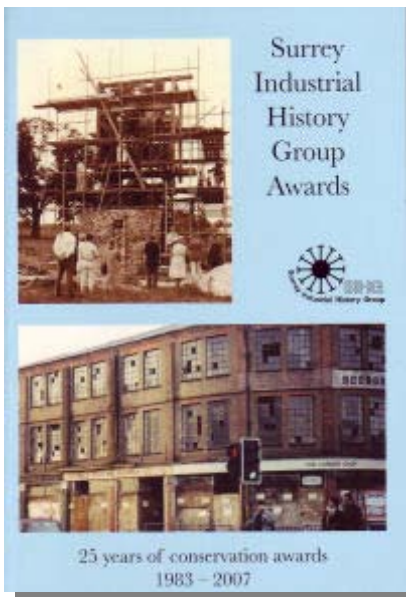




**Launch party for the publication of  
25 Years of Conservation Awards,  
1983-2007**

**by the Surrey Industrial History Group**

Angela Fraser DL, Chairman of Surrey County Council, gave a welcoming address (right) to an audience of about fifty. SIHG Members, many of the Award Winners and members and staff of the County Council were present.



She referred to The Surrey History Centre as a splendid and very appropriate venue for the launch. The County Council had been presented with a plaque in 1990 for the conservation of Chatley Heath semaphore tower.

She was particularly

pleased to welcome Heather Stimson, a member of the family of the late Stuart Chrystall, whose substantial bequest to SIHG made publication of the book possible.

Sarah Goad, Lord Lieutenant of Surrey, had planned to attend the evening but had to take over family commitments at short notice. She has written an excellent, enthusiastic Foreword to the book.

Alan Crocker then gave an illustrated talk about the book, which he and his wife Glenys edited. The presentation included illustrations which are not in the book. Alan explained briefly why each award was deserved and how awards had inspired further investigations.

Bob Bryson, Chairman of SIHG, later presented the 26th plaque, for 2008 to John Redpath of The Spike, Guildford (left). John remarked that the



winning of an award can provide welcome recognition and boost interest in a conservation project. (A temporary plaque had already been presented after the AGM, when John gave a talk and his team showed SIHG members round the conserved building.)

Refreshments were organized by Jan Spencer and Margaret Levett, Christopher Mann set up a bookstall and Glenys Crocker mounted a display about the Conservation Awards.

Thanks are due to the staff of the Surrey History Centre for their hospitality.

*Nominations are now being sought for the 2009 plaque!* □



SIHG is a group of the Surrey Archaeological Society, Registered Charity No 272098  
Castle Arch Guildford Surrey GU1 3SX  
Group Patron: David Shepherd OBE, Group President: Prof AG Crocker FSA

Published by the Surrey Industrial History Group and printed  
by Kall-Kwik, 9, Bridge St., Leatherhead KT22 8BL  
© SIHG & contributors 2008 ISSN1355-8188

## Contents

- 1 25 Years of Conservation Awards, 1983-2007
- 2 Notices
- 3 Diary  
Surrey Industrial History Group Officers
- 4 The Bletchingley, Merstham & Quarry Line Observatories *by Paul Sowan*
- 5 Industrial Archaeology News No. 145 Summer 2008 *report by Gordon Knowles*
- 6 Industrial Archaeology Review. Vol. XXX. No. 1: May 2008 *report by G Knowles*
- 7 A Boat from Cobham Appears in Swanage *by Peter Tarplee*
- 8 Visit to Reigate Fort, Saturday 17 May 2008 *by Gordon Knowles*
- 8 Some Observations on Mickleham Pumphouse *from Alan Thomas*

### Reports & Notices

Details of meetings are reported in good faith, but information may become out of date. Please check details before attending.

#### SIHG Visits, Details & Updates at [www.sihg.org.uk](http://www.sihg.org.uk)

*Sunday 26 October 2008*

#### **Didcot Railway Centre**

Individual entry; meet at the Refreshment Room at 1100 when we hope to have an hour's guided tour, £2.00. This is a Steamday, see [www.didcotrailwaycentre.org.uk](http://www.didcotrailwaycentre.org.uk). Access via Didcot Parkway Station. £7.50, £7.00 over 60s. Organized by Robin Turier.

*Saturday 4 April 2009*

#### **Croydon's Industrial Archaeology**

Tour led by Paul Sowan plus pub lunch. Organized by Jan Spencer.

*Saturday 4 July 2009*

#### **Whitechapel Bell Foundry**

A hard-to-book opportunity to visit this traditional foundry. Entry £10.00. Organized by Tony Gregory.

*Saturday 28 February 2009*

#### **Surrey Archaeological Society: Archaeological Research Committee Symposium**

War Memorial Hall, Ashted

*Saturday 25 April 2009*

#### **SERIAC 2009—at Winchester Guildhall**

hosted by Hampshire Industrial Archaeology Society (HIAS)

#### **Recording Factory Closures**

A good opportunity to record the history & to rescue traditional papers & machinery!  
*If you hear of a factory which is about to close, please report it to us: [info@sihg.org.uk](mailto:info@sihg.org.uk).*

## SIHG Newsletter No 165 September 2008

### DIARY

#### The 33rd series of SIHG Industrial Archaeology Lectures

alternate Tuesdays, 1930 - 2130, from **30 September 2008** at University of Surrey (Lecture Theatre F).

Enquiries to programme co-ordinator, Bob Bryson, [meetings@sihg.org.uk](mailto:meetings@sihg.org.uk).

Maps at [www.sihg.org.uk](http://www.sihg.org.uk). Free parking is available in the evening on the main campus car park.

Single lectures at £5, payable on the night, are open to all.

#### Diary September

- 30 Tue **Surrey Industrial History Group** First Lecture of the *New Series*  
A Light to Lighten Our Darkness: The History & Development of Lighthouse Optics  
by *Julia Elton, Past-President Newcomen Society.*

#### Diary October

- 14 Tue **Surrey Industrial History Group** Second Lecture of the *33rd Series*  
Sawmills: A Slice Through Time by *Martin Watts, Millwright & Mill Historian.*
- 26 Sun **SIHG Visit: Didcot Railway Centre** See below
- 28 Tue **Surrey Industrial History Group** Third Lecture of the *33rd Series*  
Samuel Cody: Air Pioneer by *Peter Reese, Author.*

#### Diary November

- 11 Tue **Surrey Industrial History Group** Fourth Lecture of the *33rd Series*  
Cornwall's Mining Heritage by *Dr Peter Stanier, Author & Industrial Archaeologist.*
- 25 Tue **Surrey Industrial History Group** Fifth Lecture of the *33rd Series*  
Early Wireless by *Ken Tythacott, British Vintage Wireless Society.*

We are in urgent need of a new **Treasurer**. This is a relatively light task as SIHG is part of the Surrey Archaeological Society. The formal accounts are thus presented by the parent body, not by the SIHG Treasurer.

The deadline for **submitting copy** for the next Newsletter is **two months time**.  
*Submissions are accepted in typescript, on a disc, or by email to [news@sihg.org.uk](mailto:news@sihg.org.uk).*

**Anything related to IA will be considered.**

**Do, please send in reports / photos of holiday visits or thoughts on local, national or international Industrial Archaeology.**

*Priority will be given to Surrey-based or topical articles.*

*Contributions will be published as soon as space is available.*

*Readers are advised that the views of contributors are not necessarily the views of SIHG.*

This edition of the Surrey Industrial Group Newsletter has been reformatted so that  
it is more easily read online or printed out as a PDF.

Diary entries have been curtailed to cover SIHG events only.

Other editorial matter is practically as originally published.

Many thanks to all who have sent in contributions.

Website: [www.sihg.org.uk](http://www.sihg.org.uk)

#### Surrey Industrial History Group Officers

Chairman & Lectures Organiser: **Robert Bryson**, [meetings@sihg.org.uk](mailto:meetings@sihg.org.uk)

Secretary: **Alan Thomas**, [info@sihg.org.uk](mailto:info@sihg.org.uk)

Treasurer: (vacant)

Membership Secretary: **David Evans**, [membership@sihg.org.uk](mailto:membership@sihg.org.uk)

Newsletter Editor: **Jan Spencer**, [news@sihg.org.uk](mailto:news@sihg.org.uk)

## The Bletchingley, Merstham & Quarry Line Observatories

by Paul Sowan



The Observatory in 2008

This article from SIHG Newsletter 76 (1993) is reprinted in response to the interest aroused by the article in the May Newsletter.

It was usual in surveying the line for a railway tunnel under high ground, to erect an observatory at or near the highest point. Frederick Walter Simms described the construction of the temporary observatory, built in advance of laying down the line of the Bletchingley Tunnel on the South Eastern Railway's original main line between Redhill and Godstone in his treatise *Practical Tunnelling* (1844). 'In order to command a view of every Shaft on the work', he tells us, 'the [surveying transit] instrument was set up on the most elevated spot of ground, as near the middle of the tunnel as possible; and, that the view, might be uninterrupted to the machinery and timber about the shafts- as well as the earth when brought up from below as the work proceeded, the transit was elevated considerably above the surface, by the erection of an observatory and as such a building is only required during the construction of the tunnel, it is a generally temporary erection.: although there are instances of observatories for such works having been built of an expensive character. The observatories at Bletchingley and Sapwood were nearly similar to each other, and the engraving, showing that at Saltwood, Kent, will give the reader a knowledge of the kind of building that will be sufficient for all such purposes, and, being composed of brick and timber, it may be taken down at an advanced period of the work, and the materials used up.'

Simms' Bletchingley observatory was a sturdy brick pillar. 30 feet high with a flat stone fixed securely at the top on which to stand the transit instrument. Around this, but independent of it, was a tower constructed of larch poles 'intended for and afterwards used in the works.' The upper part, or observatory room, was enclosed with quartering

and feather edged boards. The ascent was by steps from below through a trap door in the floor, and the floor was trimmed so as not to touch the brick pier by about 5 or 6 inches. A telegraph (semaphore) was mounted on top, so that the surveyors could signal to the man whose job it was to mark the exact spot where the centre of each shaft was to be and to move to the left or right as required.

### The Merstham Tunnel Observatory

Just possibly, Simms' allusion to observatories which had been built 'of an expensive character' was a mischievous reference to the London & Brighton Railway's observatory still visible today as a brick tower with architectural pretensions on the highest point above Merstham Tunnel (TQ 290 548). The South Eastern Railway, it will be recalled, had been required by Parliament to route its original main line to Dover via the London and Brighton's metals via Croydon and Redhill before turning east for Tonbridge, Ashford, and Folkstone. And it had been required, by way of compensation to the Brighton company, to purchase, 'at cost' the section of line the Brighton company had built a few years earlier between Redhill and Stoa's Nest Farm, near Coulsdon. This arrangement meant SER trains running over LBR metals from Norwood junction to Coulsdon, and LBR trains running over SER metals from Coulsdon to Redhill. Many authors have described the problems that resulted from inter-company rivalries (something that may be back on the agenda should the UK's railways be privatised!)

The Merstham tunnel observatory, like that at Bletchingley, is of two quite independent parts - essentially a very firm central brick pillar to support the surveyor's instrument, and a quite separate windshield. The central pillar is a roughly built, but stout; circular brick tower which tapers slightly upwards. The tower is hollow, though not open at the top (this is where the stone slab, or similar, for standing the instrument would be). Access to the inside of the pillar is possible via a door opening - presumably this small circular space was used for storing tools, ranging poles, or the like. Considerable wear on the brickwork of the south jamb of this internal door opening possibly supports the tool store interpretation. Access to the top is via a vertical iron ladder fixed to the south side of the pillar, although as the lowermost part is now missing it would require some agility and physical strength and at least a decent length of rope to get to the top.

The external tower, (also circular) is considerably more elegantly built, with a doorway (partially blocked up) in the east facing side. There are stone string courses and parapet at the top. And, oddly, four 'windows' only two of which (facing approximately north and south) would have been of any use in setting out the line of the railway tunnel which runs immediately below. Perhaps the east and west facing windows were added for aesthetic reasons? Although it seems possible the tower may have had some role as a lookout point during the last war (a close examination of arrangements at the top might help to clarify this), it appears to be likely that the entire structure is as substantially built for the London & Brighton Railway Company during the period 1838-41. Another possibility, of course, is that the central pillar, as at Bletchingley, had a utilitarian timber tower around it; and that the relatively elegant brick tower was erected later as a landscape fea-

*(Continued on page 5)*

*(Continued from page 4)*

ture which incidentally concealed the rather crude central structure.

It should be mentioned that passers-by (a public footpath goes right by the tower) often assume it to be just another, though rather more imposing, in the series of 'ventilation shafts' whose brick tops extend in a straight line across the fields. There is no shaft below the observatory tower (and therefore, of course, no corresponding heap of excavated spoil). The tower had to be constructed first, before the shaft positions could be accurately determined. And the construction of a shaft below the surveying point would naturally have militated against the whole point of having a very firm, immovable place to stand the transit instrument!

### The Quarry-Line Observatory

To have one surviving railway tunnel surveying Observatory is distinctly unusual (I know of no others elsewhere in Surrey or the UK), but in fact at Merstham we have two! About 200 metres south west of the brick tower may be found, (at TQ 291 546) the remains of the corresponding structure erected by the London, Brighton & South Coast Railway's new 'Quarry Line' tunnel surveyors; this line opened in 1899, running from Purley via a new tunnel at Merstham to Earlswood (avoiding Redhill.) The Quarry Line observatory is a much more austere affair, just to the north of a very small chalk pit (which contains a ventilation shaft and associated spoil tip.) There are just four substantial square brick pillars, with iron ties linking them at the top. □

## Industrial Archaeology News No. 145 Summer 2008

*review by Gordon Knowles*

Industrial Heritage in Western Australia by Richard Hartree is an account of a joint visit by AIA, GLIAS and Newcomen Society members to a conference in Perth in November 2007, and in particular the visits made both before the conference and as part of it. These included the Kalgoorlie Goldfields, water supply, Albany harbour, forestry and of course a winery. The conference illustrated the diverse approach to Industrial Heritage in Australia from the real concern by Tasmanian Hydro to the lack of interest shown by Western Australian Tourism. Absence of protective legislation and availability of skilled people are two major problems.

Neil Cossons writes on Forty years on: a new life for St Pancras. He tells what by now is a well rehearsed story; that of the ambitions of the Midland railway from the 1830s, through to the building of the Victorian Gothic masterpiece, its glory years and decline from the 1930s in the case of the hotel, and the station in the 50s. John Betjeman's concern and efforts, which led to the Grade I listing of Barlow's train shed and Gilbert Scott's hotel in 1967, are remarked upon. The story of the subsequent rebirth is retold and Cossons notes with approval the statue of Betjeman on the new concourse but equally feels that 'The Meeting Place' sculpture 'strikes a jarring note of giant-sized kitsch'. He feels, though, that Betjeman has more than a hint of satisfaction on his face as he looks down on the revitalised station.

Marilyn Palmer writes on the future of the AIA. With her retirement from the University of Leicester the office facilities there will no longer be available. A new home has to be found. An offer has been made by the Ironbridge Gorge Museum Trust, among others, and is an obvious choice. Discussions are being held to pursue this possibility.

An article by Manuel Muriel describes the ill-fated 4 ft. gauge railway laid by the Scottish mining company, Tharsis Copper & Sulphur, in Spain in 1871. The mines closed in the 1990s; one rail line to La Zarza closed at that time and the main line to Corrales closed in 1999. Much of the track has been lifted for scrap, vandalism has taken its toll, and efforts to preserve at least part of the remains have not made any headway. Although there is new Spanish legislation designed to assist in the preservation of the country's cultural heritage, including industrial, there are currently no signs of any action. It will soon be too late, the author writes, perhaps it is time for people in the United Kingdom to help save the British industrial heritage abroad.

Of particular interest to SIHG members who visited Sheffield last year will be news that a Heritage Lottery Fund grant of £595,000 has been made to enable the internationally important Hawley collection of hand tools to be united with the collection in the Kelham Island Museum. It is also reported that the museum, which was badly hit by last year's floods and is still closed, has work on flood defences and new displays on the ground floor galleries in hand. There is no date given as to when the museum will re-open. □



*Reigate Fort:  
Casemate Entrance &  
Stumps of Felled Trees,  
see page 8*

## Industrial Archaeology Review.

Vol. XXX. No. 1: May 2008

review by Gordon Knowles

The 2007 Rolt Memorial Lecture by **Colin Rynne** of University College, Cork is the first article in this issue. His title was *Technological Change as a 'Colonial' Discourse: The Society of Friends in 19<sup>th</sup>-Century Ireland*.

He re-examines the considerable contribution made by Irish Quakers to technological development in the U.K. during the 19<sup>th</sup> century, and argues that these were the result of a collaboration of social equals, and not the product of a 'colonial discourse'. If it had been the latter, then the relationship would have been as between that of a 'colony' and the 'metropolitan state'. Rynne argues that this was not the case and that as far as industrial archaeology is concerned a very contrary view prevails and that Ireland's contribution to technological development was never based on a subordinate relationship.

In railways Richard Pim is noted; he was the prime mover in the building of Ireland's first railway of 5.5 miles linking Dublin with Dun Laoghaire in 1834. He was also responsible for the building of the first locomotive by an Irish railway in its own works. Before the rise of the Belfast shipyards Quaker families in Cork and Waterford built many ships. The *Sirius*, a paddle steamer on the Cork-London route, was chartered by Joseph Lecky and made the first Atlantic crossing, arriving in New York some hours ahead of Brunel's *Great Western*. JR Wigham, although Scottish born, lived in Dublin and developed a revolutionary form of gas lighting for lighthouses, whilst Thomas Grubb and his son Howard created in Dublin one of the largest manufacturing companies in the world for building large astronomical telescopes. All of these, and others, were from Quaker families.

**Barrie Trinder**, now a freelance writer and consultant, formerly spent 15 years teaching at the Ironbridge Institute and is well suited to write on *William Reynolds: Polymath – A Biographical Strand Through the Industrial Revolution*. Reynolds (1758-1803), the Shropshire ironmaster, died young, and left no substantial archives but analysing the various aspects of his life illuminates many aspects of the Industrial Revolution: changes in ironworking technology, the application of steam-power, canal-building, the production of chemicals, glass and ceramics and the establishment of manufacturing communities. Trinder shows how an entrepreneur who knew many of the leading scientists of his time, and had his own laboratory and scientific collection, acted as a link between science and manufacturing. The balance between documentary and archaeological evidence of Reynolds's achievements is examined and it is suggested that the impact of conservation schemes on popular understanding has been substantial. Trinder suggests that an appreciation of science and technology is central to studies of the Industrial Revolution.

**Michael Nevell** is Director of the University of Manchester Archaeology Unit and writes in part one of a two part article on *The Archaeology of Industrialisa-*

*tion and the Textile Industry: the Example of Manchester and the South-western Pennine Uplands During the 18<sup>th</sup> Century*. He describes the growth of domestic textile manufacture around Manchester during the 16<sup>th</sup> and 17<sup>th</sup> centuries and the transformation during the early 18<sup>th</sup> to the mid 19<sup>th</sup> centuries from an impoverished backwater to one of the major industrialised areas in the world. The archaeological remains from the decade either side of 1800 are both extensive and early compared to the classic period of the Industrial Revolution. Nevell highlights some key evidence from this period and suggests future directions for research in the region. He refers to earlier research by Powell on wills and inventories of the period and to Stobart's study of probate for Cheshire and the part of Lancashire south of the Ribble.

He notes the development of the weaver's cottage and multi-storey vernacular workshops and identifies the Tameside area east of Manchester as being one of the best studied areas. He gives a detailed description, with drawings, of the Summerbottom workshops built by John Swindells in 1790. The earliest water-powered textile mills were for the fulling of woollen cloth. There were 36 fulling mills recorded in Greater Manchester during the 18<sup>th</sup> century, 31 of which were built after 1780. Woollen Scrubbing, the equivalent of carding in the cotton industry, was a hand operation until the invention of a mechanical process by Daniel Bourne in 1748. This process separated the mass of fibres and brushed them parallel and was an ineffective method until Arkwright invented a rotary carding machine in 1775.

Silk mills formed a small but significant part of the new factory-based textile industry. The first successful silk mill was Lombe's mill in Derby, a five-storey building erected in 1721. By the end of the century there were nine silk mills in Stockport and one in Manchester; none survive although there are a number of 18<sup>th</sup> century mills extant in Macclesfield. Cotton spinning mills were by far the most common of all mill buildings erected during the 18<sup>th</sup> century. Hargreaves built the first practical spinning machine in 1764; it had eight spindles. By the early 19<sup>th</sup> century machines with up to 120 spindles were in use. A number of important mills are described and Nevell notes that the earliest surviving spinning mill in Manchester is the original steam-powered eight-storey twin mills of A and G Murray in Ancoats, built 1798 – 1802.

Textile finishing sites are the final type discussed. These were bleaching, dyeing and printing works. All had existed in earlier times but the need for mechanisation was urgent as basic cotton production soared. Two significant technological changes were the introduction of chemical bleaching and of steam power to all three processes. Finally Nevell describes the mill builders, quoting insurance records for the earliest records. Many tenant farmers and merchants supplied the original capital. 387 mills have been identified as being built and run during the 18<sup>th</sup> century in south-east Lancashire and north-east Cheshire of which 260 have known builders. Less than 12% were built by landowners. Important mill families are described including the Wagstaffes and the Heapes, probably the two most significant.

(Continued on page 7)

(Continued from page 6)

This article represents an enormous amount of research and with a second part to come must surely rank as among the most significant studies of the industry and of the location in this period.

**Mark Fletcher** is Director of Matrix Archaeology, a private contracting and consultancy company. He writes on *Old Mill, Congleton, Cheshire – Brindley’s Grand Design?* Old Mill was one of a small number of silk mills established in East Cheshire during the mid-18<sup>th</sup> century. It was notable for its size, and for the involvement of James Brindley in its construction. The mill was extended and a beam engine installed c.1830, but it was partially demolished in 1939. The remaining structures were demolished in 2003 providing opportunity for both excavation and recording of the site.

James Brindley (1716-1772) had worked at Congleton corn mill in 1752 and it is recorded that he was employed to: ‘execute the larger wheels for a new silk mill’. The 1753 mill had 29 bays totalling 73.87m in length. The principal elevation had five storeys and was

in a classical Georgian form facing southwards. There was a north wing, c 1803, in similar style and the major eastern extension was built in the 1830s when the engine was installed. The extension also had five storeys and the additional 17 bays formed a further extended symmetrical elevation of 29 bays.

The recent excavations of the pits disclosed that Brindley’s wheels were 2.97m radius and 1.78m wide. The adjacent pit wheel would have been some 1.0m in radius. There are excellent line drawings of the site and projections of equipment together with contemporary photographs illustrating the article. The layout of later waterwheels has also been traced and measurements calculated. It is thought that the engine house was built by Samuel Pearson, details of this building and the engine mountings have also been discovered and recorded.

It is suggested that the earlier generation of silk-throwing mills pre-empted Arkwright’s Cromford Mill by several decades and that the early ‘Factory System’ owed a considerable debt to these buildings. □

## A Boat from Cobham Appears in Swanage

by Peter Tarplee



Whilst on a trip on PS Waverley recently I noticed some brochures outside the purser's office advertising pleasure cruises from Swanage pier on *Western Lady III*.

The last time I had seen this ship was when it, together with *Western Lady IV*, was operated by Western Lady Ferry Service between Torquay and Brixham. This was in 1997 when I was working on *A Guide to the Industrial History of the Borough of Elmbridge* and visited the Dolphin Shipyard at Galmpton on the River Dart where the ships were being maintained over the winter closed season. I was met by Sandie Armstrong, the ferry operations manager, who had studied the history of these ships and written a book about them. I was given a tour of the ships and a description of the operation. At the yard when I visited there were three Fairmile ‘B’ launches there, *Western Ladys I, III and IV*, and the reason for the visit was, of course, to gain information for the Elmbridge guide.

Noel Macklin had been producing cars in the grounds of his house Fairmile Cottage in Cobham since

1921; first Invictas then Railtons. In 1939 he saw that war was coming and realised that there would be a need for a large number of small coastal boats so he formed the Fairmile Marine Company. He stopped making cars altogether and his Cobham premises were used to design and plan the construction of the Fairmile series of launches. These were wooden-hulled boats of 50-60 tons displacement, 110 feet long, with a speed of around 25 knots. The kits of pre-cut wooden parts were mass-produced in sawmills and furniture factories throughout the UK and then dispatched to boat yards for assembly. The firm employed over 500 staff of whom 200 would have been based at Cobham; and they built around 800 boats.

*Western Lady III* was a rescue motor launch built in 1941 by the Southampton Steam Joinery Company. It entered service in July 1942 as *RML 947* and spent much of the war at Portland. So she is now back near to where she spent her war service, and is one of the few Fairmile boats from the Cobham-based company which is still operational. □



**Visit to Reigate Fort,  
Saturday 17 May 2008**  
*report by Gordon Knowles*

Ten intrepid members braved the inclement weather and made a most interesting visit, organized by Tony Gregory. Under the guidance of Mark Russell, the National Trust Warden for the site, we were taken into the Magazine and Casemate not normally open to the casual visitor. The Trust has undertaken a lot of refurbishment, including felling invasive tree; the inner chambers are just bare walls at present, but it is the intention to have replica figures and equipment installed to make the scene more representative. At present one needs to use imagination to conjure up the atmosphere of a hundred and ten years ago.

The Fort, really a fortified camp and Mobilisation Centre, was one of a chain of thirteen — from Henley Grove, Guildford, in the west to North Weald in Essex — built in the 1890s for the defence of London from perceived attack by the French. Unfortunately the gestation period (from the middle of the century) was so long that they were virtually obsolete when built. The arrival of the Maxim machine gun and longer range artillery with improved fused shells changed land warfare to the mode that was brought to fruition in WWI. Reigate Fort was one of the largest in the line and cost £14,702 to build. The forts were decommissioned as early as 1906 when it was felt that with the launch of HMS Dreadnought the navy would be strong enough to deter any enemy landing. In any event Germany, rather than France, was now the potential aggressor.

The layout of each fort was different, but there were basic elements in common. There was a tool store with spades, picks and axes to enable additional trenches to be dug and sight lines cleared around the perimeter in an emergency.



*Tool Store*



*The Entrance*

Trench lines and firing steps which had already been dug can easily be identified now that the undergrowth has been cleared. The underground magazine with double walls in case of explosion held ammunition for artillery and rifles; probably rifles too would have been stored although the militia volunteers usually kept their weapons at home.

There is a guide book on sale which gives an illustrated description of the site. It is well worth a visit to the fort which is open daily without appointment unless you want to have a guided tour and see inside the buildings as we did. □



*Inside a Casemate*

**Some Observations on the  
Mickleham Pumphouse**

*letter from Alan Thomas*

The article on the the Pumphouse and Water Supply for Mickleham Downs House, near Dorking, in the previous Newsletter indicates that this installation had some curious features.

The usual configuration for pumping from a deep well is for the well to be fitted with a set of 'bucket' pumps which pull the water bodily up from the bottom of the pipe, from which it overflows at or near the surface into a tank. A set of force or plunger pumps then forces the water at a sufficient pressure to reach the reservoir (in this case probably located in the roof of the house) from which the water is distributed by gravity. Examples of this system are the pumps at Horton Hospital (1902) and the cross-compound horizontal steam pumping engine at the Kew Bridge Steam Museum (1911).

At Dorking the well-pumps are still extant. The force-pumps must have been inside the pump-house. The engine was evidently connected to line-shafting, from which both sets of pumps would have been driven.

There is scope here for an archaeological dig, to find evidence of the tank or sump inside the pump-house, together with a depression sufficient to accommodate the drive pulley for the well-pumps. Some signs of mountings for the engine and the force-pumps might also be found. If there is no sign of an opening in the walls for an exhaust pipe, it is just possible that the drive could have been electric. The date of the installation could have been any time from the latter part of the 19th century to the early 20th, after which submersible electric pumps came into use.

But why was the pumphouse not built on top of the well? This would have avoided the need for right-angle gearing to drive the well-pumps - it would have been possible to drive them directly from the line-shafting. □