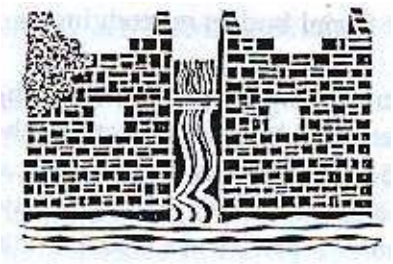

Gunpowder & Explosives History Group

Newsletter 3, 2001

GEHG AUTUMN MEETING

Priddys Hard, Gosport, Portsmouth

Explosion! Museum of Naval Firepower

Saturday 3 November 2001

PROGRAMME

10.30	Meet at entrance to Priddy's Hard
11.00	Group meeting Education Centre
12.00	Self guided tour
13.00-14.00	Lunch. Members may bring sandwiches or use the site's café
14.00	Meet at reception desk, Mr Derek Gurney will show the group areas of the site not normally accessible to the public.
16.00	Tea at café and disperse

Priddy's Hard was bought by the Board of Ordnance in 1759 and within a bastioned trace a Grand Magazine, capable of holding 6,000 barrels of gunpowder, was completed by 1771. The site expanded over the next two centuries, in the late nineteenth century beyond the defences cordite and lyddite stores were built. During the First World War a shell filling factory was established, although this has largely been cleared. The site remained in naval hands until the early 1990s when the Ministry of Defence released it for disposal, a grant from the National Lottery has subsequently enabled the site to be developed as a visitor attraction. In addition to preserving this historic site, Explosion! has important collections of naval armaments and explosives related items, for further information see www.explosion.org.uk

TRAVEL DIRECTIONS TO PRIDDY'S HARD

By Road: M27 to junction 11, follow A32 to Gosport and signs to *Explosion!* which is located at the end of Heritage Way, there is a free car park By Rail: Take the train to Portsmouth Harbour Station and then the ferry to Gosport, on the Gosport side turn right and follow the Millennium Promenade to Explosion!, about 20 minutes walk or catch the No.87 bus.

DORCHESTER POWDERMILL, MASSACHUSETTS

Arthur Percival has sent some details of the Dorchester powdermill Massachusetts which he received from an American family historian Don Evenden derived from the *Dictionary of American Biography* 1931. He writes that on 22 August 1673, the Reverend John Oxenbridge, the Reverend James Allen and three laymen formed a partnership to build a powder-mill at Neponset in the township of Milton, across the river from Dorchester, Massachusetts. They soon took on two more partners and in 1675 appointed Walter Everendon, who had manufactured gunpowder in England, to be the overseer of the mill.

Within three months, the mill was running at full capacity to supply gunpowder for settlers for the prosecution of King Philip's War (1675-77). This was a bitter conflict between the local Wampanoag tribe, their allies and the English colonists. Philip, or Metacomet, was the leader of the Wampanoag. The Massachusetts General Court considered the mill of such great importance that they arranged for a guard to placed on the mill, and allowed the mill owners to impress men to build a watch-tower on the other side of the river.

The biographic entry claimed that Walter Everendon was the first man to make gunpowder in America, and the powder was reputedly of excellent quality.

In 1701 Walter Everendon bought out one of the partners and gradually acquired the interest of all the others but one. He died in 1725, a year after selling out his interests to his son. The family, whose name is variously spelt Everden and Everton, continued to manufacture powder until after the American Revolution, although by 1775 they appear to have fallen into poverty.

Arthur Percival notes that Everendon is Faversham name, although it is fairly common throughout Kent.

Editor's note: Arthur Pine, Van Gelder and Hugo Schlatter 1927 *History of the explosives industry in America*, Columbia University Press, New York

In this book, they state that the first gunpowder mill in America was established at Pecoit, Massachusetts in 1639. They confirm that a mill was bought at Milton in 1673 and that in 1675 an agreement was made to build at powder mill at Neponset and note the association of Walter Everendon with the enterprise.

THE IMPORTANCE OF A GOOD BREAKFAST

Keith Fairclough

In 1621 the East India Company set up gunpowder mills at Chilworth to produce gunpowder from saltpetre imported from India. Until December 1621 the Company organised production itself., but in that month sub-contracted the mills to Edward Collins who produced gunpowder for the Company from the imported saltpetre it supplied to him. Then in 1632 the Company lost the right to produce gunpowder, and Chilworth mills were shut down for a couple of years.(1) During these years, an exchange of opinion between Collins and the Company in 1630 makes it clear that the Company was importing coarse saltpetre, which was delivered to Chilworth where it was refined prior to incorporation. In October 1630 Collins complained that the saltpetre he had recently received was so bad that he lost 38lbs per cwt when in earlier years the loss had only been 18lbs per cwt. The Company responded by promising to send better quality coarse saltpetre that had been dried out properly, but maintained the previous allowance of 18lbs per cwt fro refining.(2)

Then in September 1632 the Company decided to refine the saltpetre at its dockyard at Blackwall before sending it to Chilworth.(3) No reason is minuted, but the Company's right top produce gunpowder was under threat at that time and this may have stimulated the decision. One week later the Company decided that it would be better to refine the saltpetre in the kitchen of its London headquarters, Crosby House, as this would be a cheaper and safer alternative to refining it at Blackwall. At the same time it decided to write to its factory in India instructing them to send no more saltpetre as the mills at Chilworth were to be shut down.(4)

The decision to use the kitchen at Crosby House aroused some concern, on the grounds that it was offensive and inconvenient, so the following week it was decided to refine the saltpetre in a shed in the back garden at Crosby House. It was noted that the scum left over from this refining would provide good manure for the gardens.(5) However, a week later, after complaints from neighbours that the refining would be offensive and dangerous, it was once more decided to set up facilities at the Blackwall yard.(6) Once again this decision was reversed the following week on the grounds that recent works at Blackwall meant there was insufficient room to carry out the work.(7) on 11 October advice was sought from Mr Dikes, who recommended setting up 'onely two furnaces within the chimney' in the kitchen at Crosby House.(8) Work must have started soon afterwards.

Then in April 1633 it was reported that the saltpetre workers at Crosby House were reporting sick and there were fears that their lives were in danger. The reason that was minuted was that the workers were coming to work without having breakfast, and it was thus ordered that they be given 'hott Cawdles' to eat before they started work, as this would prevent the steam and smoke from entering their stomachs and thus prevent the sickening occurring. The Oxford English Dictionary defines the word caudle as a warm drink, consisting of thin gruel mixed with wine or ale, sweetened and spiced, given chiefly to sick people. At the same meeting however there was some discussion over whether to sell saltpetre in a refined or coarse state and a cost comparison was called for.(9) This comparison emphasised the great charge of refining the coarse saltpetre, although no details are given.(10)

In June 1633 the Company received an offer from an agent representing John Evelyn who wanted to purchase the coarse saltpetre from the Company.(11) the outcome of

these negotiations are not minuted, but it probably brought the Company's interest in refining its imported coarse saltpetre to an end. The matter is never noted again.

1. K R Fairclough 2000 The east India Company and the production of gunpowder 1625-1636 *Surrey Archaeological Collections* 87

2. British Library, East India Company Court minutes, B/14 ff.20, 66-7

3. Ibid, B/15 f.61

4. Ibid, B/15 f.65. For details of Crosby House: W. Foster, 'The East India Company at Crosby House, 1621-1638', London Topographic Record, Volume ?? (1913), 106-39

5. British Library, East India Company Court minutes, B/15 f.71

6. Ibid, B/15 f.77

7. Ibid, B/15 f.88

8. British Library, East India Company Court minutes, B/15 ff.92-3

9. Ibid, B/15 f.255

10. Ibid, B/15 f.304

11. Ibid, B/15 ff.304, 313

PETITION BY WALTHAM ABBEY WORKERS – AUGUST 1809

Some time ago, while trawling through Board of Ordnance Extracts from the Minutes, I made some brief notes of an item that at first appeared rather trivial. On reflection however, I realised what a good example it is of the Board expecting the maximum use out of the basic resources that were provided for its workers. I regret that I am not able to quote in full.

The workers at the Faversham Mills had recently been granted some indulgences. There was a reaction by Waltham Abbey workers that resulted in a petition 'for a new greatcoat' to be issued once every three years, to certain of them. These included corning house men, mill men, stove men, cylinder house men and foremen.

The old coats would be returned to be repaired 'in the strongest manner possible without regard to shabbiness of appearance' then re-issued to other men employed in the manufactory. These were described as the boatmen, drawers & setters of stoves and others who have continually to drag the boats with powder in its different stages of process between the various buildings including the magazines, amounting often to many miles in the course of the day.

After three more years of wear, the coats were again to be returned and repaired. If they were unsuitable for further repair then the cloth, where possible, they would be used to repair others.

Coats that could neither be repaired again nor used to repair others, were to be made into mops 'of which a great number are necessarily used in the manufactory'.

PRO WO 47/2460 Extracts from Board of Ordnance Minutes August 1809

Beryl Williams

ROBERT ASHBEE, MANAGER CURTIS'S AND HARVEY, HOUNSLOW

Arthur Percival has sent in the copy of a review of *The Erotomaniac: The secret life of Henry Spencer Ashbee* by Ian Gibson published by Faber, which appeared in *The Guardian* 17th February 2001. It reveals that Henry was born in London in 1834 and that his father, Robert Ashbee, from Faversham, Kent, was manager of the Curtis's and Harvey gunpowder factory at Hounslow. Arthur raises the possibility that Robert Ashbee began his career in the Faversham gunpowder industry, later moving to a better-paid position at Hounslow.

NINETEENTH CENTURY TORPEDO TESTS

Bill Harna of Bath has found a description of tests to determine the best type of explosive for use in torpedo heads.

Bath Chronicle, 5 Dec 1873, p3 District News

A series of torpedo experiments took place in the sea at Weston-super-Mare; the objective being to test the comparative strengths of gunpowder, guncotton and a new combustible known as picric powder. In all 15 torpedoes were laid in the bay varying in depth of water from 10 feet to 20 feet connected with which were cables stretching to Knightstone where they were subsequently attached to a galvanic battery.

ROBBERY AT WALTHAM ABBEY ROYAL GUNPOWDER WORKS, 1851

Arthur Percival provided this note on a robbery at Waltham Abbey in 1851, *Kentish Gazette*, Tuesday 22 April 1851, page 2.

''Extensive Robbery'' …the storekeeper's office, Waltham Abbey Royal Gunpowder works (night of the 8th inst.) nearly £500 was stolen from a chest (lock blown with gunpowder!)(Mr Topham storekeeper).
Apprehended: George Rowe, a licensed victualler, landlord of the 'Compass Inn' in the Borough; John Cornish and Charles Eves, nightwatchman at works, and Jesse Griffiths, a costermonger and fish-dealer, living in the neighbourhood'.

EXPLOSION AT CHILWORTH, 1901

Mary Yoward has found an account to the 1901 explosion at Chilworth in a local Hampshire newspaper.

Hampshire Chronicle, 16 February 1901

'A fatal explosion occurred in the black corning house at Chilworth Gunpowder Co. works on Tuesday morning, by which six men lost their lives and one was injured. The explosion occurred soon after the workers returned from breakfast. The building – substantially of brick and tiles – was wrecked. The shock was felt for miles and pedestrians in the immediate neighbourhood were thrown down.'

MATERIAL PROVIDED BY JIM BUCHANAN

Jim Buchanan has sent in copies of a number gunpowder advertisements, mainly relating to sporting powders, some providing useful information on the location of American powder mills. He also sent a copy of the Explosives Inspectorate Annual Report for the year 1891 published in 1892, see also GMSG Newsletter 26, **8**.

(1) The E.C. Powder Company Limited, advertisement for smokeless nitro cotton powder.
(2) The E.C. Companys Smokeless Sporting Powders, about 1893.
(3) E.C. First and Quickest Smokeless Sporting Powder, about 1910.
(4) Orange 'Extra' Sporting, made by Laflin & Rand Powder Company, Pottsville, New Orleans.Schultze Gunpowder, advertisement about 1893.
(5) Schultze Smokeless Gunpowder, illustrates an Eley No.12 cartridge with the legend 'The Warminster Cartridge Loaded with Schultze' and another No.12 cartridge with the legend 'Loaded with Schultze Gunpowder'.
(6) The Schultze Gunpowder Company, about 1904, illustrates two Schultze gunpowder tins and three No.12 cartridges 'Gas-tight cartridge case for Schultze Sporting Powder Made in Great Britain', 'The Warminster Cartridge loaded with Schultze','The Yeoman Smokeless Cartridge Made in Great Britain'. Images reproduced below.

(7) King's Smokeless, The King Powder Company, Cincinnati, Ohio, USA - advertised as the only nitro powder made mechanically.
(8) Page from an American magazine, late nineteenth century, includes advertisements by Laflin & Rand Powder Company, E I Dupont de Nemours & Co, Oriental Powder Mills, Boston, Massachusetts, and Von Lengerke & Detmold the American agents for Schultze gunpowder.

Her Majesty's Inspectors of Explosives 1892 *Annual Report for the Year 1891* Sixteenth Annual Report HMSO

The report follows a standard format and for example reports that 125 explosives factories, including gunpowder works, were licensed, although two were disused. 372 magazines were licensed or operating under a continuing certificate, in this instance five were disused. A footnote also refers to a magazine on Erith Marshes, Kent, which was established by the Explosives Inspectorate and the Metropolitan and City Police for storing seized explosives. Its operation was exempt from Explosives Act. Notes are found on inspections of licensed premises and some visits to foreign factories, reports on accidental explosions at home and abroad, which often contain useful information on manufacturing techniques. Notes are also found on what we would call terrorist incidents, but at the time were termed `outrages'. Appendices at the end variously list factories and the classes of explosives they manufactured, the distribution of factories, magazines and firework factories by county, other tables list Explosive Inspectorate Special Reports and a list of all accidental explosions during 1891. It concludes with an index. Licensed premises are referred to through out by number, a code that may be gradually deciphered as the name and number usually occur in the explosion reports. This brief outline of just one volume indicates the wealth of information contained in these reports, copies are available at the Public Record Office, Kew reference LAB 59.

Jim draws our attention to two incidents which reflect the foolhardy disregard for gunpowder and its power some users displayed.

p108 10 January 1891, Saltwells Colliery, Rowley Regis, Staffordshire 'The deceased appears to have been carrying a quantity of gunpowder in paper and a lighted candle. According to one witness he had both the powder and candle in the same hand. Under these circumstances it is not surprising an accident occurred. The whole proceeding showed great recklessness; and the jury censured the deputy-manager fro giving out the powder in paper.' One person killed

p125 12 October 1891, Workshop in Weaman Street, Birmingham 'Edward Perrin had a number of bags of damp meal powder, which he placed in front of and some distance from the fire. This not being quick enough, he actually emptied it the powder out of the bags, and placed some on each hob, about 7lbs in all. The deceased was his step-daughter, Mary Carpenter. Considerable damage was done to the house.*

*Proceedings were afterwards (at our instance) instituted in this case for 'illegal manufacture', and a conviction was obtained, and a small fine inflicted.

THE MUNITIONS INVENTIONS DEPARTMENT: A CASE STUDY IN THE STATE MANAGEMENT OF MILITARY SCIENCE, 1915-1919

Michael Pattison has sent details of his Phd thesis which was submitted to the University of Teesside in 1981.

This thesis, a historical study in the relationship between science, warfare and technological change, explores a crucial period in the promotion of scientific advice to the military in Britain. The study focuses upon the previously unaccounted activities of the Munitions Inventions Department of the Ministry of Munitions: one of the largest and most important of several government advisory bodies which held responsibility fro scientific and technological innovation during the First World War. The department's history illustrates the nature and development of scientific enquiry in the context of military organisation and the State's attempts to encourage wartime recovery of British science and industry.

Particular attention is paid throughout to the way in which the Department recruited and organised eminent scientists and industrialists in support of military, and to the differing and changing perceptions of the role of these civilian advisors from the viewpoints of the State, the military, the public, and the scientists and industrialists themselves. Thus, a picture emerges of the changing relationship between civilian scientific advisers and the military throughout the war. In order to illustrate these significant changes three important examples of the work of the Department are considered in detail (the evaluation of inventions, nitrogen fixation research, and anti-aircraft experiments), and an assessment is made of the Department's additional function of gathering scientific and technical intelligence.

Conclusions are drawn about the considerable political importance of the Department, about its limited effectiveness in devising new weapons technology, and about the influence of particular individuals on the operation of the Department. The study also shows why it was that inventions departments of this kind should proliferate only in the Great War and why official proposals for a post war ministry of Invention and research were eventually rejected in 1919.

THE DEVIL'S PORRIDGE

This is the title of an exhibition in St Johns Church, Eastriggs, Scotland commemorating the First World War factory at Gretna. His Majesty's Factory Gretna was the largest explosives factory constructed during the Great War, stretching around nine miles from Eastriggs to Gretna and across the border to Longtown in Cumbria.

The exhibition is at St Johns Church, Dunedin Road, Eastriggs, it is open Wednesday to Saturday 10am to 4pm and Sunday 12 noon to 4pm, admission is 70 pence. Telephone 01461 40460.

AIR RAIDS ON FRENCH EXPLOSIVES FACTORIES

A magazine article describing the exploits of 617 Squadron, the unit responsible for the Dam Buster raid under the command of Leonard Cheshire, recounts attacks on two French explosives factories. The explosives factory at Bergerac, 50 miles (80km) east of Bordeaux, on the river Dordogne was attacked on 18 March 1944. Its

defences were negligible and the factory was devastated. Two days later on 20 March the explosive factory at Angouleme, 75 miles (121km) north-northeast of Bordeaux was attacked by 13 Lancasters and destroyed.

Bennett, P 1994 617 – the Cheshire Era Part Three *FlyPast* March 1994, 59-61

TROISIÈMES JOURNÉES SCIENTIQUES PAUL VIELLE CITÉ DES SCIENCES ET DE L'INDUSTRIE 19-20 OCTOBRE 2000

Wayne Cocroft

This conference celebrating the work and influence of the late nineteenth century French chemist Paul Vielle was jointly organised by the Centre de recherché en histoire des sciences et des techniques (CRHST) and the Association des Amis du patrimoine poudrier et pyrotechnique (A3P). The title of the conference was 'Instrumentation, experimentation et expertise des matériaux énergétiques (poudres, explosives et pyrotechnie), du XVI siécle à nos jours'. The conference was well attended by around 125 delegates, a mixture of professional explosives engineers and chemists, retired explosives professionals and historians. The list of speakers and papers below provides an indication of the excellence of the conference programme. Conference organisation and hospitality was excellent. It is believed that it is intended to publish the proceedings of the conference.

Seymour Mauskopf (Duke University, USA) - The French tradition from Piobert to Vielle

Patrice Bret (CRHST) - Contrôle de qualité, expertise et recherché expérimentale au temps de la poudre noire: de l'éprouvette d'ordonnance de l'inflammabilité

Vittorio Marchis (Politecnio, Turin) - L'essai sur la poudre la de Papacino d'antonio er ses développements à l'Arsenal de Turin

Seynmour Mauskopf (Duke University, USA) - Instruments in the relationship between the US Ordnance and the Du Pont family

Michael Gordin (Harvard University, USA) - No Smoking Gun: D.I. Mendeleev and Pyrocollodion Gunpowder

René Amiable (3AP) - Les instruments scientifiques de Paul Vielle au XIX sièle

Henri Tachoire (Université de Provence, Marseille) - Les techniques de mesure à la bombe calorimétrique, de Paul Vieille à la micro-mesure et à la micro-mesure et à la bomb rotative

Jean-Louis Paulin (SNPE) - La bombe manométrique

Dietrich Grüne et Barbara Baschung (ISL) De la bombe manométrique de Vieille à la bombe plasma: un apercu de l'évolution de la loi de combustion de Vieille

Alain Carrière (ISL) – Sur l'évolution des modèles de Ballistique Intérieure de Paul Vieille à nos jours, et leur evaluation sur diverses armes, des pistolets au canon de Jules Verne

Jean Tranchant (A3P) Que penser des épreuves de stabilitié des poudres B depuis Paul Vieille?

Claude Fauquignon (ISL) Le tube à choc de Paul Vielle: motivations, description de l'appareil et de l'instrumentation, apport scientifique

Jean-Marie Buscaillon (CEG) Contribution de CEG au développement de la détonique et de ses applications, à la connaissance de la physique des chocs de haute intensité et à la simulation, 1960-1980

Alexander Dolgoborodov et V N Marshakov (ICP, Moscou) Combustion of solid propellant under shock wave laoding

André Cachin (CEA) La measure des phénomènes brefs en détoniques

Patrick Mercier (CEA) L'expérimentation détonique au CEA-DAM:methods et moyens

Yves Guenguant (SNPE) Épreuves et modélisations des mécanismes de transition en modélisation

Pierre Naslin (DGA) Le role du laboratoire central de l'Armament dans l'instrumentation

Paolo Brenni (Istituto e Museo di Storia della Scienza, Florence) Lesd appareils pour la mesure de la vitesse initiale des projectiles

Vincent Bodard (CRB) L'évolution de la mesure des vitesses de combustion

Robert Gencey (ECP) L'École Centrale de Pyrotechnie

Pierre_Yves Hervé et Georges Cousin (ECP) Un grand pas en métrologie munitionnaire: le Stand du Point 2000

The conference ended with a visit to the Museé de la poudrerie nationale at Sevran-Livry.

ASSOCIATION DES AMIS DU PATRIMONE POUDRIER ET PYROTECHNIQE (A3P)

The Association of the friends of powder patrimony and pyrotechniques was formed in the early 1990s under the presidency of Réne Amiable. The group has an impressive list of aims, including the acquisition of documents and artefacts, the conservation of buildings and installations, research into the history of explosives and promoting its aims through conferences, exhibitions and publications. Amongst the

association's achievements is the placing of plaques to commemorate famous figures of the French explosives history, including Antoine Lavoisier, Gustave Maurouard, and Paul Vieille.

Further information about the association may be obtained from Monsieur and Madame Amiable, Association des Amis du Patrimoine Poudrier et Pyrotechnique, 38 rue Keller, 75011 Paris.

`Sir John (later Lord) Ligonier (1680-1770), Military Commander and Member of Parliament for Bath'. Brenda J. Buchanan, *Bath History* Vol.VIII (2000); 26 pages, 7 illus, 55 footnotes.

This is a wide-ranging and respectful even affectionate account of a man who arrived in Britain as a youthful Huguenot refugee and rose to the highest rank in the British Army. Scholarly and yet very readable, it reveals Ligonier as a successful commander in battle, an able administrator and a humane man.

He was Commander-in-Chief of the British Army 1757-66, a period which of course included most of that first world-wide conflict, the Seven Years War. GEHG readers may be interested chiefly in the coverage of Ligonier's time as Lieutenant General of the Board of Ordnance (1748-56) and then Master General (1759-63). In gunpowder terms, this was during the period when all powder for the Royal Navy and the British Army was manufactured by the private sector, and made in just one size of grain for cannon and smallarms alike an idea used also by the French, but destined to seem extraordinary to later generations. The quality of British forces' powder in Ligonier's time seems to have escaped the condemnation which it would attract in the American War (1775-84), and which led to Congreve's reforms. One wonders whether quality was really higher in the earlier war, or whether it was more that defeat in the later one led to investigation and recrimination. In the longer term, Ligonier's reputation in gunpowder circles will perhaps depend on that question.

Barbara's present article is naturally meant for a readership interested chiefly in the Bath connection, but she of course came to Ligonier via gunpowder studies, and will no doubt return to expand on that aspect of his remarkable life in due course.

David Harding

McCallum, Iain 'Achilles Heel, Propellants and High Explosives, 1880-1916' *War Studies Journal*, Summer 1999, Vol 4, Issue 1

During the years leading up to 1914, writes Ian McCallum, 'changes in design affected the main components of the artillery round, namely the shell with its bursting charge, the propellant to send it on its way and the fuze and primer to explode it in the right place and at the right time. Since World War 1 was more than any other an artillery war, and since ammunition is the ultimate weapon, these changes directly influenced the course of the fighting by land and sea.

The article details the remarkable advances which brought to an end the long reign of gunpowder and replaced it by the products of an explosives industry base don dynamite-related technology and firmly linked to the private sector. Crucial was the introduction

of smokeless propellants which by increasing the power and range or ordnance facilitated breech-loading systems, quick-firing guns and fixed cartridge ammunition. These in turn led to the development of high explosives such as the picric acid based melinite and lyddite used as the burster in French and German projectiles, and the safer and more reliable TNT adopted from about 1908 by the Germans.

McCullum argues that by 1914 the British had allowed themselves to fall behind in the quality of their projectiles and fuzes, and that in particular the failure to adopt TNT imposed a serious handicap, hitherto insufficiently recognised, on fighting efficiency of the British armed services. Only belatedly were steps taken by the War Office to remedy the situation, and not until early 1917 were the Ministry of Munitions and the armament firms able to produce fully effective gun ammunition. Meanwhile the deficiencies of British projectiles were exposed on land during the great battles of 1915 and 1916, and at sea during the naval attack on the Dardenelles and at the battle of Jutland.

Iain McCallum

MacDougall, Ian editor 2000 *'Oh! Ye had tae be careful': Personal recollections by Roslin gunpowder mill and bomb factory workers,* Tuckwell Press, East Linton, in association with The European Ethnological Research Centre and The Scottish People's History Trust. 220pp, 23 plates, ISBN 1 86232 126 4, price £9.99.

This book is the first in a new series entitled 'Flashbacks' based on oral history research by the Scottish People's History Trust. The Trust is a charitable body formed a few years ago. It aims to record the memories of working people and to preserve them both in the form of written archives and records and in the form of tape-recorded interviews. The Trust is also active in searching for, cataloguing and encouraging permanent preservation by deposit in public repositories of surviving documentary sources of working people's history and is committed to editing and securing publication of such sources.

The Roslin book recounts the memories of one man and ten women, the imbalance reflecting the greater longevity of the women workers. Their recollections were recorded in 1996-7. All the women worked at the 'bomb factory', the assembly section which was high above the mill itself, and only for the period of the Second World War. The one man, James Paris, worked at the mill from 1931 until its closure in 1954, except for a few war years when he was in the army, and his work brought him into contact with most parts of the business.

Their memories provide a great deal of detailed information about the factory and also about school days, social life, and experiences of work in other sectors of employment including work in other industries such as the paper mills, rubber works and a carpet factory.

The foreword and introduction are informative both about the book and the oral history project. One omission however is an explanation of the method used to represent pronunciation, which is intriguing, especially to one who once asked a local resident of Gorebridge for directions and was completely mystified by the reply! Presumably, it is written as if it were standard English with a Scottish accent. It would be nice to know, but it is perfectly comprehensible anyway, eg 'Ah didnae doff ma cap because ah didnae wear yin!' Eleven of the 23 photographs are of posed groups of workers and the rest are mostly exteriors of buildings and transport scenes,

reflecting what is available. The foreword comments that there is remarkably little archival evidence, making the oral testimonies an important source of information. There is an excellently detailed index, which is fascinating to read in itself.

The Tuckwell Press's list is available in a catalogue styled 'Seriously Scottish' and is available from The Mill House, Phantassie, East Linton, East Lothian EH40 3DG.

Glenys Crocker

Cocroft, Wayne D 2000 Dangerous Energy: The Archaeology of Gunpowder and Military Explosives Manufacture, English Heritage, Swindon
320 pages, 275 x 215mm, 380 illustrations, plans and figures, paperback, price £45

Much of the research into explosives carried out in Britain has been directed at the manufacture of black powder: material that had a military use, but which served the mining and extractive industries more. No attempt has been made to extend this research into the field of military explosives until this book appeared, together with the associated rescue of the Royal Gunpowder Factory at Waltham Abbey in Essex, north-east of London.

Because the rules on the closure of gunpowder and black powder works, involving the demolition of the buildings for safety reasons, work on the history and artefacts of the industry is difficult and is reduced to pure archaeology and interpretation. When the Royal Gunpowder Works at Waltham abbey closed, the opportunity was taken to protect the artefacts and, eventually, to preserve a substantial amount of the site. We are led to expect that the site will open to the public in 2001.

The first chapter is devoted to the history of gunpowder up until the latter half of the eighteenth century. This is followed by a chapter on the growth of the industry in the next hundred years, the period when the industry was reformed to provide a series of royal powder works. This chapter covers many of the problems of safety and transport and also the social conditions of the workers. In the latter half of the nineteenth century the Waltham Abbey works came to the fore. The fourth chapter details the development of the site, almost one kilometre long and interlaced with waterways, leats and mill ponds fed by the river Lea. Whilst Waltham abbey is the principal subject of the book, many other sites in Britain, such as Chilworth in Surrey, and elsewhere are discussed and illustrated. Many of the British sites were water-powered, but Waltham abbey progressed from water wheels to steam engines. The author describes the machinery and, where possible identifies its manufacturers. The extensive development of the site is shown on maps and plans. The period has left a substantial range of buildings and other artefacts. Gunpowder was being displaced by cordite as a propellant and this led to considerable changes in the industry and to the end of gunpowder works in the Lake District and Cornwall. The change in the way the materials were processed affected the design of nearly all the buildings.

The fifth chapter deals with the development of the chemical explosives industry and growth of gas a propellant. Other materials were produced, such as nitrated wood pulp or Shulze Powder, and this led to fresh building designs and sites lay-outs. Nitro-glycerine required a flow pattern from tanks at high level. Safety meant that all the buildings had to be protected by their own bunds. Waltham abbey had its own nitro-glycerine plant.

A sixth chapter deals with the industry during the Great War of 1914-18. There was a massive growth of the industry, with dozens of new and temporary sites spread over the whole country. We read descriptions not only of propellants, but also of the bursting explosives used with bombs and shells. The war brought the problems of the defense of sites with large buildings and of guarding against huge explosions at these big plants with mechanised production. Women became the principal source of labour in munitions factories, one of the factors that led to universal suffrage some twelve years after the war. The housing needs of the workers were met by the construction of estates around works like Chilworth, with its Art Nouveau parish church and hall, also at Longtown, near Carlisle. The nationalised brewery and public house system of Carlisle was another product of the wartime munitions industry!

After absorbing chapters covering the artefacts of later industries and of rocketry and the space age, the last chapter looks at the policy concerned with the protection and preservation of Waltham Abbey

The gazetteer is very useful and makes one wonder why this study was made earlier.

The book follows the standard English Heritage format, £45 seems a high price to pay for a 320-page paperback, but the quality of its scholarship and design and the likelihood of a short print run, make it not unreasonable

Available from: English Heritage Postal Sales, **www.english-heritage.org.uk**, price £45.00

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Kenneth Major

The Firework Book Gunpowder in Medieval Germany Translation of MS 362, University Library, Freiburg, Das Feuerwerkbuch c.1400 Transcribed by Gerhard Kramer – Translated by Klaus Leibnitz Introduction by Claude Blain, Arms & Armour Society
96 pages, 145 mm x 220 mm, 11 illustration 4 in colour, manuscript text, a commentary, bibliography, index and glossary, paperback, ISSN 0004-2439

Available from: Edmund Greenwood, Field House, Upper Dicker, Hailsham, East Sussex, BN27 3PY, £10 plus 75 p&p; £8 plus 75p for members of The Ordnance Society, The Muzzle Loading Association of Great Britain and The Newcomen Society.

PUBLICATIONS FOR SALE

Crocker, G 1988 *The Lowwood Gunpowder Works A Short History* £1 incl.p&p

Palmer, A 1998 *The Low Wood Gunpowder Company its inception and early growth 1798-1808* Gunpowder Mills Study Group Cost £7.50 members £6 p&p £1

Harding D F, 1999 *Smallarms of the East India Company 1600-1856* Volume III *Ammunition and Performance* Foresight Books Cost £5 p&p £1

Offprint of Chapter 21, Gunpowder – including relevant sections of contents list, introduction, index, etc

EXPLOSIVES ON THE INTERNET

Members are invited to submit details of Internet sites containing information on the history of explosives.

www.hsei.gov.uk

www.jpyro.com/journal/index.htm This is the page of the American *Journal of Pyrotechnics*, its main interests are modern pyrotechnics and fireworks. The web site contains a useful abstract of articles from each issue. A number of the issues contain material of historical interest, including in Issue 9 'Performance of study of Civil War vintage black powder' by K L Kosanke and F Ryan, and in Issue 12 'Speculation on the effects of gunshot or explosives residues on historic silk flags' by C S Tumosa.

www.geocities.com/Pentagon/7087/index.htm This site contains descriptions of many Second World War installation in Europe including a number of ammunition depots and explosives factories.

http://haas.purespace.de/index.html German website, part in English, Information on explosives, chemical agents and their production in Germany.

PRINCIPAL CONTENTS

Names in brackets indicate sources of information rather than authors