17.00, 18.00 and 19.00 arrive in London at 19.30, 20.30 and 21.30 respectively. (All local times).

Members should make their own arrangements for accommodation in Paris and it is advisable to book in advance. Patrice Bret has provided a brief list of convenient hotels, the prices being 300-700FF single and 340-830 double. Details will be provided on request.

Please contact Brenda Buchanan (tel 01225 311508) or Alan and Glenys Crocker (01483 565821) if you want further information. If you want to take part it will be necessary for you to let Brenda have the following details before 7 April to meet the Ministry of Defence requirements for entry to Le Bouchet: Name; First Name; Title and Function; Place and Date of Birth.

## **ICOHTEC SYMPOSIUM IN BUDAPEST, 7-11 AUGUST 1996**

The symposium on the History of Technology will include a Gunpowder Section and proposals for papers are invited. The cost will be 550 Deutsch Marks per participant and 350 DM per accompanying person. If interested please contact Brenda Buchanan, 13 Hensley Road, Bath, Avon BA2 2DR, tel 01225 311508.

## **GUNPOWDER MILLS IN LUXEMBOURG**

The note about a gunpowder mill in Luxembourg in Newsletter 17, page 10, prompted Ken Major to send us some photocopied pages from the book *Die Mühlen des Luxemburger Landes* by Emile Erpelding, St-Paulus-Druckerie, Luxemburg, 1981. On page 317 it has two paragraphs under the sub-heading "Kieselmühle (Pulvermühle)", covering the period 1243 to 1797 but with no mention of gunpowder. Then on pages 471-2 there are six paragraphs under the sub-heading "Pulvermühle (Pulvermühle)". The account starts in 1083 but the gunpowder period appears to be from 1720 to the early 20th century. A long list of names of people active at the site is given but some of these were associated with other industries including cotton-spinning. On page 480 there is a photograph of this mill with a substantial weir but the building looks more like a large residence than a gunpowder mill. Finally on page 472 there is an entry for "Pulvermühle (Siechenhof)" but this again has no mention of gunpowder. It is not clear whether one of these mills matches the one referred to in Newsletter 17.

**THE AUTUMN MEETING IN LONDON, 1995****Keith Fairclough**

The chairman, Alan Crocker welcomed about 20 members to the annual autumn meeting of the Group, held at the Institute of Historical Research, University of London, on 14 October 1995. Several regular attenders sent their apologies, and cards were sent to two members who were ill, Michael Wilks and Malcolm McLaren. Proceedings commenced with a talk on "The Royal Gunpowder Factories, 1759-1815" by Wayne Cocroft of the RCHME. He emphasised that between these dates priorities changed, and he delineated three separate periods. Faversham mills were acquired by the government in 1759, but despite the arguments forwarded in favour of such a purchase little was done by the Ordnance during the ensuing decades, either to increase production at Faversham or to make these mills a centre of excellence and improved technology, except that presses were probably introduced. It was also noted that a stamp mill was still in situ at Faversham. Was the government still using this old technology, taking advantage of a clause in the legislation prohibiting such methods of incorporation that specifically exempted them? It was not until the arrival of Major William Congreve at the Board of Ordnance in 1783 that the situation began to change, and between then and c.1804 the original intentions forwarded for the Government's involvement in production began to be implemented. During this period Congreve experimented with the procedures for proofing powder, to acquire a better quality product, and to encourage proper proofing at the point of production before dispatch to the Government stores. He also improved charcoal quality by introducing retort-burnt charcoal in place of pit-burnt methods. To ensure that such improvements were maintained he set up Government charcoal production sites at Fisher Street and Fernhurst in Sussex. At Faversham, explosions in 1781 and 1792 led to the introduction of better technology and an expansion in production at the traditional sites, and in the late 1780s a new site was opened, the Marsh Works. A speciality of this new site was the reworking of powder, to bring this activity more within Ordnance control rather than rely solely on contracts with the private sector. Congreve also ensured the purchase of Waltham Abbey by the Ordnance in 1787, and immediately brought in improved technology and skilled workmen from Faversham to make Waltham Abbey a second centre of excellence. The third period, from c.1804 to 1815, witnessed a consolidation of the technical improvements of the second period, and the introduction of steam stoves instead of gloom stoves in the drying process. But the major feature of these years was the massive expansion in Government production capacity. The Faversham site allowed little scope for further expansion, but much was done elsewhere. At Waltham Abbey local water rights were purchased in order to acquire more water power, and a series of horse incorporating mills were introduced. In addition new production sites were opened at Tipnor near Portsmouth and at St Budeaux near Plymouth, and the Ordnance acquired and immediately improved Ballincollig in Ireland. Slides of contemporary maps and drawings and present day remains accompanied the talk and some account was given of attempts to record and preserve such remains.

This last theme was particularly emphasised in the next talk, "Recent discoveries at Waltham Abbey", given by Steve Chaddock, an archaeologist recently employed at Waltham Abbey. He showed a series of slides of that site taken during the process of decontamination, displaying remains that had not been previously

visible but which, with the aid of further documentary and map research, could be identified and placed in the context of the historical development of the site. The care taken to uncover and preserve these remains during the process of decontamination was obvious. Of particular interest were the slides of the internal canal network that had been uncovered and the craft associated with this system. There were numerous small canals to move materials around the site, as well as a link with the nearby Lee Navigation to allow access to the larger river barges which carried the raw materials and the finished product. During recent work four more of the small barges used for internal movement had been found, three ship shaped and one swim head, as well as an ice breaker. In addition a sunken river barge had been recovered from what was once the mill head and moved to a site where it can hopefully be displayed in the future.

The afternoon session opened with a talk "Recent work by RCAHMS on the gunpowder and explosives industry, especially at Ardeer", given by Miles Oglethorpe of the Scottish Royal Commission. Ardeer is still a working factory, and the co-operation of the ICI staff there is essential to gain a better knowledge of the site. There is a superb documentary and photographic archive to be preserved and exploited. Much of the area which was once given over to gunpowder production is now overgrown, but parts have been cleared, especially in the vicinity of a range of six 'terraced' stone and cement incorporating mills. There was some discussion about a blending house at the end of this range, whether it was used to mix materials before incorporation or to mix the powder from the separate mills after incorporation to obtain a more uniform blend. There was also discussion about the use of gunpowder produced at the site. Some members of staff there have suggested that it was mostly used for fuses, for there were fuse spinning production facilities at the site. However members of the Group suggested that there must have been far more varied uses of Ardeer black powder. A series of slides were shown which gave a tour of the nitroglycerine plant at the site, and another series showed the works in the early twentieth century. These last illustrated the self-sufficient nature of the works, with its own power station, printing establishment and wood pulp facilities, and the reliance on young female labour. There were also Chilworth mounds, named after the mounds clad with corrugated iron introduced by the Germans at Chilworth in Surrey.

The final talk, "The gunpowder mills of Wales", was given by Alan Crocker, chairman of the Group. After delineating the four known sites in Wales, he concentrated on two in particular, Tyddyn Gwladys just north of Dolgellau and Glynneath on the southern edge of the Brecon Beacons. The former had been licensed in 1887 and brought into production the following year, primarily to supply a local gold mine owned by William Pritchard Morgan. Slides of the remains of the site water power facilities were shown. Water was supplied by a leat from the top of a waterfall, Pistyll Cain, to a 30 ft diameter overshot water-wheel. This wheel powered the incorporating mills by means of an underdriven shaft inside a brick vaulted tunnel. Production lasted less than ten years. The Glynneath site had a longer working life, being licensed in 1857 and working under a series of owners, including Curtis's & Harvey and ICI, until 1931. There is now some discussion about scheduling this site. Slides included some of the work force in the 1920s, and contact has been made with one former employee, Tom Pritchard, whose models of the mills are in the hands of Neath Museum. The site has the remains of a series of water turbine and steam driven mills, and

aqueducts bringing the water from River Mellte. The talk closed with some discussion about the sources of gunpowder for the Welsh mining and slate industries, given that local production was never sufficient.

In the final session of the meeting Bill Curtis opened with an short account of his investigations into the earliest use of the term black powder. He quoted from several manuals from the 1890s which all used the term for gunpowder, sometimes emphasising that the two were one and the same. The earliest mention of the term he had found was in March 1868 when it was used in conjunction with a mention of Schultze granulated wood powder. From this he proposed that the term black powder arose at the time when different grades of powder first appeared, as before that date no such specification was needed. This contribution is published in this Newsletter. There was then some discussion of the next ICOHTEC meeting, in Budapest in early August 1996, when once again there will be a section specifically on gunpowder; and of the proposed visit of GMSG to Paris on the 11-12 May 1996. Fuller details of both will be forthcoming.

## Kristianstad

### TORSEBRO KRUTFABRIK

Nyrestaurerat krutbruk från Karl XI:s tid. (1648) Driften igång till 1923. "Krutgata" med kvarnränna längs Helgeå. Kraftiga kruthus (1692 och 1828) i skön ek och bokbacke, våghus etc. Bruks-herrgård, delvis från anläggningstiden.

**ADRESS:** Torsebro, 10 km N Kristianstads centrum (Infartsvägen skyltad väster om gamla bron i Torsebro samhälle)

**ÖPPET:** 12-16

**PROGRAM:** Guidad visning, föreläsning och möjlighet till kaffe

**ARRANGÖR:** Vähusens Vänner och Läns museet i Kristianstad

**KONTAKTPERSON:** Sune Friström, 044-10 17 80

Barfod & J C B Jensen (Copenhagen, 1992). The chapter on Sweden has a section on Torsebro Krutbruk on pp123-30, with a plan of the works in 1765.

I have written to the museum at Kristianstad asking for more information about the restored powder mill but am still awaiting a reply.

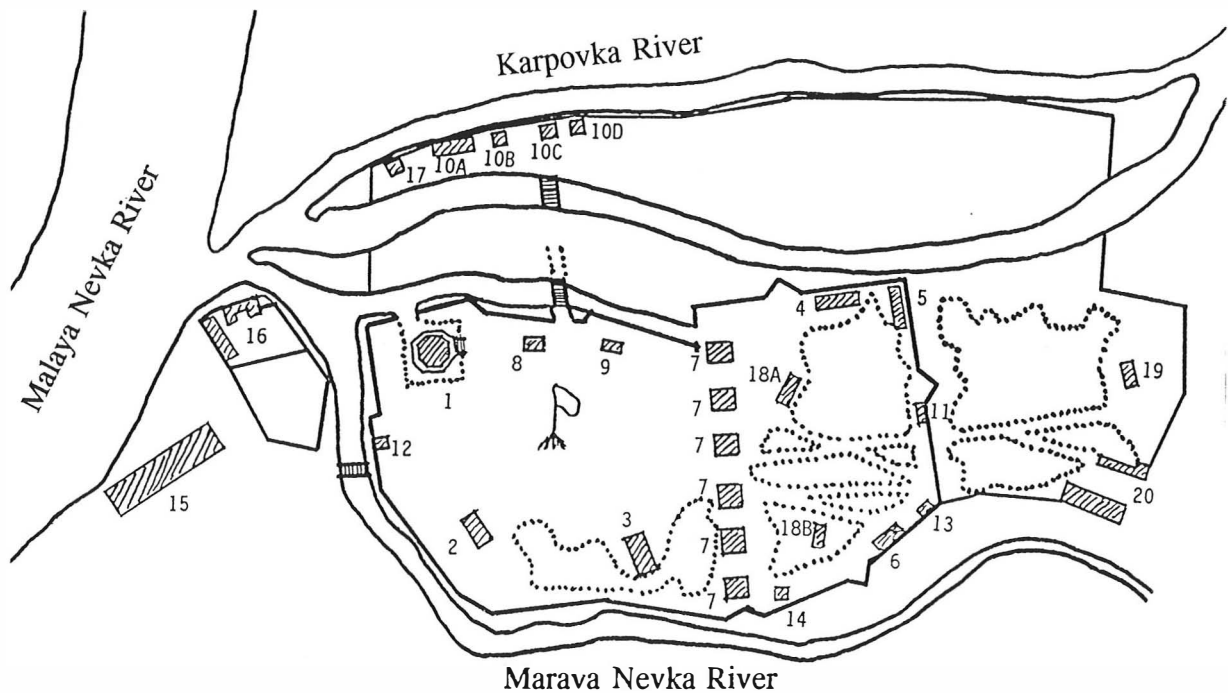
*Glenys Crocker*

### *Kulturhusens Dag, Industrie & Hantverk*

A brochure for European Heritage Days in Sweden, which listed properties open to the public in September 1995, included these details of a powder mill.

Our archaeologist contact in Sweden explains that 'it says the mill is newly restored, dates from 1648 and worked up to 1923. *Krutgata* means powder road/way but no one here knows what that would mean. The mill house (1692 and 1828) is very well built of oak, ...'

Members will remember that Anders Jespersen brought a Danish book on the gunpowder industry in Scandinavia to our attention (Newsletter 12, pp 9-10, March 1993) : *Bogen und krudt* by L H



Sketch plan of the gunpowder mill on City Island, St Petersburg, in 1729. A rough translation of the key is as follows: 1. Magazine for dry powder. 2. Timber building for dry powder. 3. Timber stove. 4. Timber building for old powder. 5. Timber building for dry powder. 6. Timber building for storing dry saltpetre. 7. Power mill buildings. 8. Timber building for dry powder. 9. Timber building where dry powder is put in barrels [?]. 10A. Boiling house. 10B. Drying house. 10C. Forge. 10D. Small timber building for charcoal made from pine trees. 11. Guard house near the front gate. 12. Guard house near the back gate. 13. Small timber building. 14. Small timber building. 15. New quarters for the master powdermaker and apprentices. 16. Place where the Tsar's servants are instructed. 17. Timber building for storing raw saltpetre. 18A. Corning mill with rotating machinery. 18B. Building for putting together ingredients. 19. Stables. 20. Old quarters for master powdermaker and apprentices.

In Newsletter 15, page 14, we reported having seen in the Peter-Paul Fortress, St Petersburg, a 1729 plan of a gunpowder mill on the City Island. However we had been unable to translate the captions giving the functions of the buildings and encouraged any GMSG member visiting St Petersburg to try to obtain more information. I am now pleased to report that **Alice Palmer** visited St Petersburg in July 1995 and was able, under difficult lighting conditions, to take some useful photographs of the plan. These have enabled me to prepare the sketch reproduced above. In addition it has been possible to have a rough translation made of the key to the numbered buildings and this is also given.

The mill was located on Gorodovoy or City Island, in the estuary of the River Neva, 1.8 km north-west of the Peter-Paul Fortress. The watercourses have changed somewhat since the early 18th century but the Malaya Nevka River and

Karpovka River still exist and determine the location quite accurately. North is at the top of the plan and, although the scale has not been transcribed, it is thought that the site measures about 300m between the two gates (11 and 12).

The plan exhibits several interesting features. First, for safety reasons, the site was remote from the centre of the city. Also, in 1729, it was not new as there were new quarters for the master powdermaker and apprentices (15) which were considerably larger than the old ones (20). Indeed, it seems likely that the original mill was constructed in 1703 at the same time as the Peter-Paul Fortress. The layout of the site is logical. For example, the raw materials buildings (10A-D, 17) are separated from the others across two bridges. The row of six incorporating mills (7) looks particularly neat. These were clearly powered by horses, stabled in building 19, as the land is too flat for water power. However the most elegant industrial building appears to have been the octagonal magazine (1), which was surrounded by a moat and reached by a bridge. One puzzle is that there appears to be no mention of a sulphur house but this may be because of the rough translation. Finally note the giant flag!

### **JOHN MERRICKS, GUNPOWDER MANUFACTURER**

This note is prompted by the fact that **Paul Merricks**, of Milton Keynes, has joined the Group. He is a member of the Merricks family, which is best known for establishing the Roslin Gunpowder Mills, 11 km south of Edinburgh, in about 1805. Paul has been researching his family history and discovered that the Merricks family originated in East Sussex near the gunpowder mill sites at Battle and Sedlescombe but he has found no evidence that they worked at these mills. In 1794 John Merricks, William Hitchener and John Hunter established the gunpowder mills at Gorebridge, 15 km south-east of Edinburgh. Four years earlier Hitchener, of Thames Ditton, and Hunter, a millwright of Kingston, together with John Wheatley, a gunpowder maker of Epsom, presumably associated with the neighbouring Ewell mills, had sought permission to erect a gunpowder mill at Abinger in Surrey. (Judie English & David Field "A Survey of Earthworks at Hammer Meadow, Abinger Hammer", *Surrey Archaeological Collections*, **81**, 91-5, 1991-2.) Permission was refused and Hitchener and Hunter transferred their interests to Gorebridge, with a new partner John Merricks, who, as he replaced Wheatley, presumably already had gunpowder making expertise. In the contract of co-partnership, Merricks was guaranteed £100 a year up to one-eighth of the profits but none of the costs of supervising the building and operation of the mills. However, it appears that disagreements arose and Merricks left to establish the Roslin mills with a new partner John Hay. In about 1820 two nephews of John Merricks went to Scotland to work at Roslin and Hay Merricks & Co continued to operate the mills. They became a limited company in 1876 and were taken over by Curtis's & Harvey in 1898.

*[Based mainly on a letter from Paul Merricks and on entries in The Gazetteer.]*

## INDIAN POWDER MILLS

Wayne Cocroft

I have recently come across a couple of books describing Indian powder mills which I thought may be of interest to members studying foreign factories.

J Braddock, *A Memoir of Gunpowder in which are discussed the Principle of its Proof and Manufacture*, Madras, 1829.

In this volume Braddock describes the process of gunpowder manufacture at the Madras Powder works in the 1820s. The mills were located about 2 miles west of the harbour and an indication of the layout of the buildings, including three magazines, is given on the accompanying enlarged detail of the map of Madras and its environs taken from Plate 41 of *Constable's Hand Atlas of India* published in 1893. (The "Powder Mills" square is about 400 yds across.) Braddock notes at the beginning of the volume that he spent some time at Waltham Abbey before his



embarkation. Throughout the text there are useful references to the practices of manufacture at Waltham Abbey in 1813-14. The incorporating mills at Madras were powered by bullocks turning two gunmetal edge runners (which he terms cylinders) each weighing 4.5 tons. He notes the tendency of the metal bedplates to wear hollow. Within the text are references to three other mills at work in India at this date at Isaphore, Allahbad and Bombay. This book also has the distinction of being one of the few, if not the only *published* account in English describing gunpowder manufacture at this date, if we exclude more generalised accounts in encyclopaedias.

Bound at the rear of Braddock's volume was a memoir by John Stephenson, on the *Manufacture of Saltpetre, Description of the Operations and Proper Plans to be used for the Manufacture of Culmee and Cooteah*, Calcutta, 1835. In this are described the operations in the Government factory at Singhea, Behar Bengal and of the local native producers of the region.

Col William Anderson, *Sketch of the Mode of Manufacturing Gunpower at the Isaphore Mills in Bengal*, John Weale, London, 1862. (See also F W Stubbs, "Sketch of the Gunpowder Works in the Presidency of Bengal", *Proc Royal Artillery Inst*, XIII, 1-14, 1885.)

The earliest gunpowder mills in Calcutta were situated at Bagh Bazar in the northern suburbs of the city against the River Hugli. These were moved about 1770 to Akra 6 miles to the south of the city. The Akra mills were in turn moved to Isaphore, north of Calcutta in the late 1790s. Anderson's account is of particular value as it also contains a number of line drawings illustrating the process machinery. Of especial interest are the grinding mills (fig 1) - these comprise two cylinders of either bronze or gunmetal 6 ft in diameter, with an 18" face, each weighing between 5.75 tons and 6 tons, turning on a metal bed. The mills were 6 ft above the level of the bullock walk to afford some protection to the bullocks and



drivers in the event of an explosion. Anderson also described a new iron mill (fig 2) at the Madras mills set up in January 1853, supplied by Messrs Hall & Co of Dartford. The illustration of the press (fig 3) is also of more general interest, as it is the only diagram I am aware of which clearly shows the operation of a screw press.

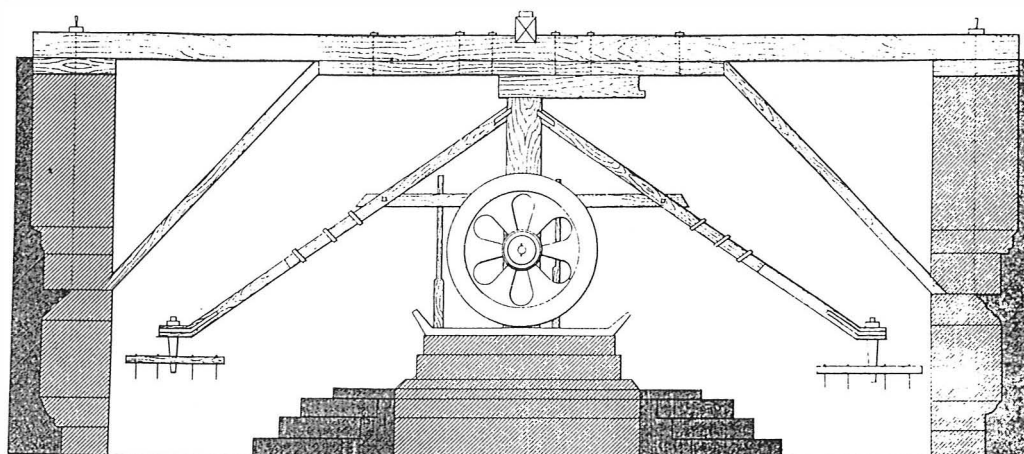


Figure 1. Incorporating or Grinding Mill used at Ishapore.

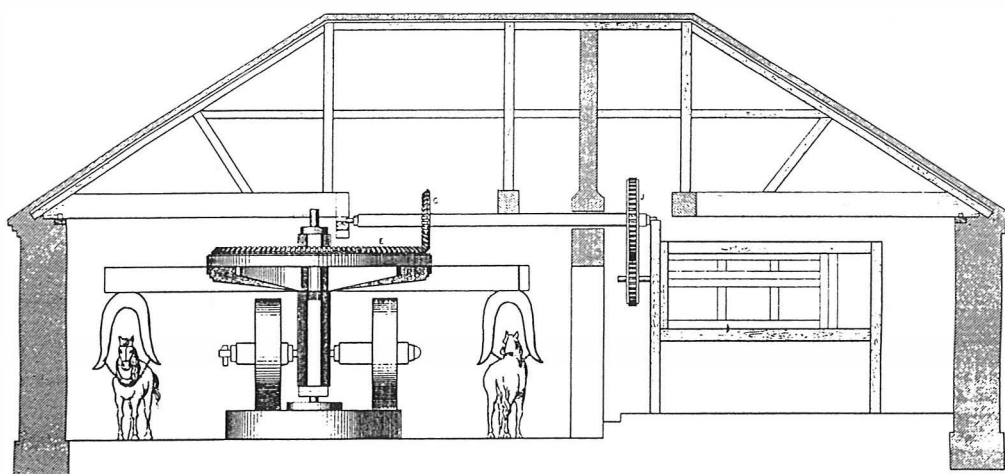


Figure 2. Section of a charcoal or sulphur mill erected at the Madras powder mill in 1853. The equipment at the right is a reel and the runners are about 5 ft in diameter.

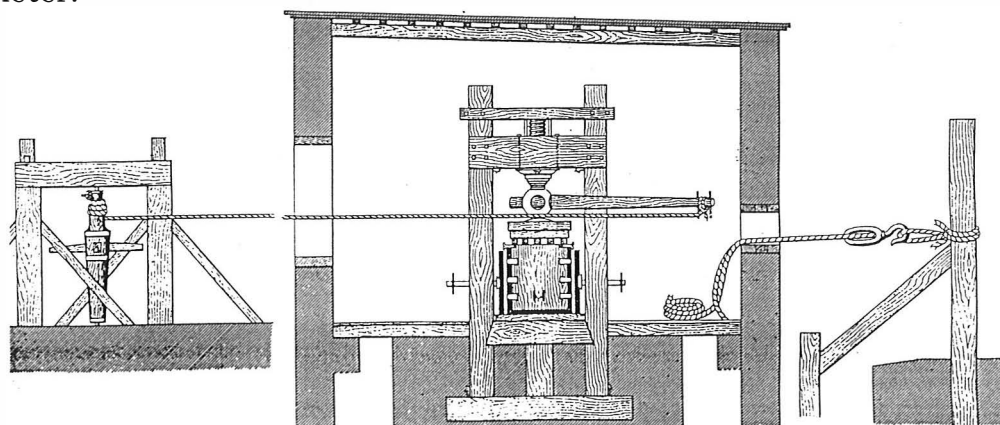


Figure 3. Screw press with capstan at the left.

## 17th CENTURY PRODUCTION COSTS

Keith Fairclough

Amongst the Ordnance records is a memo presented by a private manufacturer, obviously as part of an argument that the price paid by the Ordnance for a barrel of gunpowder is no longer adequate to meet production costs. It is endorsed 'An account of the Chardge of makeing a Barrell of Powder', but otherwise no further information is available, except for a possible dating of late 1670s from surrounding documents. It is reproduced here in full, with original spelling, as it admits of a rare insight into production costs at this period.

## An account of the Chardge of makeing a Barrell of Powder

A tunne of Petre refined will make between twenty nine or thirty Barrells Tower Proffe

## The charge of making a Barrell of Powder

The Powder makers have formerly made it, one for another, at ten Shillings a Barrell Tower Proffe, thirty Barrells to a Tunne and this hath been done since ye honble Comissioners coming standing to all hassords of fire and water, but I conceave yt this is not now to be done, as the Proffe is, and the rates of materials are

## The perticulers of ye Charge of a Barrell of powder followeth

li	s	d	
0	0	10	A Barrell for cariadge, to sume workes more to sume workes less but this rate I give as a meadium wherein is included ye Cariadge of Petre & Sea coall
0	2	00	A Barrell for Brimstone admiting Brimstone to be 18li a Tunne att this rate there is 4li, allowed in ye hundred for waste wch if ye brimstone be well refined, is sufficient, Brimstone refind and in roll hath been sould att 12li a Tunne since his Maties ristoration
0	1	00	A Barrell for Charcoal admiting yt every Sack of Coales makes 32li of boulded Coall; every Sack is to be 3 bushells and if any brans to be exchanged the price of a Sack is 2s at ye dearest, there are 60 Sack contained in a load in this rate of 1s a barrell there is not accounted the Charge of the grinding and boulding nor is the grinding and sifting of brimstone any parte of ye 2s they are cleard in ye perticuler of workmens wages hereafter expressed
0	1	00	A Barrell for Rent so admiting the worke makes 80 barrells a weeke it is 208li a year I conceave yt halfe may be sufficient which is 6d a barrell; in ye rate of this perticuler at 6d a barrell thare is allowed 14li more then the true vallue of the land and 90li for intrest of the money expended in building of ye Mills for 80 barrells

- 0 1 00 A Barrell for repaires which at 80 barrells a weeke is 208li a yeare, as is fir rente, aforesaide I conceive yt 6d a barrell is sufficient including the repaireing of Stone Sives
- 0 0 06 A Barrell for Seacoale and Tower Chardges for the Proffe only, admiting Seacoall to be at 1li a Chaldron their being no refining
- 0 1 06 A Barrell for Workmens Wages which is at 80 barrells a weeke is six pound which at 10s A weeke a peece doth pay 12 workmen but I conceive that ten workmen may be suffitient there being no refining
- 0 0 01 A Barrell for Candles Soap Tallow Broomes boulting baggs Brimstone Sives and Corneing house Sives, 1d at 80 barrells a week is 17li 6s 8d ye yeare
- 0 0 01 A Barrell for horse meat yt Grindes the brimstone & Charcoall. Perhaps there may be 2d or 3d a barrell demaunded more for Charcoall but what I write be fore is true

There is nothing in these particulars for powndage and other Charges which will come to as I conceive to 8d a barrell

In all these particulers above exprest there is not any thing gott but what is above in ye rent and repaires and no consideration for hassords of fire and water and hinderances for want of worke and by frosts and floods

Source: PRO, WO 55/1756, part.

## GUNPOWDER AGENT IN DURHAM

NATIONAL TELEPHONE NO 3017.  
TELEGRAPHIC ADDRESS.  
(REGISTERED)  
"AINSLEY DURHAM."

BOROUGH STEAM PRINTING WORKS & MUSTARD MILLS.  
WADDINGTON STREET, NORTH ROAD,

*Durham, Nov 1898*

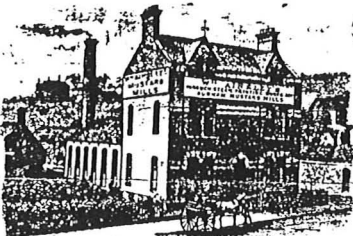
*M<sup>rs</sup> J. H. Calvert Buffalo's Head*

*Bo. of William Ainsley & Bro. Ltd.*

COPPER-PLATE,  
Letter-Press & Lithographic Printers,  
BOOKBINDERS, MANUFACTURING STATIONERS &c.

BOOKS MADE & RULED TO ANY PATTERN AND TO OPEN WELL.

AGENTS TO THE ELTEWATER GUNPOWDER COMPANY, AGENTS FOR BICKFORD SMITH & CO'S SAFETY FUSE, AGENTS FOR HILL EVANS PURE MALT VINEGAR.



The above heading of an invoice, used by William Ainsley & Bros Ltd of Durham in 1898, has been sent to us by **Tom Hay** of Darlington, a member of the Wind & Watermill Section of SPAB. Note that the Ainsleys were printers, mustard millers and Agents to the Eltewater Gunpowder Co and for Bickford Smith & Co's Safety Fuse.

**WEEDON GUNPOWDER MAGAZINES****Alan Crocker**

In 1986 I visited the Weedon Ordnance Depot in Northamptonshire on a tour organised by the Association for Industrial Archaeology. The Depot was erected at the time of the Napoleonic Wars and was also an emergency seat of government and had accommodation for the royal family. It had quarters for officers, barracks for the men, eight large store houses for arms, a hospital, a prison and four large magazines for gunpowder. All of these buildings were very grand. The site was strategically located near the intersection of the A5 and the A45 and close to what was then known as the Grand Junction Canal. Indeed a branch of the canal, 1156 yds long, was built to service the site. The Depot was closed in 1965, was eventually offered for sale in 1984 and is now in private ownership.

When I visited the site, some of the buildings had already been demolished and the rest were subject to redevelopment plans. However, the magazines, which are grouped in a row, were still intact. Each measures roughly 60 ft by 48 ft and has a single span arched roof, perhaps 20 ft high, covered with a thick layer of soil. They were separated from each other and from the rest of the site by traverses about 80 ft long. I was able to go inside the magazines but there was no lighting and it was impossible to record any details.

I have been reminded of this visit through reading an article on "Weedon Military Dock" by Hugh Compton and Alan Faulkner in *The Journal of the Railway and Canal Historical Society*, vol XXX (part 6), no 149, pages 263-270, November 1991. This naturally gives details about the construction and special features of the canal branch but, in passing, provides information about the storage and transport of gunpowder. An Act was passed in 1803 for building the depot but it was not until 1806 that authority was obtained for constructing the magazines. The canal, which was given masonry walls, was extended at the same time and the work effectively completed by 1810.

In 1838 the London to Birmingham railway opened and crossed the entrance to the branch canal by means of a rolling iron bridge. Also in 1845 it was suggested that a branch railway should be built into the depot but the resident engineer said that the canal could not be given up until all the railway companies would permit the carriage of arms, ammunition and gunpowder. These were all being brought into and out of the depot by boat. In 1852 three boats loaded with 600 barrels of gunpowder were delayed at the bridge for nearly two hours. This was part of a major movement of 5,000 barrels by canal from Purfleet. When, in 1874, a barge carrying gunpowder exploded on the Regent's Canal, the authorities at Waltham Abbey were prompted to examine the method of transporting gunpowder to the Weedon Depot. At the time it was carried in barrels in special Government barges down the River Lee, and then up the Thames to the Grand Junction Canal at Brentford. There it was transhipped to ordinary narrow boats. The possibility of using the special barges all the way to Weedon was explored. This would have been possible apart from entering the Depot, as the branch canal beneath the railway bridge was only 7½ ft wide and the barges were 13 ft wide. Eventually in 1888 the railway was diverted. However boats continued to serve the Depot and in 1892 the canal company reduced the tolls on arms and ammunition being

carried to Weedon by Henry Warlow & Co of Brentford. This firm had several boats built specifically for gunpowder traffic but there was no reduction of tolls on gunpowder in barrels. Fellows, Morton & Clayton Ltd of Birmingham also had special gunpowder boats. These carried two red warning flags. At one time they were not allowed to use the tugs at Blisworth tunnel and had to "legged" through.

If any readers have more detailed or more recent information on the Weedon magazines I would be grateful to hear from them.

## GUNPOWDER MAGAZINES IN 1801

Bill Curtis

I have recently obtained a first edition of *The Little Bombardier and Pocket Gunner*, published in 1801 by T. Egerton at the Military Library, Whitehall. Although anonymous, the author was Ralph Willett Adye, Royal Artillery. There were a number of later editions including an American version and it was the forerunner of a series of similar works appearing throughout the nineteenth century.

Under the heading "Magazines", there is a good description of the permanent magazine to store a maximum of 94,800 lbs in piles of three barrels each. Any greater pile would destroy the barrels, damage the powder and lead to accidents.

"According to Vauban's plan, powder magazines are commonly made 10 fathoms long (60 feet) and 25 feet wide, in the clear. The foundation of the longest sides, is 9 or 10 feet thick, and 6 feet or more deep, according to the nature of the ground. The side walls raised upon these are 8 or 9 feet thick; and if there is not an upper story, 8 feet will be sufficient height above the foundation. By this means the flooring may be raised above the ground, free from damap, and there will remain 6 feet from the floor to the spring of the arch. The arch is formed of layers of bricks, arched one over the other, and ought to be three feet thick at the top. The exterior surface of the arch terminates with an angle at top, like a roof, which angle must be of such magnitude as to make a thickness of 8 feet over the key-stone of the arch. The foundation of the gable ends is 5 feet thick, and the same depth as the sides; these ends are built up 4 feet thick, from the foundation to the top of the roof. The long sides are supported by counterforts, 6 feet thick and and 4 feet long; and placed 12 feet asunder. The ventilators are placed, one in the center[sic] of the counterforts, and are made with a die across them of 1½ feेत. These ventilators are also closed with plates of iron. The magazine is lighted by a window in each end, high up, which are opened and shut by means of a ladder. These windows are secured, each by two shutters, made of plank 2 or 3 inches thick; and the outer one covered by sheet iron, and both fastened with strong bolts. The entrance to the magazine is closed by two doors, one of which opens inwards, and the other outwards; the outward one covered with sheet iron. The entrance of the magazine should, if possible, be placed towards the south. A wall of 1½ feet thick, and 10 feet high, is built round the magazine, at 12 feet distance."

## HOW LONG HAS IT BEEN "BLACK POWDER"?

Bill Curtis

Not long ago it was suggested to me that the expression "Black Powder" is a recent one, probably of American origin and dating from the re-establishment of muzzle loading as a sport and hobby. This was difficult to accept and so I went on a brief trawl through the written evidence to try to find the earliest use of the term. It soon became clear that prior to the introduction of smokeless powders there were only two commonly used names for the explosive so familiar to all of us. These were "Gunpowder" or more simply "Powder". Its blackness went without saying as there was nothing else with which to compare it.

However, by 1890 "Black Powder" had firmly arrived, although the expression "Black Gunpowder" was used alongside it and lingered on well into the 20th Century. The question then was to arrive at the earliest references. The famous sporting author, Sir Ralph Payne-Gallwey, in his *Letters to young shooters (first series)*, 1890, has a chapter starting on page 198 headed "Letter XVI - On the loading of game-guns - powder - black powder and nitro compounds", in which he speaks frequently of "black powder". John Henry Walsh (Stonehenge) in *The modern sportsman's gun and rifle* of 1882 speaks mainly of "black gunpowder" but also uses the term "black powder". Colonel Cundill's *A dictionary of explosives* (2nd edition, 1895) gives under the reference 85.I on page 15 the definition "Black powder is ordinary gunpowder".

William Wellington Greener, the prolific Birmingham gunmaker and book producer, in an undated (c1890) German translation *Die jagdflinte der neuzeit* of his *Modern Shotguns* (of 1888) has "Schwarzpulver", literally "black powder" and "shooting powder". In 1881, the same author in his monumental *The gun and its development* (1st ed) refers to "black gunpowder" and mentions an Act of Parliament limiting the holding of Schultze Powder to only 15lbs in premises otherwise licensed to hold 50lbs of black gunpowder and forbidding the holding of more than "15lbs of black and Schultze Powder mixed". On page 322 he states "Black powder, generally speaking, has a real specific gravity of about 1.720 ...". Again quoting Greener, in the 1874 edition of *Modern Breech Loaders*, page 94, "trials of Schultze's sawdust powder against black gunpowder" we have "With the Boxer Enfield, Schultze penetrated three and a half boards; black powder five boards; at fifty yards".

The man who introduced Schultze Powder into the United Kingdom was the Scottish gunmaker, John Dalziel Dougall, who uses the term "black powder" in his *Shooting: its appliances; practice; and purpose* of 1875 where, on page 137 we find, "Should the days of the old black powder be numbered, ...". However, the earliest reference that I can find easily is from 30th March 1868, when Dougall gave a talk to the United Services Institution on the subject of "Schultze's granulated-wood gunpowder" in which he referred frequently to "black powder". This talk is reproduced in volume 12 of the Proceedings of the Institution.

The only conclusion that can be reached, therefore, is that the term "black powder" appeared simultaneously with the arrival of smokeless powders.

**INSTRUCTIONS FOR MAKING BLACK POWDER, 1776**      **Robert A Howard**

The following account was written by Henry Wisner (1720-90) for the Committee of Safety of New York (American Colony) in 1776.

"Gunpowder is composed of nothing more than the four plain simple articles, Saltpetre, Brimstone, Charcoal and Water. The three first of which are to be made as fine as possible, so as to be sifted through a gauze sieve, or fine bould, as fine as common flour. But it being difficult to make the Saltpetre all fine, those parts that will not be easily got through the sieve, must be dissolved in soft warm water, then let the Sulphur, Saltpetre, and Charcoal, be each separately weighed. Take of the Saltpetre an hundred weight, of the Sulphur fifteen pounds, and Charcoal eighteen pounds, and in that proportion for any greater or smaller quantity. This being done mix them all well together in some large vessel, such as a potash or any other kettle, and when all mixed, moisten the whole with the aforementioned nitrous water, till it is as moist as dough for making bread. Then put an equal quantity in each mortar, and pound it well for at least twenty hours; and as the paste by pounding will naturally grow dry, it must be kept moist by putting in a little of the said water, and when pounded sufficiently take it out of the mortar, and put it in some tub, or any other proper vessel. As to the graining, it must be done in the following manner, viz. Have a box made about five feet square, the sides eighteen inches deep, the bottom tight, and top entirely open; fix across the box two rods or laths near the middle, about four inches below the top, and about ten inches apart, then have six sieves made of wooden splits, in the same manner as a wheat riddle, but much finer, the coarsest should be as fine as a cockle sieve, or little finer, and so each sieve to increase in fineness till the last is as fine as possible. I believe it were best to make the two coarsest of wire; then take about a quart of the paste, put it into the coarsest sieve, set the sieves on the two rods that are fixed across the box, then work the sieve with a circular motion, which will press the paste through the sieve in large and unshapely grains, and when a considerable quantity is passed through, then sift it over again in the next coarsest sieve, and so till the grains are fine enough. The last sieve must be so fine, that whatever passes through it will be too fine for Powder, and is to be worked over the next back [sic]. As the paste will naturally roll together in large round balls, when worked in the sieve, a board must be made near as large in circumference as a common pewter plate, and about one inch thick on the center, declining to the edge, of some hard wood turned in a lathe, and as smooth as possible. This board must be put into the sieve among the paste, which breaks the lumps in pieces, and the paste through the sieve.

When the Powder is well grained in the manner directed, it must be rolled in a barrel, the inside of which is to be made as smooth as conveniently may be, with as small a door cut in one side, capable of being shut tight, and the barrel to be fixed so as to be turned by the shaft of the mill. Put in a few pounds at a time, and let it be rolled as above, which will make the Powder smooth; then sift it in the finest sieve, till the fine parts that work off in the barrel pass through the sieve, which is to be returned again into the mortar. The Powder must be put in flat trays or dishes, and set by to dry either in a small room kept warm with a large stove, or, if the weather be dry, in the shining of the sun."



**Ken Major** has sent us a coloured copy of the print reproduced here. It is entitled "Powder Mills, Waltham Abbey", was drawn and engraved by Ellis for Dr Hughson's *Description of London* and was published by I Stratford in 1808. The print is probably well-known and is certainly mentioned on page 24 of *The Royal Gunpowder Factory, Waltham Abbey, an RCHME Survey 1993*. However I had not seen it previously and enjoyed comparing it with Farmer's 1735 print of the mills, drawn from roughly the same viewpoint (see for example Glenys Crocker's *Shire Album, The Gunpowder Industry*, pp 16-17). The most significant feature of both prints is the hill in the background, which I have never noticed on my visits but according to the Ordnance Survey it is still there rising some 200 ft above the river. Also Farmer's horses in the left foreground were still there 73 years later but his cows have been transformed into sheep. By 1808 some rather substantial Government buildings have appeared at the right but most of the buildings, although engraved in less detail look very similar to Farmer's. No waterwheels are shown although Farmer clearly shows two. Presumably therefore most of the small buildings are horse mills and indeed they lie along the watercourse known as the Horsemill Stream. A feature of the 1808 print is the rather puzzling series of six tall posts near these buildings. Farmer only has one of these from the top of which is flying a flag, no doubt a red flag!

#### OPEN UNIVERSITY FILM 197: "THE EXPLOSIVES INDUSTRY"

**Gerry Moss** has obtained information about this TV film, including the Programme Sequence List kept by the Open University library. It has the code AST281/08, appears to have been made in 1973, lasts 24 mins 19 secs, was produced by Jim Stevenson and has a commentary by Colin Russell. The summary is as follows: "The history of the high explosives industry is outlined, manufacturing processes



described and illustrated, and the importance of the explosives industry to the 19th and 20th centuries assessed." The film was recorded at Waltham Abbey and Ardeer and includes: fuse being pushed into a stick of gelignite which is later exploded, a description of the manufacture of gunpowder, an explanation of the purpose of pieces of equipment preserved at Waltham Abbey, a brief history of gunpowder, the chemical structure of gunpowder and what happens chemically when it explodes, demonstration of explosion of uncompressed gunpowder, the danger of explosives manufacture, continuing gunpowder manufacture at Ardeer, credits against a background of a powder mill in operation. These topics appears to occupy about 20% of the film, the rest being on nitro-glycerine, nitro-cellulose, Lyddite, TNT, Nobel's life, constructing the Panama canal, quarrying and mining operations. It is hoped that this film can be shown at a future Group meeting.

### **EXPLOSIVES IN THE SERVICE OF MAN: THE NOBEL HERITAGE**

As announced in Newsletter 17, page 7, a symposium with this title is being held at the Moat House Hotel, Glasgow, on 9-11 December 1996 (now starting one day earlier) to commemorate the centenary of the death of Alfred Nobel. The most recent leaflet on the meeting announces 18 lectures, including Dr J Jeacocke of Exchem PLC speaking on "The Gunpowder Era" and Mr J E Dolan of the Royal Society of Chemistry on "The Nobel Era". The other talks are on modern aspects of high explosives. The registration fee, including the banquet in honour of Alfred Nobel, will be about £200. Further information will be contained in a circular available in April 1996. This will be obtainable from Elaine Wellingham, Field End House, Bude Close, Nailsea, Bristol BS19 2FQ, tel 01275 853311.

### **REVIEW**

**Paul Wilkinson, *Powder Punts from the Royal Faversham Powder Mills and the Royal Gunpowder Factory at Waltham Abbey. Project Report, 38 pages, 21 illustrations, 28 references, November 1995.***

**Arthur Percival** has sent us a photocopy of this report which has been deposited at the Fleur de Lis Heritage Centre at Faversham and Faversham Library. It explains the development of the gunpowder punt, mainly at Faversham but touching on developments at Waltham Abbey. A description is then given of the excavation and recording of one of the five punts examined by the Nautical Archaeology Society (NAS) at Waltham Abbey and also of a punt discovered at Faversham. A structural analysis of the two punts is included and a comparison made with other historical material. The paper contains a great deal of fascinating specialist information which I found absorbing. In particular the author convincingly interprets features of the photograph of the two punts on the mill stream at Chilworth, published in Glenys Crocker's Shire Album *The Gunpowder Industry*, that we had completely overlooked. I now look forward to seeing the official NAS report of its survey of all the punts and other craft discovered at Waltham Abbey.

*Alan Crocker*

## REVIEW

**E M Patterson, Blackpowder Manufacture in Cumbria, A4, card covers, xiv + 52 pp + 9 plans, ISBN 0 900532 84X, ISSN 0014-892X, Faversham Papers No 43, Faversham Society, 1995. £2.95 + £1.00 p&p from Fleur de Lis Heritage Centre, 13 Preston Street, Faversham, Kent ME13 8NS.**

All members of the Group should obtain a copy of this book which, like all Faversham Society publications, is incredibly good value. The Society should also be commended for publishing a specialist book on an area remote from Kent, but they are of course very proud of their role in the history of gunpowder manufacture nationally. Ted Patterson is an authority on the history of gunpowder who worked for many years at Ardeer. He has therefore had access to information about the history of the gunpowder industry that is not available to others. Also, when the last gunpowder mills in Cumbria closed during the 1930s, some workers were transferred to Ardeer. Ted therefore has had direct personal contact with these key people and has been able to collect a wealth of information about the Cumbrian mills.

However, in writing this book, Ted Patterson has relied heavily on two sources of information. The first is the well-known article on "The North of England Gunpowder Group", published in the ICI Magazine in 1929. This is reprinted as Chapter 1 of the book (6 pages). However, the original contains ten important photographs of the factories, workers, equipment and documents and eleven unimportant portraits of managers, and these have not been reproduced. This should have been explained. The next chapter is on the raw materials, charcoal, sulphur and saltpetre, as used in Cumbria. It goes into considerable detail including, for example, the influence of charring temperature on the yield, carbon content, density and spontaneous inflammation temperature of charcoal, and the differences between potassium nitrate and sodium nitrate and the method of converting the latter into the former.

Chapters 3 to 9 are devoted to the seven Cumbrian gunpowder mills: Old Sedgwick, Basingill, Lowwood, Elterwater, Gatebeck (High and Low), New Sedgwick and Blackbeck. Each of these is accompanied by a plan of the buildings beautifully redrawn by Jack Simmons of the Faversham Society. Unfortunately however, the sources of these plans are not given, most of them are undated and they are presented completely independently of the text. In the case of Old Sedgwick, for example, two plans were available, one of which, with a key to 18 buildings, was the basis of the text and the other, with 20 buildings labelled differently, was used for the accompanying illustration. This is unnecessarily confusing.

Much of the information in the descriptions of the individual mills comes from the second main source, the Manufacturing Method Books of about 1930, which have not been published previously. They give very detailed information about the technical procedures, suited to local expertise, equipment, traditions and of course the type of powder being made, which were used in each mill. Each process is described in turn. For example, at Gatebeck we have: raw material preparation including sieving, mixing, milling (2½ pages), pressing (2½ pages), glazing, reeling, pellet pressing, stoving, dusting and sizing, packing. As an example of the detail provided the first paragraph on "Mixing" at Gatebeck is reproduced here.

"In the Low Works mixing was done in Building 22, in which there were three hexagonal drums, belt driven from a shaft connected with the grinding mill. Finally only two mixing drums were used. Each drum was divided by a wooden partition so that there were four compartments for the mixing operation. There were neither forks nor bars inside the drums, only a central shaft. The drums had a length of 4 ft and the sides were 10 in wide. They turned at 15-20 rpm."

The final chapter is a list of 37 accidents including lightning strikes. There then follows three appendixes, the first of which gives monthly gunpowder production at Faversham, Ardeer, Gatebeck, Lowwood, Sedgwick and Roslin between March 1934 and December 1937. Appendix 2 on "Nomenclature and Grain Sizes" is by the late C E Sosson and is very useful. It summarises many of the confusing letters used by gunpowder manufacturers such as LGB (Large Grain Bright), SGD (Slate Grey Dense), LDA (Light Density African), CB (Cannon Bright) and CG (Coarse Grain). It also gives the grain sizes of over 60 named types of powder in terms of the range of mesh sizes used in the sieves. For example "Colonel Hawker (Punt Gunpowder)" was 8 x 10, meaning that the grains were between 0.062 and 0.500 inches across. Finally it discusses "Small Packing", meaning canisters of various shapes, card cases and calico bags. The third appendix is on "Gunpowder Terminology" and reproduces with three minor additions exactly the same text as published by Ted Patterson previously in his article in *Industrial Archaeology Review*, 8 (part 2), pp 215-16, 1986, and in his earlier Faversham Paper 27 entitled "Gunpowder Terminology and Incorporation". This is no doubt convenient for readers of the present account but again should be stated clearly.

So, this is a publication crammed full of facts, which will be of great interest to enthusiasts of gunpowder technology in about 1930, but is by no means a coherent account of the gunpowder mills of Cumbria. Indeed, as the title states it is about manufacture and not other aspects of the study of the gunpowder industry. It needs to be matched with other studies, particularly of the industrial archaeology of the sites, in order to obtain a more satisfying account of the industry in the Lake District.

*Alan Crocker*

### **Winifred N Scott: *Coryton - The History of the Village*, Mobil Oil, 1981**

Members with an interest in later chemical explosives may like to know that this 47 page booklet on Kynochtown, later Coryton, is still available from Thurrock Museum. Although it tends to concentrate on the social history of the factory and the village of Kynochtown, it does nevertheless contain many fascinating photographs of the factory. These include one of my favourite images of the industry, showing a rose garden complete with a gardener and lawnmower in front of the cordite ranges! Unfortunately the book gives no more detail about the nature of the black powder section within the works mentioned by Clifton A Kelway in his article "Kynochtown - A Great Explosives Factory on the Essex Marshes", *Essex Review*, 16, pp 112-121 (see page 116). The book is available for £1.95 (plus £0.60 p&p) from Thurrock Museum, Thameside Theatre, Orsett Road, Grays, Thurrock, Essex RM17 5DX (cheques payable to Thurrock Council).

## REVIEW

**Peter Edwards, "Gunpowder and the English Civil War", *Journal of Arms & Armour*, vol xv, no 2, September 1995, pp 109-131 (incl 125 refs).**

To the early 17th century English, after a period of relative peace, the massive use of firearms in warfare was a new idea, though a generation before they had been used in the Netherlands against Spain and more contemporaneously in Europe in the Thirty Years' War. The longbow, arguably a more proficient infantry weapon than the slow firing smooth-bore firearm (of whatever calibre), required a lifetime's training and practice for effective use and had been put aside.

The firearm most commonly in use was the matchlock musket, requiring a coil of match and some notice to light it. Certain specialist troops, such as mounted dragoons and baggage guards, bore firelocks using flints and cavalry used heavy pistols of wheel-lock, snaphaunce or flintlock design. The artillery employed a great variety of guns from small field pieces to great siege weapons. All used black powder as a propellant. It was the hitherto unknown massive requirement for this commodity, which caused the trouble.

Of the ingredients of gunpowder - saltpetre, charcoal and sulphur - only the second was widely available locally in quantity and both protagonists were forced to look abroad, either for the manufactured commodity or the raw materials.

The great problem was one of procurement, but this was not an even one. The Parliament gained from centrality and from the possession of London, a large port close to continental sources of supply. The Royalists, spread in a rough circle round East Anglia and the Home Counties, were forced to rely on shallow water ports in the North East and South West. They were also less reliable debtors on account of fewer resources, which bred distrust in their suppliers. They were fortunate, however, in having the Queen, domiciled in France for the greater part of the War, as an enthusiastic procurator and advocate.

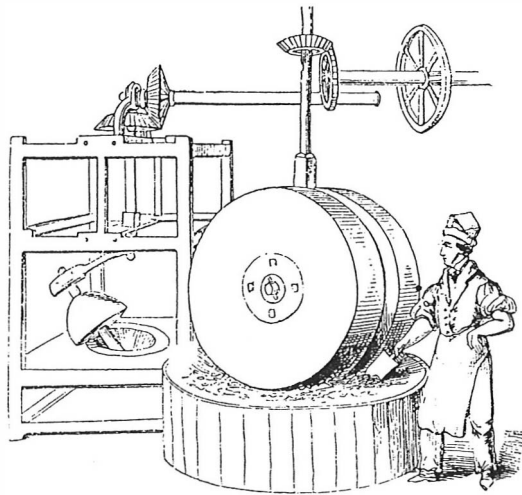
The Parliament also gained from possession of existing national sources of manufacture in Surrey, Kent, Middlesex and Essex, though the large manufactory at Chilworth was successively slighted by both sides during the Royalist advance on London and later retreat, in 1642. The Royalists started a mill at Osney, Oxford and later others in the Midlands, but were always relatively short of powder, which often rendered their many defensive sieges quite short-lived.

This fascinating study, limited as it is to one vital war material, touches upon the other great economic factors which made the eventual issue of the War, unless the King had obtained the quick victory he sought in 1642, an ineluctable certainty.

Peter Edwards' most interesting article is based on a paper given at the Gunpowder Mills Study Group's annual conference, held in the Institute of Historical Research in October 1994.

*John Fricker*

## GRINDING MACHINES



The illustration reproduced here appears on page 133 of George Dodd's *Days at the Factories*, published in London by Charles Knight in 1843 and reprinted by Augustus M Kelley of New York in 1967. The accompanying text is as follows: "The mills are provided with two different kinds of grinding-machines, such as represented on a small scale in the figure. In one of them a pair of cylindrical stones, several feet in diameter and a foot or more in thickness, are set up on edge on a slab or bed beneath, and have then a twofold motion given to them, resembling that of the

wheel of a carriage which is going round in a small circle. By means of a horizontal axis passing through the centre of the stones, the stones wheel along the surface of the bed; and by giving to the axle itself a motion round another but vertical axis, the stones are carried round in a small circle. The [charge] to be ground is laid on the bed or support, and the broad edge of the heavy stone passes repeatedly over it, by which the particles are reduced to powder. In the other form of grinding mill the [charge] is put into a kind of cell or mortar, in which it is ground by a pestle moved in a singular manner. The pestle is connected with a set of jointed arms or levers, so adjusted one to another as to give to the pestle a motion best calculated to effect the grinding of the snuff."

The word "charge" above has of course been substituted for "snuff" in the original but the account has not simply been reproduced to tease gunpowder historians. The water powered Helsington Laithes snuff mill, on the River Kent just downstream from Kendal closed in 1992. We were able to visit it a few times before it closed and the snuff-maker told us that during the 19th century, some of the equipment at the mill came from a gunpowder mill in Scotland. He thought that it was mortar and pestle type equipment, similar to that described above, and we did not take the story very seriously. However it seems that it might have been edge runners, although there was no sign of edge runners at the mill when we visited. Also, as gunpowder was made by hand using the mortar and pestle technique in the medieval period, one would have thought that water- or horse-powered mortars and pestles would have been the natural equipment to have adopted when the process became mechanised. Does anyone know of any evidence for this?

*Alan Crocker*

**Glenys Crocker, *The Gunpowder Industry*, Shire, Princes Risborough, 1985**

This booklet is now out-of-print and Glenys has no immediate plans to prepare a new edition. However she has eight copies left and these are available at £2.25 plus £0.50 p&p. Address on back cover.

## NEW GUNPOWDER MILLS NEAR PLYMOUTH

We are indebted to Tom Hay of Darlington for providing us with a copy of the following advertisement in *The Sherborne and Yeovil Mercury* of 20 September 1819.

"Messrs Cook and Co beg to inform their friends and the public, that they obtained a licence, at the last Quarter Sessions, for the County of Devon, for the erection of new GUNPOWDER MILLS, and other Engines for making gunpowder, and for a Magazine for keeping unlimited quantities of Gunpowder, on spots of land most eligibly situated for land and water carriage, and combining other unparalleled advantages, too numerous to be inserted in this note. Their connexions are most extensive, and a ready sale of two tons per week can be depended on. The business and buildings, therefore, requiring a larger capital than they can command, they propose dividing the concern into 100 shares (of which 60 are already taken), at 50l a share, to be advanced by five instalments, the last at the end of eighteen months; and consequently offer the remaining shares to those inclined to partake in this rare and advantageous opportunity of investment. The annual consumption of Devon alone is calculated at 347,000 lbs which, at the current prices, is about 12,000l, and can, from these mills, be rendered ten per cent under the present prices, and then leave a profit of twenty per cent, to the concern. The plans, statements, and calculations, may be viewed at the company's office, No 10, Lower Broadstreet, Plymouth; where further particulars may be obtained. -Letters to be post-paid.

W P Cook for Cook and Company.

September 1st 1819 - This advertisement will be inserted only this time."

## EARLY USAGE OF THE TERM "GUN POWDER"

Bill Curtis

*The Rise and Progress of the British Explosives Industry*, Brayley Hodgetts (ed), (Whittaker, London, 1909) quotes, on page 180, a 1338 document which mentions *un petit barrell de gonpoudre le quart plein* (a small barrel of gunpowder a quarter full). In 1404 (page 181) the spelling is "gunpowdre" and in 1456-58 (pages 182-3) "gunne powdur". There is also reference to the use of the term "pellet-powder" in 1449 (page 182), which is given in the Latin of the period as *pulveris librillarum*. The impression given by this term, in my view, might be misleading as the pellet referred to is not an indication of the corning or pelletisation of the powder, but of the projectile, for which the term pellet was in use at the time. *The Oxford English Dictionary* mentions 1339 as the first instance of the use of this word for a projectile. *Librillarum* is the Latin word for both a beam and a sling and, in this context, means a projectile engine. Hence *pulveris librillarum* means powder for projecting pellets and does not suggest that the powder is in any way some alternative form of the common gun powder of the period. In writing this I am assuming that Hodgetts was perhaps misled because pellet powder was a common term in the second half of the 19th century.

[ I am indebted to Wayne Cocroft for these early references.]

**SALTPETRE BANK, WHITECHAPEL, LONDON****Keith Fairclough**

An inventory of the powder business of Philippa and John Walton in 1732 notes a 'Brimstone Yard and Sulphur House in Rosemary Lane', a road leading eastwards from the Tower of London. Detailed contemporary maps do not indicate this manufactory, but do show a 'Saltpetre Bank' on the south side of Rosemary Lane near Well Close Square. This appears on William Morgan's 1682 map of London, and on a map in John Strype's 1720 edition of Stow's *Survey of London*. The saltpetre bank stood in the parish of Whitechapel, but Strype's map suggests that a lane in Wapping that led to it was also known as Saltpetre Bank. The maps also suggest that it was an open space surrounded by buildings with an access road on one side. John Rocque's map of London of 1746 has the road Saltpetre Bank but the site shown on the earlier maps seems to be occupied by a glasshouse. The site does not appear in the couple of standard reference works on London that have been consulted.

If the feature is named after its function, then could this possibly be an area where unrefined saltpetre imported by the East India Company or other merchants was taken after unloading, and/or an area where the Ordnance Board stored its saltpetre before delivery to the gunpowder producers. Before the Civil War domestic saltpetre manufacturers often delivered directly to the Evelyn family or whoever else held the gunpowder monopoly, but after the Restoration the Ordnance purchased saltpetre from the East India Company and then delivered it to the contracted gunpowder producers. A store for the imported saltpetre would be needed and the Saltpetre Bank, close to the Port of London and the Ordnance headquarters at the Tower, would have been an ideal location.

Has anyone any other suggestions or information about this Saltpetre Bank which could confirm or disprove the above? Also, is anything known of any nearby saltpetre refining activities?

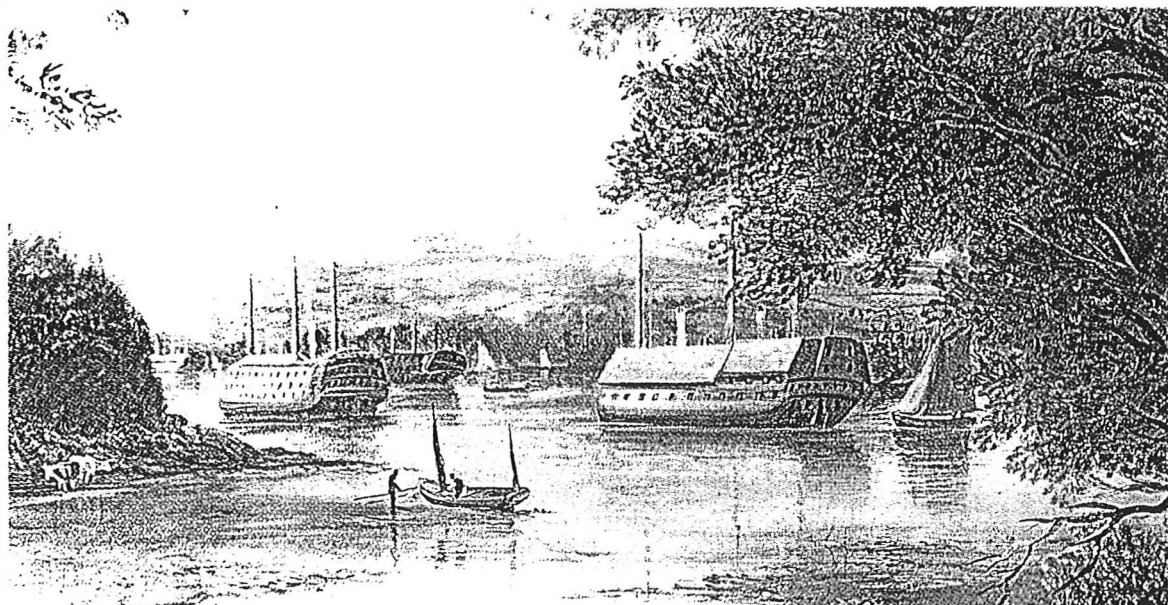
*[Rosemary Lane and Saltpetre Bank are now called Royal Mint Street and John Fisher Street. The actual saltpetre bank was, approximately, at NGR TQ 341808.]*

**MARKING OF POWDER BARRELS IN 1801****Bill Curtis**

In his *The Little Bombardier and Pocket Gunner*, (London 1801), Adye states:

"The different sorts of powder are distinguished by the following marks on the heads of the barrels:- All gunpowder for service is mixed in proportions according to its strength, so as to bring it as much as possible to a mean and uniform force. This sort of powder is marked with a blue LG. and the figure  $\frac{1}{2}$  [1,2?] or with FG. and the figure 3, whose mean force is from 150 to 160 of the eprouvette. This powder is used for practice, for experiments, and for service. The white LG. or FG. is a second sort of powder of the quality. It is sometimes stronger, but not so uniform as the blue LG.; it is therefore generally used in filling shells, or such things as do not require accuracy. The red LG. FG. denotes powder made entirely at the king's mills, with the coal burnt in cylinders, and is used at present only in particular cases, and in comparisons, and to mix with other sorts, to bring them to a mean force. The figures 1, 2 or 3, denote that the powder is made from saltpetre obtained from damaged gun-powder; 4, 5, 6, from saltpetre obtained from the grough."

## POWDERSHIPS ON THE HAMOAZE



This is the title given to an oil on canvas painting of about 1840-50 by an unknown artist, which is on display at the Plymouth City Museum and Art Gallery. The original measures 71 x 92 cm and the detail shown here about 24 x 46 cm. The Hamoaze is the name given to the inlet of the sea immediately to the west of Plymouth. The painting shows four wooden sailing ships, each with three masts but no spars, which according to the title were gunpowder magazines. The hulk in the right foreground has five or six tiny figures on top which suggests that the small sailing vessel or hoy to its right may be delivering or collecting gunpowder. On the original this hoy has red-tinted sails. Behind each of the two hulks in the foreground there are pairs of short, thick, white posts, which are rather puzzling. They seem too high to be moorings but perhaps that is because the tide is out.

We were not aware previously that there were floating magazines at Plymouth but it is not surprising. If anyone has further information about them or can interpret the painting more fully please let us know.

*[Thanks to John and Mary Day of the Surrey Industrial History Group who sent us a home-made Christmas card with a reproduction of the painting on the front.]*