



**Gunpowder & Explosives History Group**

**Newsletter 5, Autumn 2002**

**GEHG AUTUMN MEETING**

Royal Society of Chemistry Historical Group\Gunpowder and Explosives History Group

**Sir Frederick Abel**

Waltham Abbey, Royal Gunpowder Mills, Essex, Friday 8 November 2002

- 10.15 Coffee
- 10.50 Introduction, Professor Jack Betteridge, Chairman RSC Historical Group
- 11.00 Professor Sy Mauskopf (Duke University) The First Wheeler Lecture *Long delayed dream: Sir Frederick Abel and the development of cordite*
- 12.00 Graham Vincent (BA Systems) *Decontamination of RGPM Waltham Abbey*
- 12.20 Lunch
- 13.25 AGM Gunpowder and Explosives History Group
- 13.45 Wayne Cocroft (English Heritage) *Chemical Archaeology of Explosives*
- 14.45 Brenda Buchanan (Chairman Gunpowder & Explosives History Group) *Sir Charles Frederick, Controller of the Royal Laboratory, Woolwich, 1746-1782*
- 15.15 Simon Coleman (National Cataloguing Unit for the Archives of Contemporary Scientists) Oswald Silberrad Superintendent of Research Royal Arsenal, Woolwich
- 15.35 Tea
- 16.00 Wesley Harry (Historian Royal Arsenal Woolwich) *The Chemical Laboratories at the Royal Arsenal Woolwich*
- 17.00 Concluding remarks. Meeting ends.

## GEHG VISIT TO THE ROYAL ARSENAL, WOOLWICH, 25 May 2002



One of the pavilions of the Royal Laboratory (1694-6) © Jim Buchanan

Not to be confused with Woolwich Dockyard, further west (building naval ships from 1513 to 1869), the Royal Arsenal, Woolwich manufactured big guns, shells and other munitions for the army and navy. Starting as an ordnance depot in 1671, on open land beside the River Thames known as The Warren, it made ammunition from 1696 and cast brass cannon from 1717. The name the Royal Arsenal was awarded in 1805. Its buildings, storage grounds and testing ranges developed eastwards, especially after the shortcomings revealed by the Crimean War (1854-56) and the Abolition of the Board of Ordnance in 1856. By the First World War the site covered two square miles and over 80,000 were employed there in the manufacture of munitions. It closed as a manufacturing establishment in 1967, but the Ministry of Defence (MoD) Quality Assurance Department remained until 1994.

Most of the land to the east has been cleared and redeveloped. The western part covering 75 acres containing many listed and unlisted buildings within a Conservation Area, have since 1997 been in the custody of English Partnerships and their successor the London Development Agency. Large areas of ground, saturated with history but also contaminated, were stripped away at great public expense in 1999, and new roads and drains laid. Housing and industrial developments, combining new construction and conversions are now proceeding apace. The Royal Artillery's, Heritage Lottery funded museum *Firepower* was opened in 2001. The local museum of the London Borough of Greenwich is also due to move on to the site shortly to present some of the Arsenal's archaeology and history with artefacts recovered from excavations.

The GEHG visit in May 2002 greatly benefited from the presence of Wesley Harry, who was the technical information officer and archivist at the MoD Material Quality Assurance Directorate until his retirement in 1987. In the morning Wesley outlined the Arsenal's history and then led a walk around the earliest surviving parts, notably the Royal Brass Foundry (1716-17, partly rebuilt 1771-4), the remains of the Royal Laboratory (1694-6), Dial Square archway (1717-20), and the Military Academy and Board Room and latterly officers' mess (1718-20). The distinctive architecture of the Academy building, now refurbished as part of the museum, and the militaristic archway, beyond which the ancillary operations of gun making were once performed, are now attributed to Nicholas Hawksmoor.

The Royal Laboratory was where shot, explosive shells' fuzes and fireworks were prepared. Its two, now derelict, but handsome pavilions, are perhaps the oldest surviving manufacturing buildings in the country, other than wind and water mills. Associated ranges, and the 1850s ammunition factory that infilled the large courtyard between them were cleared away in the 1960s. We also saw the New Laboratory Square, with two-storeyed ranges of the Napoleonic period. A 'Blitz Event' in the courtyard added music and bustle to the day. Two octagonal Guard Houses (1814-15) mark the site of the riverside stairs and the quay (now replaced by a flood wall), where gunpowder and other materials were landed and outgoing products despatched. The first shipping pier was added in 1856.

Lunch was eaten in the *Firepower* museum which occupies the former Paper Cartridge Factory (1855-56). It has a very handsome Polonceau trussed iron roof set upon decorative cast-iron beams and columns. On its upper floor, nimble fingered children once rolled the paper cartridges for muskets. After experiencing the displays here, and their sound effects, we made a quick visit to the large-exhibit hall, formerly a woodworking machine shop, with ornate ironwork that once carried line shafting beneath north light roofs of 1878 and later.

Malcolm Tucker then led a walk around the rest of the heritage area, ending at the former Chemical Laboratory. We passed various premises of the Royal Carriage Factory – its earliest buildings date from 1802-05, classically styled with a clock turret, surrounding a tall erecting shop of 1937 where tanks were built during the Second World War. The Mounting Ground opposite enclosed a building of 1887, where field guns were placed on their carriages. The metal working section of this factory in Building 7 has several ranges of former forges and machine shops from *circa* 1860 onwards, recently refurbished as industrial units, while the corresponding woodworking buildings were recently demolished, after archaeological recording.

Expanses of open ground marked the sites of other buildings, including the Shot and Shell Foundry (1855-6) where the handsome gatehouse has been retained. The iron-framed Armstrong Gun Factory (1856) still stands and is used as a British Library store. Nearby were former Shrinking Pits, cast-iron lined well shafts filled with oil into which red hot gun barrels were plunged to shrink them out of their liners. Malcolm has recently been engaged in recording these, when they were dug out during decontamination work. Our walk then passed the stone pilastered quadrangle of warehouses (1806-13) known as the Grand Store, for military equipment, and the massive four-storeyed Central Office (1908).

The Chemical Laboratory (Building 20), was established in 1864 by Sir Frederick Abel, War Office chemist, who had a major role in the development of cordite. It is a two-storeyed building in yellow, white and red bricks, in the sub-Italinete style favoured for gasworks offices. At one end we viewed through an open window the two-storeyed room with a ventilator ridge, where chemical tests were performed. Abel is said to have lowered materials and instructions to his assistants from the safety of the balcony. External balconies, now removed, presumably provided relief from fumes, and rooms at the other end of the building were used for photography. The building, later extended, is now being converted into flats, and Malcolm has been carrying out recording work with the Oxford Archaeological Unit for Berkeley Homes.

Thanks are due to Mary Mills who organised the visit, the London Development Agency's staff for arranging the meeting place, and Wesley Harry for coming along at relatively short notice and sharing his knowledge so freely. The writer acknowledges the work of Peter Guillery and his staff at the former RCHME contained in the reference below

#### Further reading

Harry, W, 1987 *The Royal Arsenal, Woolwich*, MoD Public Relations

Hogg, O F G, 1963 *The Royal Arsenal and its background origin and subsequent history*, OUP (2 volumes)

Royal Commission on the Historical Monuments of England, 1994 *The Royal Arsenal, Woolwich Historic Buildings Report*, typescript report (2 volumes)

Malcolm Tucker

## THE SPINKS GALLERY, RGPM WALTHAM ABBEY



*Left Trevor Knapp, Chairman RGPM Company right Don Spinks*

On the 8 May 2002 'The Spinks Gallery' was opened at the Royal Gunpowder Mills Waltham Abbey. The gallery is in L167, the former Chemical and Glassware Store, which was built around 1890. Don Spinks, the leader of Waltham Abbey Town Council, has been honoured by the naming of the gallery in recognition of the role he played throughout the 1990s in securing the future of the site. The first exhibition in the gallery is 'Light the Blue Touchpaper – A Celebration of Fireworks'. The exhibits are from the private collection of Maurice Evans and will be on display for the 2002 season.

### CHEMICAL LANDMARKS

Royal Society of Chemistry National Historic Chemical Landmarks  
The Royal Gunpowder Mills: 17 April 2002

In 2001 the Royal Society of Chemistry (RSC) instituted a programme of National Historic Chemical Landmarks in recognition of sites where important work or discoveries in the chemical sciences were carried out. A plaque is presented with the intention of drawing the attention of the public to the significance of the site.

In April this year a plaque was presented to The Royal Gunpowder Mills, Waltham Abbey. The plaque inscription reads:

"For over 300 years explosives and propellants were developed and produced on this site. Work performed here has been influential in the development of the Bouncing Bomb, Kevlar and Ejector Seat technology.

Established in the mid-1660s and bought by the Crown in 1787 the Mills had an international reputation for their production methods and quality. By the 20th Century the Mills were producing and researching new explosives and propellants such as cordite and TNT, in 1948 the Mills ceased production but carried out research until 1991."

Described by English Heritage as "the most important to the history of explosives in Europe" the plaque could have mentioned many other discoveries made at Waltham Abbey. Congreve's rocket is one, but also Sir Frederick Abel's development of the manufacture of guncotton which later lead to cordite. Before the Second World War there was the development of Research Department Composition X (RDX) used in the bouncing bomb. More recently the mine clearance system, Giant Viper, was developed which was successfully used in the Desert Storm campaign of 1991.

At the ceremony following short introductory remarks by Trevor Knapp, Chairman of the Royal Gunpowder Mills Company, Dr Geoff Hooper, the site's last director, gave an illustrated talk on some of the history of the site and the research carried out there. Guests were then shown an entertaining film on the history of gunpowder and explosives. Then Dr David Giachardi, Secretary of the RSC, unveiled the plaque, which is located on the wall at the entrance to the museum. The event, which was well attended, concluded with a buffet lunch.

The Royal Gunpowder Mills are now open as a visitor attraction; see [www.royalgunpowdermills.com](http://www.royalgunpowdermills.com). For those interested in further information on the RSC Historic Chemical Landmarks see [www.rsc.org/lap/publicaf/landmarks.htm](http://www.rsc.org/lap/publicaf/landmarks.htm).

Gerry Moss

## **GUNPOWDER FIND AT THE BRITISH LIBRARY**

A press release by The British Library reported that a small collection of gunpowder samples had been found amongst its collections. The powder was found in a small stationery box, which was part of the John Evelyn collection; Evelyn's family were associated with gunpowder manufacture in the late sixteenth and early seventeenth century. The find included a solid block of gunpowder and twists of nineteenth century gunpowder samples wrapped in old paper. The date of the powder is, however, uncertain. Some it was suggested might have been taken from the barrels stashed below the Houses of Parliament in 1605 by Guy Fawkes. On a nineteenth or early twentieth century mourning envelope was the note 'Gunpowder. Large package is Guy Fawkes' powder' underneath it, written in pencil was another sentence, dated 1952, 'But there was none left!'

The find has been passed to the Royal Armouries for analysis.

Source: The British Library press release 21-3-02 [Jim Buchanan & Wayne Cocroft]

## HALL'S SPORTING GUNPOWDER SIGN



Jim Buchanan has sent this photograph of sign advertising Hall's sporting gunpowder. It was presumably displayed by one of Hall's agents.

Jim Buchanan

## REQUEST FOR INFORMATION

Bill Marks is researching the history of his family and is particularly interested in his grandfather William James Marks who was killed in an explosion at Curtis's and Harvey Ltd, Hounslow, Middlesex on Friday 15 July 1915.

He is interested in sources on information on the firm of Curtis's and Harvey and on the July 1915 explosion. If any member can provide any information, please send it to the editor who will forward the information to Mr Marks.

## **REVISITING THE ‘CHEMISTS’ WAR’, 1914-1923 Modern War, Munitions, and National Systems**

The growing interest in the history of explosives manufacture was reflected in a recent conference held at the Institute of Advanced Studies, University of Bologna, 13-16 June 2002. The conference was sponsored by the United States National Science Foundation and was organized by Jeffrey Johnson, Villanova University, Philadelphia and Roy Macleod, University of Sydney, Australia.

The programme provides a useful snap-shot of the research being conducted in Europe and the United States into explosives production during the First World War. The intention is to publish conference proceeding, either later this year or early next year.

### ***Session 1 National Systems 1: Allies and Central Powers***

Jeffrey A. Johnson, Villanova University - The German and Austrian Systems: Comparative Perspectives on their Mobilization

Sophie Chauveau, Centre Pierre Léon MRASH, Lyon - Mobilisation and Industrial Policy: Chemicals and Pharmaceuticals in the French War Effort (1914-1918)

Wayne Cocroft, English Heritage – First World War Explosives Manufacture: The British Experience

Sebastian Kinder, Humboldt University –The Kirchmöser Powder Plant

### ***Session 2 National Systems 2: Neutrals and Allies***

Giuliano Pancaldi, University of Bologna - Academics, the State and Chemical Industry in Italy during World War I: A Survey of Recent Literature

Nathan M. Brooks, New Mexico State University - Munitions, the Military, and Chemistry in Russia during World War I

Kathryn Steen, Drexel University - Technical Expertise and the Mobilization of U.S. High Explosives

Ernst Homburg, University of Maastricht - Operating on Several Fronts: The Dutch, British, and German activities of Royal Dutch Shell in the Field of Dyestuffs and Explosives during World War I

### ***Session 3 Case-studies: Manufacturing Systems and Research Issues***

Erik Langlinay, EHESS, Paris - Kuhlmann at War, 1914-1924

John K. Smith, Lehigh University - Organizing for Total War: DuPont and Smokeless Powder in World War I

Patrice Bret, CRHST, Paris - Marqueyrol and the Laboratoire Central des Poudres in the Great War

José Gomes - Georges Urbain and his Laboratory: Contributions to the War Effort

Wayne Cocroft



## 29<sup>th</sup> SYMPOSIUM OF ICOHTEC, GRANADA, SPAIN, 24-29 JUNE, 2002

### 5<sup>th</sup> MEETING OF THE GUNPOWDER AND EXPLOSIVES SECTION: 'Gunpowder and Explosives: recent research and future themes'

The continuing interest in this aspect of the history of technology was demonstrated by the scheduling of 17 papers over two days in six sessions, at this the fifth meeting of our section. Debate and discussion were lively, and papers were commonly followed by a quick show of hands and an eagerness to pursue the topics raised. The inclusive nature of our approach to this subject was demonstrated by the range of papers, from the philosophical to the practical, with a broad chronological cover along the way.

The introductory paper presented by **Bert Hall** (Canada) with his co-author **Robert Smith** (UK), under the title 'Paradigms, Revolutions, and Determinism in the History of Gunpowder', challenged us to consider the role of our subject in the interpretation of historical change. A concern with objects may put us in danger of espousing a technological determinism, which must be avoided by students of gunpowder if we do not wish to find ourselves in an historical cul-de-sac.

Then began our survey of recent research. **Ahmad Y. al-Hassan** (Canada) introduced us to the complicated subject of 'Gunpowder Composition in Arabic Military treatises in the Thirteenth and Fourteenth Centuries', especially the treatise of al-Rammah with its 108 recipes for gunpowder. The publication of an English translation of this work is now underway. **Kelly DeVries** (USA) and **Robert Smith** (UK) reflected on 'The Burgundian Influence on Late Medieval Gunpowder and Gunpowder Weapons', at the time of an arms race of modest beginnings but spectacular progress. The Valois dukes were extraordinarily inventive with regard to both powder chemistry and gunpowder weaponry. The question of the relation of new technologies to the State was raised by **Steven Walton** (Canada) in his paper on 'Elizabethan Gunners and their machines: place and (em)placement'. There was little of the modern conception of 'science' about Renaissance gunnery, but there was a development of individual professional expertise and a movement towards corporations of gunners, practising their skills in London in the several 'artillery parks'.

The paper presented by **Ruth Rhynas Brown** (UK), 'The thundering cannon: guns in the seventeenth century', took us from the beginning of the century when the English navy had some 30 ships armed mainly with bronze guns, to its conclusion when there were almost 180 ships with mainly cast-iron ordnance. This ability to cast iron cannon cheaply and in quantity underpinned the development of the naval power that was so important for the establishment of England on the world stage. A different but complementary view was presented by **Brenda Buchanan** (UK) in her consideration of 'Gunpowder Production at English Mills in the Later Seventeenth Century: How much? How efficiently? For what market?' Documents from previously unrelated sources showed that the productive capacity of the major privately-owned mills was then considerably greater than the orders placed by the Board of Ordnance. Such unused capacity allowed for the development of a gunpowder industry that was to find significant additional markets in mining and overseas trade. This helped to promote the country's growing power in the eighteenth century through trade and settlement, but made it difficult for the military to secure increased supplies to meet

wartime needs. The reference to ‘troughs’ in the documents led to a discussion of the technology of incorporation and the relative significance of stamps and edge runners.

With the paper by **Juan Navarro Loidi** (Spain) on ‘Gunpowder in Spanish artillery treatises in the seventeenth century’ we returned to the subject of written texts. From a study of four manuals published between 1590 to 1699, we learnt of such matters as the ingredients required (for powder for different purposes), and the method of preparation; of the checks on quality; and of attempts to explain the burning of gunpowder, and internal ballistics. By the end of the century the earlier explanations, which had been of a qualitative nature, seeing for example charcoal as the spirit of flame, were being replaced by a more prosaic understanding based on experience. But a growth of understanding over different periods of time in different countries is never simple, and the paper by **Jennifer Keelan** (Canada) on ‘Inflammable Airs, Airguns, and Gunpowder Theories: Jan Ingenhousz’s Motley Account of a new Inflammable Gas’, revealed the lack of synergy between the needs of the army for research on gunpowder ballistics, and the interest of the Royal Society in gunpowder chemistry. As a medical man of the later eighteenth century, Ingenhousz was fascinated less by the underlying chemical mechanics of explosion and combustion than by its physiological counterpart in respiration, as part of the effort to cure illness and increase longevity.

By the second half of the nineteenth century research was becoming formalized, a matter of committees, although as the next two papers showed, individual initiative and expertise were still of over-riding importance. The paper by **Seymour Mauskopf** (USA) on the ‘Long Delayed Dream: Frederick Abel and Smokeless Powder’, led us through the intricacies of the search by this British chemist of the War Department for a substitute for gunpowder. This led eventually to the development of cordite, the research towards which was reported to various committees on explosives from the 1860s to the early 1890s. The paper presented by **René Amiable** (France) on ‘The invention by the Frenchman Paul Vieille at the end of the nineteenth century of the first scientific instruments intended for research on explosive substances’, examined the work of Vieille at the ‘Dépôt Central des poudres et salpêtre de Paris’. Here from the later 1870s he worked on the development of two scientific testing instruments: the recording manometric bomb and the calorimetric testing apparatus. The adoption of these scientific instruments allowed great progress to be made in the study of explosives.

We were reminded of the social and political consequences of explosives by **Ann Larabee** (USA) in her paper on ‘Portable Force Unleashed: The Unexpected Consequences of New Explosives in the 19<sup>th</sup> Century’. There was an inevitable tension between the need to promote new explosives such as dynamite, whose use in civil engineering requiring the circulation of information about its making and safe handling, and the danger of such information falling into the hands of criminal and terrorist groups. The words of the Harvard professor of chemistry, Josiah Cooke, were particularly appropriate, ‘Great power in the hands of ignorant or careless men implies great danger. Sleepless vigilance is the condition under which we wield all the great powers of civilization’. These sentiments were echoed by **Ian Rae** (Australia) in his paper, ‘3,2,1...Bang! A History of the Fuze’, with his reference to the account of a failed attack on the Greenwich Observatory in the mid-1890s in a novel by Joseph Conrad, entitled *The Secret Agent*. This fictional failure is explained

by the ‘professor’ in terms of ‘You can’t expect a detonator to be absolutely foolproof’, but as was pointed out, that is exactly what modern fuze-makers must aim for. A fatalistic approach will not do. The paper went on to explore the development of the fuze from the simple trail of gunpowder between match and charge, to detonation by electrical impulse.

With the paper by **Henry Ericsson** (Finland) on ‘Designing the Mannerheim line in the 1930s: The contributions of Lt.col.J.Chr.Fabritius to the theory and practice of fortification’, we moved into new territory, not only in terms of subject but also of the country concerned. Fabritius was an army engineer with a strong theoretical and historical background which enabled him not only to devise the defensive chain between Finland and the Soviet Union, later to be called the Mannerheim Line, but also to write a successful textbook on *Fortification* (1921) and an innovative treatise on *The impact of projectiles on field constructions* (1926). But Fabritius’ technical expertise was undermined by a political naivety, which led to an untimely death in 1946.

The last paper was by **Margaret Vining** (USA) and **Barton Hacker** (USA). Entitled ‘Military Material Culture at the Smithsonian: The National Firearms Collection and other Military Collections at the National Museum of American History’, it served to remind us of the important role that physical objects such as weapons and clothing play in the study of military material culture, and of the diversity of approaches that must be accommodated within our subject.

Our sessions over two days provided us with stimulating papers and discussion, but we were sorry that three of our colleagues were unable to give their papers. The printed collection of abstracts showed us how much we were missing, for the presentations would have covered the production and trade of gunpowder in Paris in the 14<sup>th</sup>-15<sup>th</sup> centuries, the powder mills at Essonnes near Paris, and the activities of the French ‘Scientific Study Committee on Military Powders’ of 1907-08. Paradoxically however we came to feel that these absences eased the situation in several of the sessions, by allowing us time to discuss more fully the ideas that had been raised. As a group that has now met at five ICOHTEC Symposia, which welcomes new members but which nonetheless has also a continuity of membership, we are in the privileged position of being able to build upon and benefit from a flow of ideas from colleagues old and new, in a way that is difficult to accommodate in the half hour allocated per paper. It is a tribute to the spirit generated by ICOHTEC that we left Granada greedy for more.

Brenda Buchanan, Univ.of Bath, Convenor of the Gunpowder and Explosives Section  
29 July 2002

## **MoD PATTERN ROOM**

The Ministry of Defence's Pattern Room, which contains around 13,500 firearms, is to be relocated from soon to be closed Royal Ordnance (BAE systems) factory at Nottingham. Its new home will be the Royal Armouries at Leeds where it will form 'a library of weapons' and may be renamed the National Firearms Collection. Most of the arms will remain as a working collection with periodic exhibitions of the more interesting items in the galleries of the Royal Armouries.

*The Guardian*, 23 February 2002, p 6

*Wayne Cocroft*

## **SEMTEX**

Semtex, the most notorious explosive of recent times, was invented in 1966 by the Czech Stanislav Brebera. Originally designed for use by communist North Vietnam, this odourless explosive became notorious through its use by many terrorist organisations. During the 1970s it was widely distributed by the Czech government making gifts of it to many countries, including Libya, Iraq, Iran, and North Korea.

Semtex, as originally produced, was an odourless crystalline high explosive; effective at a range of temperatures, it could also be easily cut or moulded to shape. It came in a variety of colours - red, yellow and black. In an attempt to make it less attractive to terrorists, in recent years a 'smelly' version has been developed, which may be detected by sniffer dogs. Metal traces have also been added to aid detection and its lifespan has been reduced from 20 to 3 years.

Despite these efforts, large stocks of older Semtex still remain; Libya alone received nearly 700 tonnes during the 1970s and 1980s. The Czech army still holds about 60 tonnes, much of it in insecure depots, and subject to frequent theft.

Semtex is manufactured at the recently renationalised *Explosia* works in Semtin, a suburb of Pardbice, eastern Bohemia. Its market price is around £4 per kg, on the domestic black market it fetches about £100, but on the international black market it can command up to \$1,300 per kg.

*The Guardian*, 23 February 2002, p19

*Wayne Cocroft*

## **FINNISH EXPLOSIVES FACTORY**

The factory of Vihtavuori Oy was established in the town of that name in 1922. It employs about 400 people and is divided into two business units, the ammunition unit and the blasting explosives unit. The factory manufactures nitrocellulose single base propellants, nitrocellulose and nitroglycerine double based propellants, and triple based propellants where nitroguanidine is added as a cooling burning component these are generally used in artillery rounds.

Vihtavuori Oy trade leaflet

*Wayne Cocroft*

## BEES TAKE THE STING OUT OF EXPLOSIVES

*The Guardian* reported experiments to train foraging worker bees to hunt out traces of 2,4-dinitrotoluene, tests have shown that bees are able to detect explosive traces in 99% of cases. The researchers intend to fit tiny radio transmitters to the bees to track their flight paths. They see applications for searching out plastic landmines; which are difficult to detect by other means, and for use at security checkpoints where a hive might swarm around a suspect package.

*The Guardian*, 15 May 2002, p11

Wayne Cocroft

## RECENT PUBLICATIONS

*Gretna's secret war* (1999) Routledge, G L, Bookcase ISBN 0951992105 £7.95 A5 booklet, 88 pages, illustrated

This booklet describes His Majesty's Factory Gretna, which during the First World War was the largest explosives factory in the British Empire employing around 20,000 people at its height. It describes the construction of the factory and its operation, and also contains anecdotes from former workers and a number of poems inspired by the factory. It is heavily illustrated with contemporary photographs of the factory, process plant, housing and the workers, along with photographs of some of the surviving remains.

Available from Bookcase, 17 Castle Street, Carlisle, Cumbria, CA3 8TP

*Anteitung Schiesspulver zu bereiten, Büchen zu laden und zu beschiessen* (How to produce gunpowder, load guns and shoot them) Leng, R (ed) Imagines Medii Aevi Band 5, Reichert Verlag Wiesbaden (2000)

68.00 Euro (about £44.00) available through [www.amazon.de](http://www.amazon.de) which may be accessed through [www.amazon.uk](http://www.amazon.uk) using your UK password and credit card details.

This book is a facsimile of a codex probably written by a master gunner about 1410, which is held by the Bavarian State Library in Munich. The book also contains a summary of the development of gunpowder and firearms in Germany.

For a review see Gerhard Kramer *ICON*, 7, 2001, 156-7

*Roslin Gunpowder Mills* (2001) Stevenson, W and Meilke, V Roslin Heritage Society  
Published as a CD-ROM, cost £10 (plus 75p p&p)

An illustrated history covering 150 years of Roslin Gunpowder Mills and Bomb factory with over 600 pages of pictures and text, based on contemporary newspaper reports, photographs, and some reminiscences of local people and former employees.

The CD comprises:-

- |    |  |                            |                                  |
|----|--|----------------------------|----------------------------------|
| 1  | Introduction and history                         | 2                          | History                          |
| 3  | The constituents of gunpowder                    | 4                          | The process of manufacture       |
| 5  | Explosions                                       | 6                          | Aerial photographs, 1946 & 1988  |
| 7  | A walk through the Powder Mills and Bomb Factory |                            |                                  |
|    | <i>a) The gatehouse</i>                          | <i>b) The main section</i> | <i>c) On to Kirkettle</i>        |
|    | <i>d) Kirkettle</i>                              | <i>e) The Bomb Section</i> | <i>f) Rosslyn Castle Station</i> |
| 8  | Mill and Factory Workers                         | 9                          | A walk when the mills are quiet  |
| 10 | A walk in the Roslin Glen (flora and fauna)      |                            |                                  |

Minimum system requirements – PC, Pentium processor, Windows 95, 16 Mb available RAM, 110 Mb free hard disc, Screen resolution 800 x 600.

For further information and sales, contact – [stevenson.roslin@talk.21.com](mailto:stevenson.roslin@talk.21.com)

The CD loads very quickly and it is very straightforward to navigate around the different sections. It includes good quality scans of historic and contemporary photographs and sections of historic plans - all are very crisp. Roslin Heritage Society is to be congratulated on using this innovative way of making this collection of archive images available to a wide audience.

*Old Sedgwick Gunpowder Works: an archaeological and historical survey* Jecock, M and Dunn, C (2002) English Heritage, English Heritage Archaeological Report series AI/11/2002 (typescript report) 52 pages, 16 figures (13 in colour)

This report represents the first in a series from English Heritage dealing with the gunpowder mills of Cumbria. It describes the recent survey of the Old Sedgwick Gunpowder works, where field survey has revealed that the main layout of the works may still be traced as earthworks. This evidence is combined with a reassessment of the historical and cartographic sources to present a new analysis of the remains of the earliest of the Cumbrian powder mills.

Reports may be ordered from Angela Arrull, English Heritage, 37 Tanner Row, York, YO1 6WP. Cost £10 including postage and packing, please make cheques payable to 'English Heritage'.

How strong are our modern gunpowders? Replicating Mordecai's tests of 1844 *Black Powder Newsletter*, December 2001, 25-27, David Harding

*Summerfield* (2001) Nicolson, W H A5 Spiral bound booklet, privately published

This booklet describes the early history of the Imperial Metal Industries/Royal Ordnance Factory at Summerfield, Kidderminster. It was developed in the early 1950s to produce solid propellant rockets and this booklet discusses the propellants used along with manufacturing processes and testing facilities.

Available from William H Nicolson, Threshing House, 6 Kyrewood Court, Tenbury Wells, Worcestershire, WR15 8SG, cost £10.00 (plus £1 p&p) please make cheques payable to W H Nicolson.

Gunpowder manufacture in England 1750 to 1900 *Arms Collecting* (2001) **40**, no.2, 47-52, William Adye-White.

This article provides a summary of the history of gunpowder manufacture in England from 1750-1900.

*The Rock Cannon of Gwynedd* (2002) Jones, G R, 147 pages, ISBN 0-9533692-1-8, no price given. Published by the author at Gwylfa, Cae Clyd, Blaenau Ffestiniog, Gwynedd, LL41 4AU, tel:- 01766 831516

This book will be reviewed in a later newsletter.

*The Gunpowder Mills of Cumbria. A History of Cumbria's Gunpowder Industry* (2002) Tyler, I, 296 pages, ISBN 0-9523028-8-8, £17.99, Blue Rock Publications, Thelkeld Mining Museum, Keswick, Cumbria, CA12 TT

This book will be reviewed in a later newsletter.

## **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 (Offprint of Chapter 21, Gunpowder – including relevant sections of contents list, introduction, index, etc). Cost £5 p&p £1

## PUBLICATIONS AVAILABLE FROM THE FAVERSHAM SOCIETY

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