

Gunpowder Mills Study Group

NEWSLETTER 17, AUGUST 1995

MEETING AT THE INSTITUTE OF HISTORICAL RESEARCH,
SENATE HOUSE, UNIVERSITY OF LONDON
SATURDAY 14 OCTOBER 1995

PROVISIONAL PROGRAMME

- 10.00-10.30 Assemble and Coffee in the Common Room on the Ground Floor
- 10.30-10.45 Chairman's Introductory Remarks
- 10.45-11.45 **Wayne Cocroft**, Royal Commission on the Historic Monuments of England, Keele:
"The Royal Gunpowder Factories, 1759-1815"
- 11.45-12.15 **Steve Chaddock**, Archaeologist at Waltham Abbey:
"Recent Discoveries at Waltham Abbey".
- 12.15-12.45 **Alan Crocker**, Chairman Gunpowder Mills Study Group:
"The Gunpowder Mills of Wales"
- 12.45-14.00 Lunch. It is recommended that members bring a packed lunch which may be eaten in the Common Room where hot drinks can be purchased.
- 14.00-15.00 **Miles Oglethorpe**, Royal Commission on the Ancient and Historic Monuments of Scotland, Edinburgh:
"Recent Work by RCAHMS on the Gunpowder and Explosives Industry, especially at Ardeer"
- 15.00-16.15 Members' Contributions and Discussion of Group Activities
- 16.15 Prepare to vacate room

We shall be meeting in The International Relations Room on the second floor of Senate House. Goadge Street, Warren Street and Russell Square underground stations are nearby. Parking might be available in the University of London car park - entrance at NW corner of Russell Square.

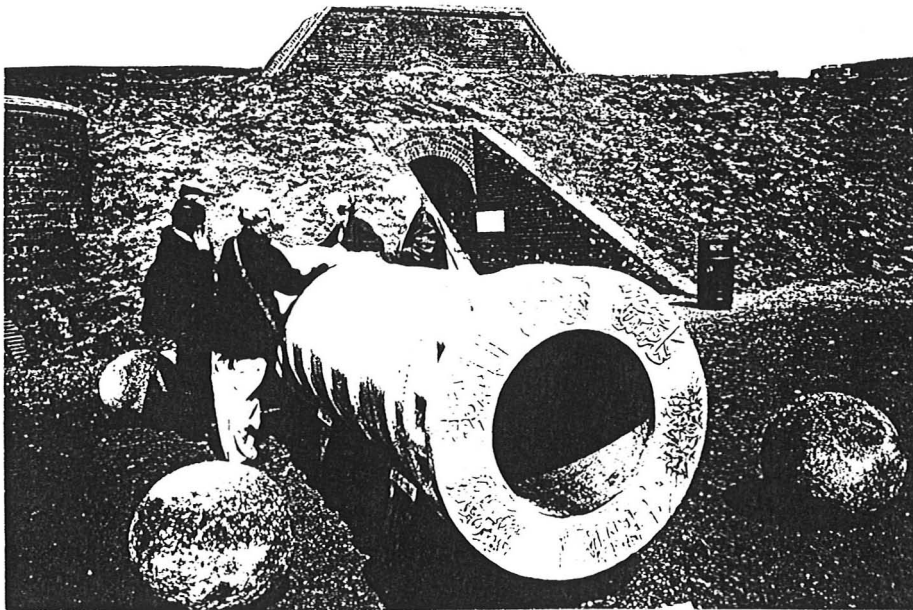
To cover administrative costs a fee of £2 will be made. It would be helpful to know approximately how many people will be attending. Please therefore let Glenys Crocker know if you are coming (6 Burwood Close, Guildford, Surrey GU1 2SB; tel 01483 565821).

PRELIMINARY ANNOUNCEMENT

The Spring Meeting 1996 is being organised by Patrice Bret and will be held in or near Paris one week-end towards the end of May.

Nineteen members and friends attended the Group meeting held on 21 May at Fort Nelson, the Royal Armouries Museum of Artillery, on Portsdown Hill, Fareham, Hampshire. Fort Nelson, together with several other forts, was built between 1862 and 1871 to protect Portsmouth from an anticipated attack by the French. In particular it was thought that the French might land along the coast and attack Portsmouth from the north. Therefore the guns of the fort point inland rather than towards the sea. Unlike older castles and forts it is low, largely hidden from view and has many underground tunnels and chambers. However the forts were never attacked and became known as "Palmerston's Follies". Fort Nelson soon became obsolete and was stripped of its artillery by 1902. It was a transit camp for soldiers in World War I and an armaments stores in World War II. Then it was abandoned in the 1950s and eventually leased to the Royal Armouries in 1988. Since then the collection of artillery at the Tower of London has been moved to Fort Nelson and it is now open to the public.

We spent the morning having a special tour of the site with an excellent guide who had clearly done additional research on the Fort and its exhibits in anticipation of the questions which Group members might ask. We first toured the ramparts, saw the emplacements for the large guns and the expense magazines and heard about the development of breach-loading, rifling and the influence of William Armstrong. We then examined some of the large guns on display around the parade ground (see photograph) before descending to the central tunnel and visited the north caponier and the north mortar battery, with guns in place protecting the northern part of the dry moat which surrounds the fort. We then returned along the tunnel to the central underground magazine, which we attempted to interpret. Then, back on the surface, we were treated, together with other museum visitors, to a live firing display by a Napoleonic Group, with Lancashire accents. They were practising for a performance at Waterloo a few weeks later. In introducing the display the announcer welcomed the Gunpowder Mills Study Group and noted that it was, at least approximately, our tenth anniversary.



Members examining a large cannon on the parade ground at Fort Nelson. From left to right: Patrice Bret, Angus Buchanan (with cap), Brenda Buchanan, Mary Yoward and Ken Major.

After lunch and a quick look at some other parts of the museum we had our Group meeting in a lecture room which was satisfactory after we had obtained some temporary curtains which enabled us to show slides. The programme was changed a little from that announced in Newsletter 16 as I had forgotten to bring my slides of gunpowder labels at the Hagley library. This turned out to be fortunate as it allowed ample time for Patrice Bret to give a talk surveying the remaining gunpowder factories in France together with an account of the former factory of Sevran-Livry near Paris, part of which now houses a small gunpowder museum. Patrice offered to arrange a visit to the museum for Group members. We have accepted this offer so that next year's Spring Meeting will be held in Paris. The other major talk was by Tony Yoward on the history of the Fritham gunpowder works in the New Forest. Henry Drayson, whose father had been superintendent of Waltham Abbey and who had previously been at the Maresfield gunpowder mills in Sussex, erected a gunpowder mill at Fritham in 1860. Drayson seems to have been a rascal, absconded with his partner's funds and the works were sold in 1869 to the Schultze Gunpowder Company. They made the very successful Schultze gunpowder and blasting powder which involved nitrating wood fibre. The factory closed in 1921. Tony is to be congratulated on the very detailed research he has done on the factory, which has included much documentary work and discussions with elderly former employees and their relatives. We look forward to his written account of the history of the factory.

The other contributions were short. Bill Curtis told us about the powder being made at the Pernambuco factory in Brazil and introduced Raj Durve, whose firm, Zwitron International Ltd, represent the manufacturers in Britain. Raj and his brother became involved because, some years ago, they set up a successful company to quarry slate in Brazil and bring it to Cornwall for dressing. The Brazilian slate is very similar to Cornish slate in colour and texture. They are therefore able to use Cornish expertise both in the quarrying and the finishing. Also, of course, they use gunpowder for the blasting. Unfortunately there was a major explosion at Pernambuco a few months ago and some of the historic equipment was probably destroyed. Finally, Brenda Buchanan gave a tongue-in-cheek talk suggesting that the role of St Barbara, the patron saint of artillerymen and naval gunners, miners, firemen and quarrymen (feast day on 4 December), should be extended to include gunpowder historians, or was it gunpowder makers?

It was a very enjoyable, sunny day and we were all very grateful to the speakers, our guide and particularly Bill Curtis for making the arrangements.

NOTE ON STONE EDGE RUNNERS WITH IRON TYRES

In response to the article on this topic in Newsletter 16, pp13-14, **Malcolm McLaren** has written to say that he is certain that they were used at Waltham Abbey. However he is now unable to locate specific references to their use. There may however be photographs of some in that part of his "Waltham Abbey Special Collection" which has been transferred to the Epping Forest District Museum. At least one photograph does exist as Malcolm recalls that, when selecting illustrations for slides in the early 1960s, he discarded it in favour of one showing conventional stone edge runners. He also recalls seeing a manuscript entry "rimmed with iron", probably in one of the Royal Gun Powder Factory letter-books at the Public Record Office. He also notes that in *The Rise & Progress* (1909), Nathan, then Superintendent of Waltham Abbey, states that "the first mention of Iron runners and beds for incorporating mills was in 1804.

1855, no. 73, Hall E. Relates to incorporating mills for gunpowder and consists of heating and cooling the pans so that an equable temperature is maintained at all seasons.

1855, no. 1173, Hall E. Relates to means of supplying water to edge runner gunpowder mills in a uniform and regulatable quantity, distributed over the bed by a sprinkler.

1857, Dec 1, no. 2983, Spray F C. Saltpetre for gunpowder is refined by dissolving in water, boiling and evaporating to dryness in vacuo. The dried ingredients are mixed by revolving blades with steam in the mixer; the dried powder is then glazed in an annular space between two concentric cylinders, one or both of which may revolve.

1858, Nov 5, no. 2478, Davey S. Blasting powder consists of potassium nitrate 64 parts, sulphur 16 parts, charcoal 12 parts and flour, bran, starch or other glutinous or viscous matter. Eight parts sodium nitrate can be used in place of the potassium nitrate and the proportions varied. It is then mixed to a paste with water, rolled into thin cakes and cut into grains or pressed through a sieve, when the extruded strips are dried and granulated through rollers.

1859, May 17, no. 1226, de Trets A E C J R. Explosives - for splitting rock - about 52.5 parts sodium nitrate, 27.5 parts spent tan and 20 parts sulphur.

1859, Nov 23, no. 2649, Hughes E T (Rave N). Blasting powder - a saturated solution of an alkaline carbonate with chlorine gas in contact with vegetable or mineral substances. Preferably 80 parts potassium carbonate, 30 parts of ground straw and 15 of anthracite mixed to a paste with water and treated with chlorine gas. After the saturation, it is dried and used as a powder or in blocks.

1859, Nov 23, no. 2651, Hughes E T. Blasting powder - potassium chlorate with charcoal or wood in the proportion 2 to 1. It is mixed with gummy water, reground together and dried. The chlorate may be dissolved in water, fine charcoal added and the mixture heated to a paste and dried.

1860, Jan 18, no. 139, Roberts T & Dale J. Explosives - sodium nitrate may be partly or wholly substituted for potassium nitrate in manufacture. Anhydrous sodium sulphate not exceeding 18% of the sodium nitrate is added to prevent deliquescence.

1865, Feb 13, no. 402, Ehrard L H G. Explosives - improvement to no. 2594 of 1864. The use of tannin or similar containing it, eg cate, chue, gum kino, artificial tannin, coal, wood, charcoal or any kind of vegetable or mineral carbon. The proportions for blasting powder are 3 parts each by volume of potassium chlorate and potassium nitrate mixed when required with 2 parts of cutch or catechu and 4 parts of cannel coal, all powdered for sporting or ordinary gunpowder. One part by weight of tannin or cutch is mixed with 4 parts of potassium chlorate or 6 parts for projectiles.

1865, June 22, no. 1679, Gale J. Gunpowder can be made temporarily non-explosive by mixing with a fine powder which does not absorb water and it can be separated by sifting, winnowing or the like. Ivory, boneblack or galm powder can be used, the proportions preferably being 1 part of gunpowder to 3 parts of the added powder.

1865, June 17, no. 1636, Klein A (Neumeyer G A). Gunpowder for mining or war is composed of 75 parts potassium nitrate, 6.25 parts of sulphur and 18.75 parts of charcoal, prepared by igniting birchwood in a closed vessel and soaking the product in a soda lye.

1865, Sept 7, no. 2293, Tohausen F (Barnett F & Roussile C A). Pyrotechnics - a serpent worms firework consists of sulphocyanide moulded into cones and covered in tinfoil.

1866, June 28, no. 1721, Plimsoll H D. Provisional patent only. To render gunpowder non-explosive it should be mixed with titaniferous iron sand, which can be removed when required by sifting or by magnetic separation.

1866, July 26, no. 1940, Bennervill H A. Explosives - mixture of lime, sulphur and uric acid is allowed to ferment and is heated, triturated and dried. "Stroniane", if not already present in the lime sulphate is added.

1866, July 28, no. 1956, Griess P & Caro H. Fulminating compounds can be prepared by adding chromic acid or a mixture of chromic and hydrochloric acids to a solution of azo compounds such as aniline, toluidine, naphthylamin, rosaniline, aminobenzoic acid, benzidine etc. Crystalline compounds of the acids and the azo compound are thus precipitated.

The following patents relate to Nitro-Glycerin:

1863, Sept 10, no. 2230, Jordon T B. Provisional protection.

1864, July 20, no. 1813, Newton W E (Nobel A)

1867, May 7, no. 1345, Newton W E (Nobel A).

The following patents relate to Nitro-Cellulose:

1862, Mar 27, no. 852, de Cornelian Vernede (Clemence J L H) Comtesse de.

1862, Apr 14, no. 1090, Gray T W (Revy J J). Disclaimer.

1863, Nov 3, no. 2720, Revy J J.

1865, Apr 20, no. 1102, Abel F A.

INDEX OF GUNPOWDER MAKING ARTICLES IN *THE ENGINEER* John Day

01 (1856) 91, 252, 264	Gunpowder patents
10 (1860) 332	Gunpowder patents
11 (1861) 96, 340	Compound used as substitute for gunpowder
12 (1861) 93, 103	Experiments with gunpowder
12 (1861) 119	White gunpowder
12 (1861) 263	Explosion at gunpowder mill near Cork
22 (1866) 185	Barytic gunpowder
22 (1866) 457, 488	Gunpowder
23 (1867) 49, 534	Gunpowder
23 (1867) 547	Explosions at gunpowder magazines
26 (1868) 86	Thermodynamics of gunpowder
29 (1870) 159	Experiments on the strength of gunpowder
30 (1870) 165	Gunpowder - its nature and action
31 (1871) 215	Firing gunpowder in closed chambers
31 (1871) 306	Limits of safety of powder magazines
33 (1872) 91	Explosions in powder mills
34 (1872) 246	Fireproof gunpowder safe
38 (1874) 9	Pebble powder
38 (1874) 263, 298	Legislation on explosives
38 (1874) 385	Regents canal explosion
41 (1876) 185	Powder for heavy guns
52 (1881) 397	Stowmarket explosives works
55 (1883) 354, 422	Explosives of 1875
55 (1883) 383	Order in Council on explosives
60 (1885) 5	Combustion of gunpowder in guns
60 (1885) 165	Annual report on explosives

INCRUSTED GUNPOWDER IN INCORPORATING MILLS

Alan Crocker

Explosives Inspectorate Report, 57, on an explosion at the Chilworth Gunpowder Mills on 15 Nov 1883, discusses in detail the problems of removing incrustated gunpowder from the pans of incorporating mills. Such hardened powder could form because the ploughs, which were usually of wood shod with felt, leather or india rubber, were badly constructed or maintained. Also, if the pans, particularly the curb at the edge and the "cheese" at the centre, were made of soft iron, frequent dressing was needed to produce uniformly smooth non-adhesive surfaces. Similarly the runners had to be kept in good order to avoid incrustation on their surfaces.

The explosion at Chilworth occurred when a workman was using a copper paddle, known as a "spud", to remove such an incrustation, prior to placing a charge of green powder on the pan. The *Report* lists ten other explosions caused by the use of copper, bronze or even wooden tools: Ballincollig, Apr 1872, 9 Mar 1877; Bassingill, 12 Oct 1875, 2 June 1877; Blackbeck, 19 Mar 1881; Chilworth, 3 Aug 1874; Herodsfoot, 12 May 1876, 4 Oct 1876; Melfort, Dec 1872; Waltham Abbey, 16 June 1870.

The *Report* also summarises the rules laid down by several manufacturers for removing hardened gunpowder:

Waltham Abbey: "It must be tapped by a wooden mallet not spudded up" and "No greater force must ever be used than is absolutely necessary".

Pigou, Wilks, Laurence & Co: "All mill cake must be carefully washed off and it is on no account to be struck by any tool whatever".

Wakefield & Co: "The indurated powder in the mill must be softened off with water".

John Hall & Sons and Chilworth: "Any mill cake adhering is to be washed off with warm water and on no account to be struck with any tool whatever".

However these rules were to be applied when mills were to be cleaned-off for repairs or examination and, strictly, did not apply before loading a fresh green charge.

In conclusion Col V D Majendie, H M Chief Inspector of Explosives, who prepared the *Report* states: "I am of opinion that every millman and indeed every worker in a gunpowder factory should be strictly enjoined that he is under no circumstances whatever to use any metal tool to remove hard powder incrustations but that their removal should be effected by means of water supplemented if need be when the whole of the incrustation has been thoroughly saturated by a suitable wooden implement gently applied."

[With thanks to Wayne Cocroft for providing a copy of the *Report*]

SALTPETRE IMPORTS 1847-54

Alan Crocker

During a recent visit to see the archives of the Royal Society for the encouragement of Arts, Manufactures & Commerce (RSA), 8 John Adam St, London WC2N 6EZ, I noted the following entry on page 90 of Guard Book 1 for 1754-56:

"An account of what quantity of the underwritten species of merchandize have been imported into England annually for 7 years ending Christmas 1754:

Saltpetre [in cwt.qr.lb]: 19,062.3.2; 25,976.3.16; 2,079.2.8; 13,080.2.24; 21,089.2.23; 15,838.2.8; 19,668.3.15. [Total] 116,807.0.15. Average 16,686.3.0.

Custom House, London, 19th February 1756. John Tomkyns for John Oxenford, Assistant Inspector General."

GUNPOWDER MAGAZINE IN CHICHESTER

Tony Yoward

Before the Drill Hall in East Row, Chichester, was built in 1912, a small room was used in the Guildhall as an armoury. In 1778 the City took consideration of the danger to which the inhabitants were exposed from great quantities of gunpowder, for use of his majesty and forces being frequently lodged in private dwelling houses and other buildings in the populous part of the city, for want of a proper place to secure the same. To prevent the fatal effects of an explosion as far as possible, a guardhouse and powder magazine were to be built at the expense of the city in the angle formed by the east wall of the City and the Friary wall. Only the magazine was built as the guardhouse was considered unnecessary. [From *Chichester - a documentary history* by Roy Morgan]

EXPLOSIVES IN THE SERVICE OF MAN: THE NOBEL HERITAGE

This is the title of a symposium being held at the Moat House Hotel, Glasgow, on 10-11 December 1996 to commemorate the centenary of the death of Alfred Nobel. It will cover the science, technology and use of high explosives in research, manufacture and other applications and be complemented by an exhibition illustrating the early development of the explosives industry. It is being organised by the Industrial Division of the Royal Society of Chemistry. Further information is available from Mrs E S Wellington, tel/fax 01275 853311. [Information from Jim Lewis]

FERNILEE GUNPOWDER MILL AND MAGAZINES IN DERBYSHIRE

Alan Gifford, Chairman of the Midlands Mills Group, has sent us a copy of a chapter on "Gunpowder Mills" which appears on pages 299-300 of a book entitled *Three Centuries of Derbyshire Annals*. It quotes a notice, read in the parish church of Hope on 28 December 1800, of an application to be made to the Quarter Sessions by Thomas Williamson of Fernilee, millwright, for a license to erect and have mills or other engines for making gunpowder with proper magazines and offices to adjoin thereto at Shalcross in the hamlet of Fernilee. The license was obtained at the Epiphany Sessions in 1801 where it was stated that the local manufacture of gunpowder would be very useful and beneficial on account of the great number of coal and other mines thereabouts, in the working thereof great quantities of gunpowder are used. As noted in *The Gazetteer*, the mills remained in the hands of the Williamson family until the late 1880s when it was acquired by the Chilworth Gunpowder Company. It closed in 1920.

The chapter also notes that in 1827 licenses for powder magazines were obtained by the Butterley Company, at Amber wharf, near Bull Bridge, in the parish of Crich, Henry Orton, on Sinfin Moor, and Charles Hitchener, in the township of Alvaston. It should be noted (see Newsletter 8 page 7, and *The Gazetteer*) that in 1791 William Hitchenor, of Thames Ditton, and others were refused permission to establish a gunpowder mill at Abinger Hammer in Surrey but, in 1794, they were successful at Gorebridge in Scotland. Hitchenor and Hunter had an office in Liverpool until 1965. Also in 1834 Curtis's & Harvey obtained a license for a magazine in the township of Boulton. At the time they had mills at Hounslow and probably in Somerset.

REVIEW

Henry Wilkinson, *Engines of War: or historical and experimental observations on ancient and modern warlike machines and implements including the manufacture of guns, gunpowder and swords with remarks on bronze, iron, steel etc*, Longman, Orme, Brown, Green and Longmans, London, 1841, 269 pp + viii. Reprint with new 5 page introduction by W S Curtis, Richmond, Surrey, 1973.

In his introduction to this reprint, Bill Curtis notes that Henry Wilkinson was a member of a London gunmaking family. However he developed an interest in the figuring of iron and steel, particularly in sword blades, and over the years this resulted in the firm of Wilkinson becoming better know as sword makers.

The book has a small format, 118x167mm, and contains two chapters of particular interest to gunpowder historians: Part V "On the History and Antiquity of Gunpowder" and Part VI "On the Manufacture of Gunpowder". The first of these gives accounts of Greek fire, Berthold Schwarz, Roger Bacon, Marcus Graecus, origins of gunpowder in India and China the influence of the Arabs, serpentine powder in England, the use of large quantities of gunpowder at various battles in the first part of the nineteenth century, eg 5,021 barrels at the first and second sieges of San Sebastian, and the fact that about 80,000 barrels was stored in magazines in Great Britain, Guernsey, Jersey and the Isle of Man in 1783.

Part VI is based on the methods of manufacturing gunpowder at "one of the most celebrated mills in England", that of Pigou & Wilks at Dartford. First, the composition of gunpowder is stated and then the refining of saltpetre is discussed. I particularly noted that in 1628 the East India Company had a large quantity of saltpetre in their stores and "weekly made about thirty barrels of powder at their own mills", which we know to have been at Chilworth. It is noted that *Company's petre* was much purer than *Madras private petre*. The method of purifying saltpetre by boiling, filtering and crystallising is described in detail. I also found the description of the next stage interesting. The crystals were melted and the liquid saltpetre pored into moulds to make cylindrical cakes about 12ins across and 8 or 9ins deep. These cakes were taken to a horse-powered mill with stone edge runners, placed on the cast iron bottom, broken up with hammers, crushed under the edge runners and then ground to a fine powder between two horizontal stones as in a corn mill. About 20 million lbs of saltpetre was being imported annually in the 1820s.

The section on charcoal reveals that one furnace was used with each cylinder for the best results but with groups of three or four cylinders for common powder. Dartford made two batches each day whereas Ballincollig made four. Sulphur refining and mixing, which at Dartford was done by hand, are then described. This is followed by incorporation using stone edge runner mills with iron or stone beds. The importance of mixing with only a small amount of water, so that a paste is not formed, is emphasised. Pressing at Dartford was carried out using screw presses as it was thought that gunpowder could be injured by the use of hydraulic presses, which were introduced by Congreve but not adopted generally. Corning was done using the old system of 20 to 30 sieves containing lumps of powder and blocks of *lignum vitae* in a frame. Two of these frames were operated by a man turning a handle and eccentric crank! Glazing was carried out for different lengths of time depending on the wishes of the purchaser. In particular poor quality Africa powder was made as bright as silver by putting black lead into the glazing barrel. Dartford had a drying-house heated by steam pipes. Dusting and packing are then described briefly. Finally there are sections on accidents, testing, analysis and the use of potassium chlorate rather than nitrate as an ingredient.

I learned a great deal from this book.

Alan Crocker

REVIEW

Oscar Guttman, *Blasting: A Handbook for the Use of Engineers and Others Engaged in Mining, Tunnelling, Quarrying etc.*, Charles Griffin, London, 1st ed, 1892, 179pp + x, 135 figs.

We acquired a copy of this book recently from an antiquarian book dealer, who explained that the high price (£35) was because it is rare. We already had the first volume of Guttman's *The Manufacture of Explosives*, which was published in London by Whittaker & Co in 1895. This is the volume which contains the sections on gunpowder, the second volume dealing entirely with modern explosives. Also, we have Guttman's *Monumenta Pulveris Pyrii*, published by the author in London in 1906, which I reviewed in Newsletter 14, page 12. Guttman came to Britain from Hungary in the 1880s and had a wealth of experience in research, development and manufacture of explosives and in mining.

The book on blasting is believed to be his first major work in English and was in fact first published in German. There are 12 chapters as follows: Historical sketch; Blasting materials; Qualities and handling of explosives; The choice of blasting materials; Preparation of blasts; Chamber mines; Charging of bore-holes; Determination of the charge; Blasting in bore-holes; Firing; Results of working; Various blasting operations. In particular Chapter 1 discusses in detail the introduction of gunpowder into mining in the 17th century and it is interesting to compare this with information presented by Heinz Walter Wild at the 1994 ICOHTEC meeting at Bath. Guttman claims that the first blasting work of which there is any authentic account was carried out by Caspar Weindl on February 8th 1627 in the Oberbiberstolle of Schemnitz in Hungary. Wild stated that the oldest report of shotfiring underground dates from 1573 in a Venetian mine. Also Guttman found no evidence for the claim that gunpowder was introduced into English mines by Germans in 1670 but notes that it seems to have been used in the Godolphin mine near Breage in Cornwall in 1689. In the *Bergwerkschatz* of Elias Montanus (Frankfort, 1622) there is an account of a copper ball filled with "good" gunpowder and covered on the outside with cotton soaked in saltpetre dipped in a mixture of pitch and sulphur, which was ignited and thrown into a shaft or a tunnel to drive out by its explosion the smoke that had accumulated from working "by fire".

The second chapter also contains information which was new to me. Thus it was only in England that powder for blasting and guns had the same composition of saltpetre 75%, sulphur 10% and charcoal 15%. The proportions for blasting powder in other countries were: Germany 66, 12.5, 21.5; Austria-Hungary 64, 16, 20; France 62, 20, 18; Russia 66.6, 16.7, 16.7; Italy 70, 18, 12. However, the proportions for powder for guns were similar to that in England. Also, I did not realise that incorporation in stamp mills was carried out from between 24 and 60 hours, of the order of ten times longer than in edge runner mills. In Switzerland, tilt hammers were used instead of stamps. Again, I discovered that the wooden discs in Lefebvre's corning machine (the type at the Frederiksvaerk Mills in Denmark - see Newsletter 6, pages 6-7) are weighted with lead and grooved on the faces like millstones. Finally, I discovered that the brown powder made at Chilworth was a dark yellowish-brown colour.

The rest of the book also contains interesting information but probably of less relevance to most members of the Group. Anyhow, having decided to review the book, I now feel that the £35 was well spent.

Alan Crocker

POWDER MAGAZINE AT PORTMADOC

Ken Major

I have rescued a massive set of mortgage deeds of Portmadoc and Tremadoc. They comprise a basic deed of 1871, a second of 1881 and a final one of 1902. The first deed has a plan at the back which is at a scale of 1:500 and is 6ft by 4ft in size. This delineates every property in the two towns.

In the schedule of properties there is reference to a Powder Magazine belonging to the "Plymouth and Dartmoor Company". This is beneath the modern garage on the harbour wall. The same name appears on the other deeds.

It is odd that there should be a powder magazine in such a tight town site. The implication is that the magazine acted as a warehouse at which the many independent slate quarries could buy their powder.

GUNPOWDER MILL IN LUXEMBOURG

Issue 49 (Dec 1994) of *International Molinology*, The Bulletin of The International Molinological Society (TIMS) has, on pages 2 to 8, an article by Emile Erpelding on "The Mills of the Grand Duchy of Luxembourg". Figure 8 of this article is a reproduction of an undated engraving with the caption "The powder mill near the City of Luxembourg. In the background: the city and fortress". The view shows several watercourses, two 4-storey buildings and what appear to be several neighbouring cottages. The text provides no further information. The Krupp catalogue of 1894, discussed elsewhere in this Newsletter, states that they supplied "Norb. Reuter & Co., Luxemburg" with one press for prismatic powder in 1885.

RAILWAY GUNPOWDER LABELS

Russ Nicholls has provided us with this copy of a British railways label. The original measures 201 x 153mm and is printed on thin fawn card with black lettering. It also has a red design, appearing grey here, which perhaps represents a cross-section of a wagon. Do other members have examples or knowledge of this type of label?

BRITISH TRANSPORT COMMISSION BRITISH RAILWAYS		USE BLOCK LETTERS	R.R. 21273
From _____		_____ 19__	
EXPLOSIVES			
TO _____		_____ Section	
Via _____			
Letter Wagon	Number	3	
Consignee _____			

PLACE AS FAR AS PRACTICABLE FROM ENGINE, BRAKE-VAN AND WAGONS LABELLED "INFLAMMABLE"

SHUNT WITH GREAT CARE
LOAD and UNLOAD OUTSIDE GOODS SHEDS

This label to be used for GUNPOWDER and all other EXPLOSIVES.

USE OF HOME-PRODUCED SULPHUR IN BRITISH GUNPOWDER

Wayne Cocroft

In a short piece on the Parys Mountain mine, Anglesey, I have come across a brief note on the home production of sulphur for the gunpowder trade.

" After mining, the metal was recovered in two ways. Raw sulphide ores were roasted for weeks or even months, within ovens either *in situ*, at Amlwch, or at the destination smelter ports like Swansea or Garston. Sulphur for the gunpowder trade was sublimed in this way, and the Parys Mine itself possessed a "Sulphur Yard", the confines of which are no longer easily ascertained" (Briggs 1992, p75)

Unfortunately the article was not closely referenced and I have been unable to shed any more light on this activity. Though mining may have begun in the Roman period, it was not until the 1760s that copper mining began on an industrial scale. Though several mineral veins were exploited, copper sulphide was the staple of the industry. It would be interesting to know at what date the roasting of copper sulphide ores, perhaps elsewhere in Europe, began as an alternative source of sulphur to Sicily. It is difficult to assess just how important this supply was in the nineteenth century. Guttman in 1895 stated that until 1893 Sicily was the chief source of sulphur. However in that year another important source developed was through the Claus Chance process where it was recovered from the manufacture of soda. He also noted that in Sweden it was chiefly manufactured from pyrites (Guttman 1895, pp51-2).

Briggs C S, "Site preservation and mineral development at Parys Mountain, Anglesey", pp75-81 in Briggs C S, *Welsh Industrial Heritage: a review*, CBA Research Report No 79

Guttman O, 1895, *The Manufacture of Explosives*, vol 1, London.

GLYNCEIRIOG GUNPOWDER MILL: UPDATE

In Newsletter 15, p19, we reported references to a gunpowder mill at Hendre, near Glynceiriog, which is 4 km south of Llangollen. These were in a book entitled *The Glyn Valley Tramway* by W J Milner, Oxford Publishing Co, Poole, 1984. Also in Newsletter 16, p26, there was a note on a visit to the site by Stuart Chrystall. Then in March, in our role as editors of the Newsletter of the Wind & Watermill Section of SPAB, we had a letter from David Llewelyn Davies of Kamloops in British Columbia asking if we could publicise a book he has written on a corn mill at Glynceiriog, where he was brought up. We therefore asked him if he knew anything about the gunpowder mill. In his response he explained that he had written *The Glyn Valley Tramway* and that it had been published by the Oakwood Press, Oxford, in 1962, reprinted in 1966 and 1974 and republished as a new edition in 1991. He also provided the names of some contacts at Glynceiriog who might be able to help.

We have now been able to purchase a copy of the 1991 booklet. The only reference to the gunpowder mill is in the caption of an 1895 photograph of Hendre granite quarry on page 4. It states that "The warehouse on the right was built by the Glynceiriog Wood Blasting Powder Ltd which had previously occupied the site". However the building is also shown as a black rectangle near the river on a detail of a 6 inch 1900 OS map of the site reproduced on page 32 of the book. We think we have overcome the confusion of two books with the same title and will report in a future Newsletter any additional information obtained from the contacts.

MASCHINEN ZUR PULVERFABRIKATION

Alan Crocker

This is the title of a catalogue of equipment for manufacturing gunpowder which is held in the Eleutherian Mills Hagley Library at Wilmington, Delaware (EMHL Pamphlets 35,5). It was issued by Fried. Krupp, Grusonwerk, Magdeburg-Buckau, in January 1894. Friedrich Alfred Krupp had revealed in the spring of 1892 that he had acquired 51% of Hermann Gruson's joint stock company. By May 1893 Krupp's Essen empire had formally absorbed Gruson's Magdeburg works (Manchester, Wm, *The Arms of Krupp, 1597-1968*, Michael Joseph, London, 1964, p239). This explains why the illustrations of equipment in the catalogue, three of which are reproduced here, all bear the name H Gruson.

The catalogue has a 10-page appendix listing 215 separate orders for equipment supplied to powder mills during the period 1874 to 1893. This list is divided into seven sections, the titles, date of first order and number of orders in each section being as follows: complete layouts, 1880, 11; edge-runner mills (fig 1), 1874, 54 (150 sets); hydraulic and cylinder presses, 1874, 28 (35 sets); corning and crushing machines (fig 2), 1874, 36 (48 sets); presses for prismatic powder and compressed blasting powder (fig 3), 1880, 24 (34 sets); various small machines, 1878, 47; machines and apparatus for smokeless powder, 1889, 15. Mills in 21 different countries were supplied as follows, the number of orders being given together (in brackets) with the number of mills/organisations, totalling 67: Austria, 10 (3); Belgium, 5 (3); Brazil, 7 (1); China, 17 (4); Denmark, 7 (1); England, 4 (3); France, 3 (1); Germany, 95 (26); Holland, 7 (2); Hungary, 1 (1); Italy, 6 (3); Japan, 9 (2); Luxembourg, 1 (1); Norway, 2 (1); Poland, 4 (1); Portugal, 4 (1); Romania, 2 (1); Russia, 16 (5); Spain, 6 (3); Sweden, 3 (2); Turkey, 3 (1); Yugoslavia, 3 (1).

Some of the above statistics are a little uncertain as international boundaries and names of countries and towns have changed and I failed to locate some places even in Cassell's *Universal Atlas of 1893*. Also some of the data may be a little misleading. Thus two of the English orders were for the India Office, some of those for Holland for the Department of the Colonies and the French ones simply for *Frankreich*. However it is clear that about one-half of Krupp's trade was with German and Austro-Hungarian mills and the other half was world-wide. China, Russia and Japan feature prominently. One point of interest is that the orders for Brazil were for the "Pernambuco Powder Factory", written in English, presumably indicating the previous English influence at the mills. One of the English orders, dated 1885, was for the Chilworth Gunpowder Company. It was in that year that the mills had been taken over by the *Vereinigte Rheinisch-Westphälische Pulverfabriken*, who built a new range of six incorporating mills at Chilworth to manufacture brown powder. The fourth English order was in 1890-91 for a single corning machine for Waltham Abbey and one wonders whether it was used as a model for English manufacturers.

The complete installations were at Düneberg (Rottweil-Hamburg) 1880-81, Megora (Japan) 1880-81, Schlüsselburg (Russia) 1882-83, Rübeland 1885-86, Toledo (Spain) 1887, Pernambuco (Brazil) 1891, Tientsin (China) 1892, Loongwa (China) 1892, Itabashi (Japan) 1893, Pniowitz (Poland?) 1893 and St Ingbert 1893. It is interesting that five of these installations involved overhead-cable transmission-drives. The largest order for edge runners was 16 for Spandau in 1874-79. Finally a striking feature is that there were Royal Gunpowder Mills in many countries: Austria, Belgium, China, Denmark, England, Germany, Italy, Japan, Portugal, Russia, Spain, Turkey and Yugoslavia (Serbia).

Please let me know if you would like more details.

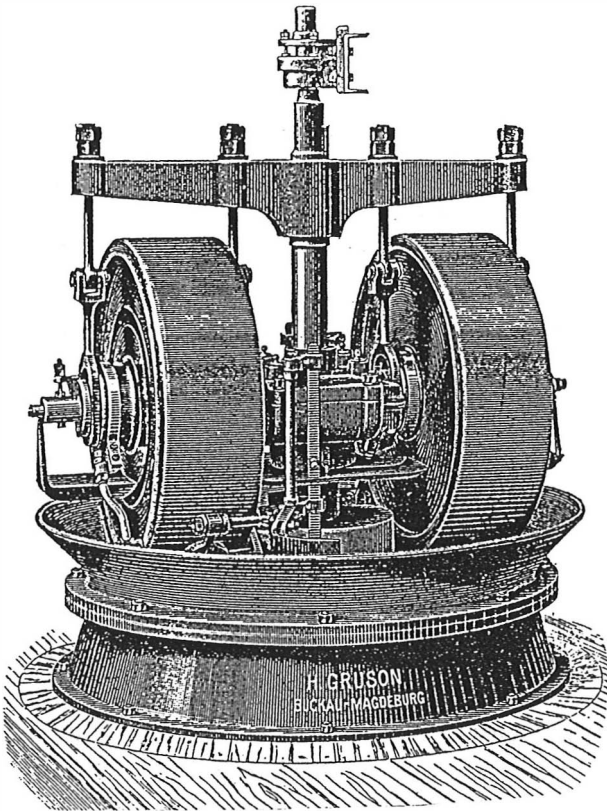


Figure 1 *Krupp-Gruson suspended edge runner mill*

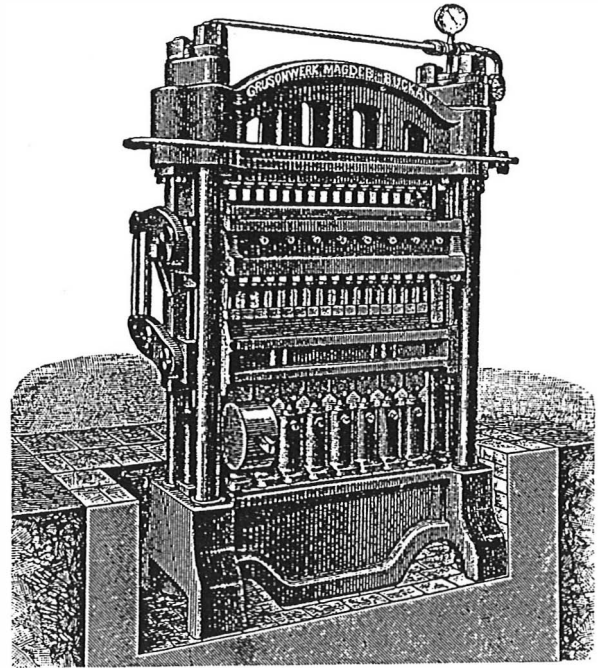


Figure 3 *Krupp-Gruson hydraulic prism with 16 stamps*

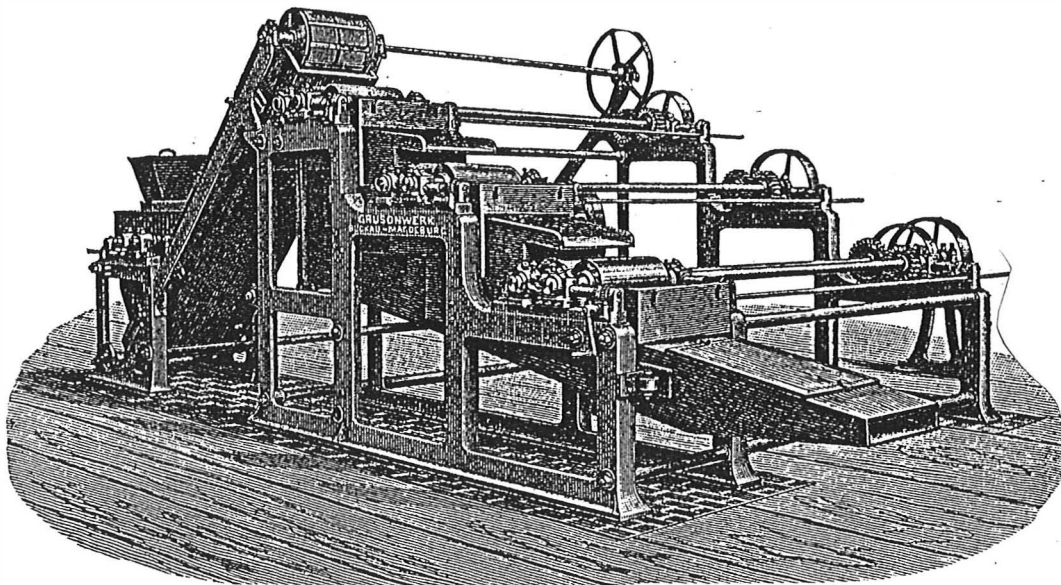


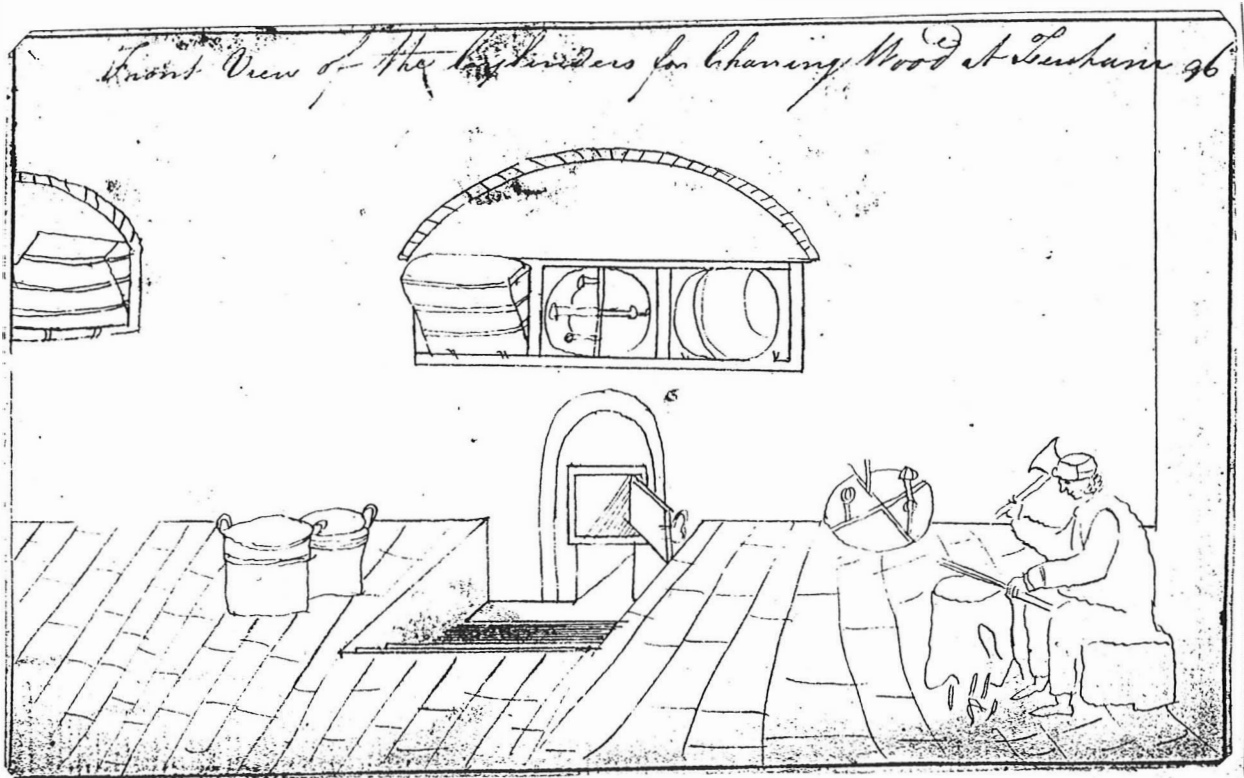
Figure 2 *Krupp-Gruson corning machine with breaker, elevator and two pairs of rollers*

Wayne Cocroft, as part of the research for his forthcoming Royal Commission & English Heritage book on the gunpowder and explosives industry, has been investigating the sites where cylinder charcoal was made in Sussex for use at Waltham Abbey. He has provided us with copies of several relevant papers which have prompted this note. In particular he has looked at "The Cylinders" at Fernhurst (NGR SU 894 283) and "Cylinders Cottages" at Fisher Street (NGR SU 949 314), which are discussed in a paper by H W Dickinson and E Straker entitled "Charcoal and Pyroligneous Acid Making in Sussex" in Transactions of the Newcomen Society, 18, pp 61-66 (1937-38).

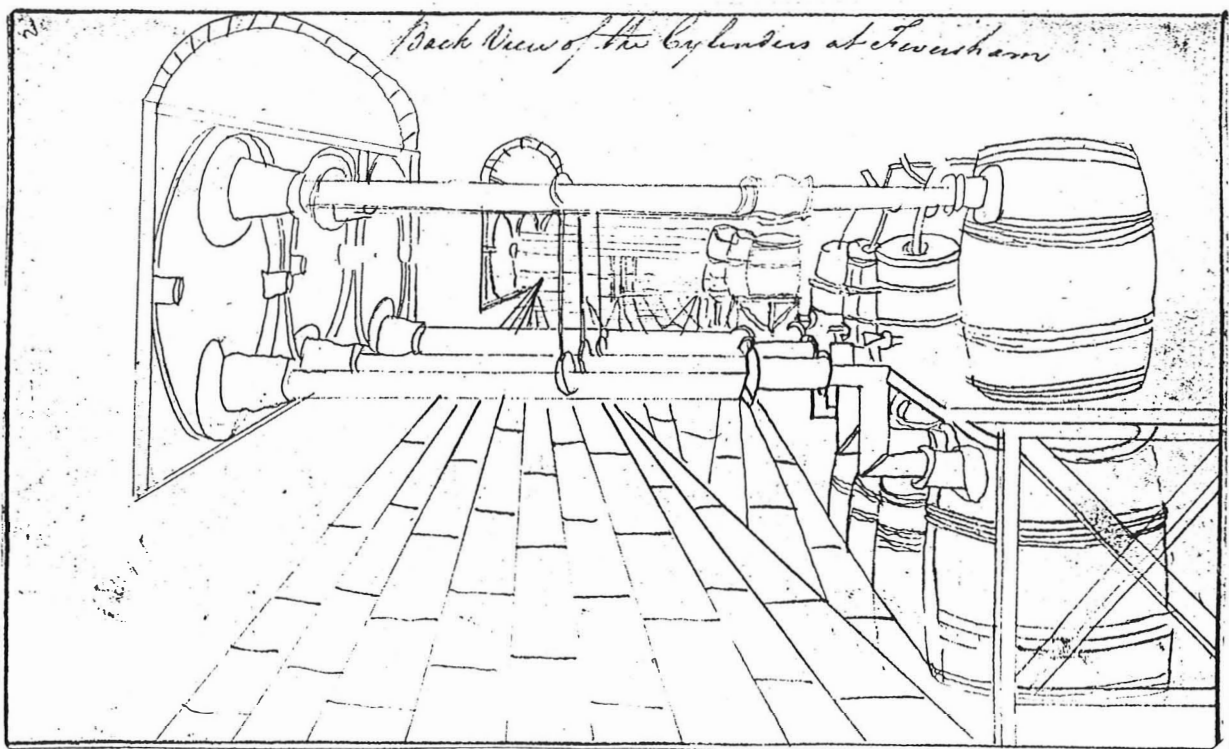
Regarding Fernhurst they quote a deed of 1880, which presumably cites an older one, : "all those two Cylinder houses, a cooking house, a charcoal stove and stable attached, coal yard, mortar shed, a building for reducing the acid wood, a tankhouse, a shed and a pitch house ...". They note that the process of distillation of wood to produce charcoal and tar is an old one and that Richard Watson, Bishop of Llandaff, did not claim to have invented it in about 1786 but simply recommended it for making charcoal for gunpowder. They also quote "Anecdotes in the Life of Richard Watson", published by his son, also Richard Watson, in 1818, vol 1, pp 240-2. "I suggested to them [the government] the making of charcoal by distilling the wood in closed vessels. The suggestion was put in execution at Hythe in 1787 and the improvement has exceeded my utmost expectation ... the strength of the cylinder powder is to that of other powder as 5:3." The form of the retorts was, according to General Wm Congreve in "A Statement of Facts Relative to Manufacturing Gunpowder at the Royal Powder Mills ... since the year 1783", p26, 1811, recommended by Dr George Fordyce and improved by Congreve himself. Fernhurst was presumably selected as a manufacturing site for cylinder charcoal because of the surrounding woodlands, formerly used to supply charcoal for the Wealden iron industry, the resulting local expertise and the reasonable access to water transport on the navigations at nearby Godalming and Petworth.

The second charcoal cylinder plant, at Fisher Street, is described in detail by Arthur Young in his "General View of the Agriculture of the County of Sussex", 2nd edition, p432, 1808 (not in the 1st edition of 1793). The cylinder room was 60ft long and there were three sets of three cast iron cylinders 2ft in diameter and 6ft long, placed in brickwork at the centre of the room. Each cylinder was closed by an iron stop 18ins long filled with sand, besides which a sand door was made to project obliquely from the front of each cylinder. Young also explains that at the back were copper pipes 7ft long connecting the cylinders to barrels. Each set of cylinders was heated using about 8 bushels of coal for about 8 hours. The charge for all three sets was 15 cwt of cordwood, cut into 18ins lengths, and the output 3 to 4 cwt of charcoal which was sent to Waltham and Faversham.

As pointed out by Dickinson and Straker, this description is remarkably close to two drawings entitled "Front View of the Cylinders for Charring Wood at Faversham '96" and "Back View of the Cylinders at Faversham" published in the *Rise & Progress*, Whittaker 1909, pp20-21. The originals of these drawings are contained in an apprentice's booklet now in our possession and are reproduced here. In particular note the set of three cylinders, one open, one closed by an iron stop and one with an oblique sand door. Note also that the grate is under the centre cylinder. Young states that this was done at first but later, in order to heat all cylinders equally, it was found better to place it under the outside cylinder with appropriate changes to the flues. A second apprentice's booklet is held by the Kent Archive Office and the corresponding drawings in this are almost identical. The two booklet also have descriptions of how cylinder charcoal was made. Again these are almost identical but both contain transcription errors made by the two apprentices. An edited version has therefore been



"Front View of the Cylinders for Charring Wood at Faversham '96", from a booklet in the editors' possession. This is a 1798 copy of a lost original drawn in 1796. Full size.



"Back View of the Cylinders at Faversham", from a booklet in the editors' possession. This is a 1798 copy of a lost original drawn in 1796. Full size.

prepared and, as this is rather different from Young's account and has not been published previously, it is given here in full:

"Process for charring wood in iron cylinders for making gunpowder at Faversham, 1798."

The wood is alder and willow, the latter preferably to be obtained, though the best coal is made from dogwood which is scarce and grown only to a small size.

The cylinders are of cast iron about 2ft in diameter, 8ft long and laid horizontally. The inner end is closed except for four holes at right angles to each other, two of which are used at a time. The reason for having four is that when the fire passing over the cylinders has injured that part, they may be turned, two fresh holes taken and a new surface exposed to the heat. The fire is in a brick flue underneath and made to pass under and over three cylinders placed together in the manner of a reverberatory furnace. The smoke is carried out of the buildings by a flue over one side.

An arched plate of iron called the shoe, made sometimes of Newcastle brick earth, is placed on the upper part of each cylinder to guard it from the immediate effect of the flame, which otherwise would melt it. The whole is enclosed in brickwork, in depth the length of the cylinders. The front or open end is then filled with the wood, cut into lengths of 6 to 8ins, to the ring. That is about two-thirds of the cylinder to the ring. The space before the ring is filled with earth, the cover fitted on and filled also with sand and ashes, and luted with clay, after which the fire is made on.

In the back part, which is a distinct room, appear the closed ends of the cylinders, in which are the four holes or short pipes. The two horizontal ones are filled up. The other two are luted to copper pipes of about 8ft in length. Through the upper one passes acid in the form of vapour, which is made to pass through a barrel into a wooden receiver through a siphon pipe immersed in water. When the vapour ceases to bubble in the water, the wood is sufficiently charred, which takes 5 or 5½ hours. The lower pipe conveys the tar into a barrel placed on the ground. 150lbs of coal is made in each cylinder at one charge. The quantity of acid and tar is not regularly ascertained, sometimes more being produced than at others. The smell and appearance of this tar resembles that made from sea coal and the acid is used for some purpose by dyers.

When the coal is taken from the cylinders, it is put into copper pans, covered up and set to cool till wanted. It is ground by a mill similar to that for sulphur, then passed through a sieve like the powder sieves. This reduces it to a very fine powder in which state it becomes part of the composition of gunpowder."

The Fisher Street and Faversham descriptions are clearly independent and different in detail but also remarkably close. Thus the cylinders are said to be about 2ft in diameter in both accounts but 6ft long in one and 8ft in the other. Similarly the pipes are said to 7ft long at Fisher Street and 8ft long at Faversham. Again, the upper end of the 3 to 4cwt output of charcoal from three cylinders at Fisher Street matches the 150lbs from one cylinder at Faversham. One minor difference is that the cordwood at Faversham was cut 6 to 8 inches long, consistent with the pieces on the floor near the workman with the chopper in the drawing, but 18 inches long at Fisher Street. Also the length of time for charring was 8 hours at Fisher Street but rather less at Faversham. The general conclusion however must be that the two accounts, strictly three because of the two versions of the Faversham booklet, seem to give a consistent and accurate description of the process.

W G HARVEY'S GUNPOWDER PRICES IN 1816

Alan Crocker

We have recently acquired through a friend, Robin Clarke, a circular letter of 1816 from William Gillmore Harvey, the gunpowder manufacturer of Battle in Sussex, giving reduced prices of gunpowder. A transcript is given below, handwritten inserts in the original being indicated by square brackets.

"[Sir]

Battle, 1st March, 1816

I have the pleasure of advising you that Gun-powder has this Day been reduced in price, and is now sold as at foot. Your commands will meet every attention and much oblige,

yours obediently,

W. G. Harvey.

F [150s/]	FF [155s/]	FFF [157s/6d]	
Tower proof Musket		[165]	
Ditto . . . Cannon		[160]	
Single Seal in papers		[230]	Per Barrel of 100lbs
Double ditto, ditto		[270]	
Superfine treble strong ditto		[300]	
Ditto in Canisters		[330]	

[15] Per cent discount"

William Gillmore Harvey operated the gunpowder mills at Battle in the late 18th and early 19th century. The *Gunpowder Mills Gazetteer*, under "Battle and Sedlescombe" (p 27), quoting H Blackman, *Sussex Archaeological Collections*, 64, 1923, pp 109-22, states that the firm of Curtis's & Harvey was formed in 1817 and removed to Hounslow. It seems likely that Harvey did indeed leave Battle in 1817 but the firm of Curtis's & Harvey was not in fact formed until 1820. Since the *Gazetteer* was published we have acquired the deed of Copartnership between Charles Berwick Curtis, Thomas Curtis and William Gillmore Harvey, which is dated 23 June 1920. This describes Harvey as a gunpowder manufacturer of Hounslow and states that the Curtis's had lately purchased the mills from Stephen Henry Greuber. Indeed the *Gazetteer* under "Hounslow" (p 17), quoting Luke Over's history of the mills, states that Harvey & Greuber were there in 1818-19.

It is interesting that the W G Harvey letter is dated 1st March. It was on 1st March and 1st September that the East India Company held its sales of saltpetre and it was the price of saltpetre which was the main contributory factor to that of gunpowder, which fluctuated considerably. The manufacturers in the south-east of England fixed their prices at the saltpetre sales. For example, the letter book of William Tinkler, gunpowder maker at Chilworth, Surrey, which is held in the Guildford Muniment Room, shows that on September 1st 1790 the price of FF powder was raised from £3.15s.0d to £4.7s.6d but six months later was reduced to £4.0s.0d. In her thesis on *The Lowwood Gunpowder Company*, Alice Palmer notes that in 1799, the Battle mills circulated a letter quoting a price of £9.0s.0d, for F powder, which was reduced to £7.0s.0d in 1800 and to £6.0s.0d in 1801. Harvey's prices in 1816 are close to these but had clearly been higher during the period of the Napoleonic Wars.

The letter is on a piece of hand-made laid paper with the watermark SM 1814 in a double oval ring. This same watermark, but with the date 1815, is recorded in Thomas Balston's book *William Balston, Paper-maker, 1759-1849*, Methuen, London 1954, pp 166-7. It is attributed to Springfield Mill at Maidstone in Kent, which was operated by W Balston & Co from 1814 to 1849. The attribution is supported by the fact that the watermark was found in two letters written by Balston himself and it is unlikely that he would be using, at his own mill, paper made elsewhere.

THE GUNPOWDER MILL AT PONT-DE-BUIS, BRITTANY

In Newsletter 16, p11, Gerry Moss noted that he had encountered a gunpowder mill at Pont-de-Buis in Brittany. We did in fact have an 80-page large-format (237 x 319 mm), well-illustrated, glossy, soft-covered book on the mill, published by the establishment in 1988 to celebrate its 300th anniversary. We would not normally have a copy of such a book but this one was given to us by the manager of the Aubonne gunpowder mill in Switzerland when we visited there in 1991 (see Newsletter 10, p6). It is entitled *La Poudrerie de Pont-de-Buis, 1688-1988* and, although the authors are not named explicitly, André Le Gall and Yvette Hetet are acknowledged for the research and for producing the book. It contains sections on the origins of the mill, its site on the River Doufine, black powder, the Revolution, an attack on the works in 1795, the 19th century including a note on the social and human aspects of the works, the advent of *Poudre B*, World War I with 5646 workers, between the Wars, World War II, after the War, a terrible accident in 1975 in which 3 people were killed, reconstructing the works, the powder works in 1988 and finally a note on the local community. The whole book is very attractively produced with over 70 illustrations, some of which are in colour. However, like many commemorative volumes, it is designed to impress the general public and the authorities rather than provide detailed information for historians, particularly those interested in manufacturing processes.

Patrice Bret saw Gerry Moss's note and sent us a chapter, entitled *La fabrication des poudres et la poudrerie de Pont-de-Buis, 1750-1815*, from the book *La Bretagne des savants et des ingénieurs, 1750-1824*, edited by Jean Dhombres, Editions Ouest-France, Rennes, 1991, pp208-21. It is by André Le Gall, one of the "authors" of the above book, and Patrice explained that Le Gall is a former powder and explosives engineer and that the chapter contains interesting information. However he also said that much of it is of a general nature rather than dealing with Pont-de-Buis itself and pointed out that the only photograph is of equipment at Vonges, another French mill, and not at Pont-de-Buis. There is also a black and white reproduction of part of an 1843 plan of Pont-de-Buis which is printed complete and in colour in the commemorative book. The text covers some of the same material as the early sections of this book but there is more detail especially on the technology. For example, the raw materials are discussed and there is an emphasis on the technical and scientific improvements of 1775 to 1815, resulting from the work of Lavoisier and others. If you would like a copy of this chapter, please send us £1 in postage stamps.

LAVOISIER BICENTENARY

In 1994, the French Academy of Sciences commemorated the bicentenary of the death of the famous chemist d'Antoine Laurent Lavoisier, who made major scientific and technical contributions to the manufacture of gunpowder. The 90-page illustrated catalogue of the Lavoisier exhibition is available for 50 FF (plus p&p) from Archives de l'Académie des sciences, 23 quai de Conti, F-75006 Paris. Also the 352-page illustrated report of the Lavoisier conference, containing 30 papers by international specialists, is available for 340 FF (p&p included) from Lavoisier, 14 rue de Provigny, F-94236 Cachan Cedex. Five volumes of the Correspondence of Lavoisier, covering the years 1762 to 1788 have been published and are available from Librairie scientifique et technique Albert Blanchard, 9 rue de Médicis, F-75006 Paris.

SOME EIGHTEENTH CENTURY GUNPOWDER BOOKS

David Hansell

I have been browsing in libraries and wonder if anyone knows of J Braddock, *A Memoir on Gunpowder*, 1829, Fort St George, Madras. It is in the Chemical Society Library - bound in with J Stephenson *On the manufacture of saltpetre*, 1835, Calcutta, and claims to reflect practise at Waltham Abbey. A cross-check by someone who might confirm that could be interesting.

Secondly, C W Vincent edited *Chemistry ... as applied to art & manufacture*, c1890, which I came across in the Royal Institution Library. There are articles on "Explosives" and "Gunpowder", the latter quite full. The actual author is not given but from the list of contributors I would pick F A Abel. Again it is said to represent Waltham Abbey practise. Unfortunately it refers to work by a variety of chemists on quality and proportions of ingredients but without references. Do we know anything of Violette, Proust, Binsen and Schischkoff in this connection?

PUBLICATIONS RECEIVED

Patrice Bret, "Une administration non révolutionnée? Prosopographie des commissaires des poudres et salpêtre 1775-1817" in *1789-1799 Nouveaux chantiers d'histoire révolutionnaire. Les institutions et les hommes*, Michel Vovelle ed, Editions du CTHS, 1995, pp49-67.

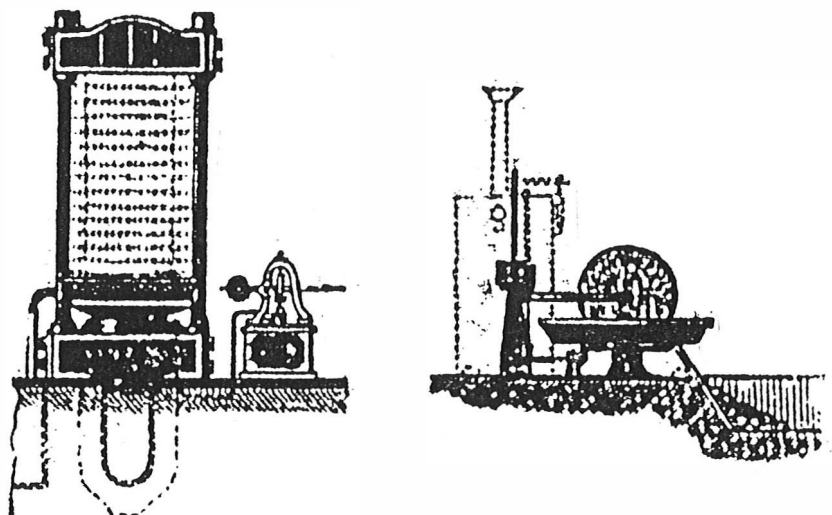
Patrice Bret has just sent us a reprint of this paper and has explained that he presented it at a conference in October 1992. We have not had time to prepare a review for this Newsletter and would be pleased to send a copy to any member prepared to do so for Newsletter 18.

E M Patterson, *Gunpowder manufacture at Faversham, Oare and Marsh factories*, Faversham Society, 1995. Faversham Papers no 42, ISSN 0014-892X, ISSB 0 900532 75 0. A4 soft covers, 23pp + x, 2 maps. £1.95 (plus £0.50 p&p) from Fleur de Lis Heritage Centre, Preston St, Faversham, Kent ME13 8NS.

Arthur Percival has sent us a review copy of this new book which we will review fully in Newsletter 18. However as it is so relevant to the interests of Group members we felt that it should be given a brief notice here. The text is essentially the 1928 Method Book for the Oare and Marsh Works at Faversham and the maps are labelled site plans of July 1920. The book contains a wealth of detailed information and will provide valuable source material for anyone interested in the gunpowder industry. However it is all presented in a very uncritical manner and it is very unfortunate that there are no cross-references to Wayne Cocroft's recent book, *Oare Gunpowder Works*, in the same series (reviewed in Newsletter 16, p22). A good example of the frustration I experienced is provided by the section on the incorporating mills at the Oare Works. There were eight suspended edge-runner mills and I was very excited to discover that four of these were known as "Kynoch" mills and four as "Chilworth" mills, suggesting that they came from these sites. They are said to have been in 8 buildings labelled 12. On the map there is one building labelled 12 and this is only about 25x20ft in size! So I looked at Wayne Cocroft's book and found that eight new incorporating mills were built as part of a major refurbishment of the works in 1926. Furthermore, Wayne shows a photograph of one of these mills (Fig 19) and they are not suspended, although apparently when they were transferred to Ardeer (Figs 20-23) they became suspended! So it's a stimulating but infuriating book and of course incredibly good value.

Alan Crocker

In Newsletter 16, pp6-10, I wrote about gunpowder machinery supplied to the Japanese and Italian Governments, as recorded in Spon's *Dictionary of Engineering* of 1872. John Day, of the Surrey Industrial History Group, has now sent me copies of two undated Gwynne advertisements. The first, occupying a full page, is for Gwynne & Co, Hydraulic and Mechanical Engineers, Essex St Works, Strand, London WC. It consists of 26 small engravings of equipment, two of which may be relevant to gunpowder making and are reproduced (x2) here. One is an "improved hydraulic press" and the other what appears to be an edge-runner mill which is described as an "improved mortar and loom mill driven by a steam cylinder direct". A footnote gives the following caution: "To prevent confusion with a new firm of similar name, and recently established, please address the Original Manufacturers and Patentees in full".



The second advertisement occupies half a page and is for John & Henry Gwynne, Engineers of Hammersmith Iron Works, London office 89 Cannon St EC. This is the firm mentioned in Newsletter 16 and presumably the subject of the above caution. They were manufacturers of all descriptions of hydraulic machinery including "improved gunpowder machinery", "hydraulic presses" and "patent turbine water wheels". The advertisement includes two engravings of pumps and states that they were awarded two first-prize medals at the Indian Exhibition at Berar and Gold and Silver medals at Brussels and Havre. However the Japanese and Italian Governments do not appear to have been satisfied with the J & H Gwynne early 1870s gunpowder installations as in 1880 and 1885 respectively they were purchasing equipment from the German firm Gruson (see article on "Maschinen zur Pulverfabrikation" in this Newsletter).



GUNPOWDER MILLS STUDY GROUP: NEWS-SHEET FEBRUARY 1996

GMSG Meeting in Paris 11-12 May and ICOHTEC Meeting in Budapest 7-11 August

Paris. Our colleague and GMSG member Dr. Patrice Bret of the Centre National de la Recherche Scientifique is organizing our spring meeting on the weekend of 11-12 May, 1996. We have a provisional programme in which it is proposed that on the first day we should assemble at 13.30 for a quick tour of the Arsenal district, home of the Gunpowder Administration and Saltpetre Refinery until the end of the nineteenth century, before taking a coach to Essonnes and Le Bouchet. We shall explore their gunpowder associations, then return to Paris for the evening.

On Sunday morning we shall proceed to Sevran-Livry where there are the surviving buildings of the national Gunpowder Works, now a museum, and the home and laboratory of the late Alfred Nobel. Here a full programme is being planned including a guided tour and several talks. The meeting will end at 16.00.

Travel and accommodation should be arranged independently, but Patrice has sent information about Eurostar and suitable hotels. No charges, except probably a small one for administration.

Please get in touch with me quickly if you wish to learn more, or with Alan & Glenys Crocker, and we will send further information. If you decide to join in it will be necessary for me to have the following details before 7 April, to meet Ministry of Defence requirements for entry to Le Bouchet:

Name; First Name; Title and Function; Place & Date of Birth.

This will be a great opportunity to learn about this subject in the most interesting way - by visiting the sites with an expert. We hope our Group will be well-represented on this special occasion.

Next, Budapest, where ICOHTEC will hold its 23rd Symposium from 7 - 11 August. There will be a Gunpowder Section for those of us with this special interest, and other sections for those with wider concerns in the History of Technology. We are promised a boat trip on the Danube, as well as the opportunity for other tours. The cost will be an inclusive 550 Deutsch Marks per participant, 350 per accompanying person. All will be most welcome and proposals for papers are invited. Do get in touch promptly if you are interested.

Please contact me at home or through the Centre for the History of Technology at the University of Bath.

Brenda Buchanan,
13 Hensley Road, Bath, Avon, BA2 2DR, UK., (01225) 311508.

