

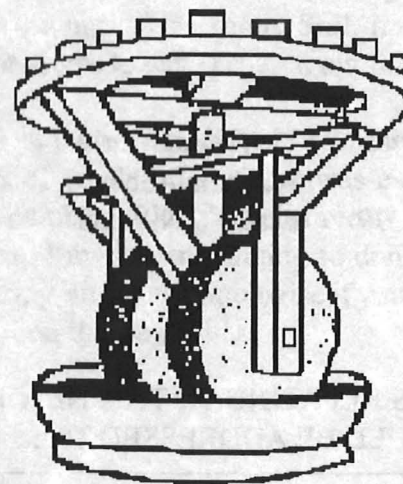
**ROYAL
GUNPOWDER
MILLS
WALTHAM ABBEY**

'TOUCHPAPER' ©

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Touchpaper

The Newsletter of the
**ROYAL GUNPOWDER MILLS WALTHAM ABBEY
FRIENDS ASSOCIATION**



**SEPTEMBER
2003**

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PLEASE NOTE: Deadline date for submissions to
the next issue is 15th November 2003



EDITORIAL

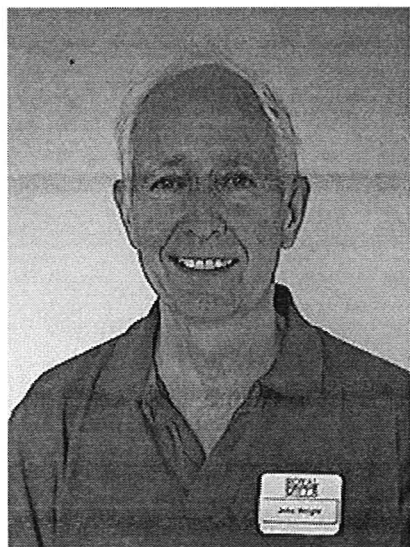
Phew! Wasn't it hot during August. The thermometer on my south facing garden wall reached 110°F on several occasions during the past month and I've had to move my computer downstairs to the comparatively cooler living room. Still, it's been good news for the Mills as it seems to have brought out the visitors.

I said in the last issue how difficult it was to produce Touchpaper with the lack of articles. This issue was even more difficult because of the number of long articles received and fitting it all in was a problem. I'm not complaining so don't be put off and keep sending me copy although I apologise if you find some of the type in this issue is on the small side.

Norman Paul
Editor



CHAIRMAN'S NOTES



Restoration of part of the old Fire Alarm System is well under way. Removal of many coats of paint has revealed some very attractive and sharply detailed cast ironwork. We are not yet entirely sure whether it was made by Siemens although the company has been very helpful in sending information and pictures of similar systems used in some German cities around 1900-1910.

Our pillars are dated 1906. (see *TouchBytes* p.10. Ed.).

Two lorry loads of railway and other artefacts have been received from Royal Ordnance Bishopton. We hope to put some of the laboratory artefacts on display but there is currently a shortage of space for exhibits. You may find this surprising with the number of buildings on site but many have yet to be officially declared 'free from contamination' - a situation we hope to resolve soon.

One of the items is a 10ft long rocket motor, believed to be a cast double base 'Retriever'.

Some of the railway items are now on display on a specially built section of 2'6" track near Building 83B on the Land Train route so that visitors can see them.

As always, guides for the Land Train are needed to relieve the load on the regulars. Please do come along for a day or part of a day if you can.

John Wright

PUBLICITY

Mrs. Helena Spencer of the bookshop, The Book Centre, in Hoddesdon has recently and most generously given a recent window to the Friends for a display on the Mills. This include a large scale Royal Engineers map of the 1860s, photos - current and historical and the Friends publications on the listed buildings which were also on sale.



Mrs. Spencer said that many favourable comments had been received from customers and it is hoped to put on further displays in the future.

A Personal Reminiscence

The Friends have been arranging for artefacts to be sent from the closing ROF Bishopton, hopefully for later exhibition. In my earlier years I lived in the Bishopton area and witnessed, albeit at a young age, the building of the factory - 1938-1940.

At the time it seemed an impressive development with a long future and favourable comment can be recalled on its contribution to alleviating the chronic unemployment in the area, although of course, by its opening the war had brought its own general solution to unemployment. Probably the locals of the time would have been surprised to see the final demise after just over a brief half century - not quite up to the Mills achievement. I think the Latin phrase is '*sic transit gloria mundi*'.

Les Tucker

REPAINTING THE CORDITE PRESS

Since retirement, my role in life has generally been that of the local, acting, unpaid and unwanted holiday relief for whatever. Sometime in June last year I was asked if I could fulfil 'my role' in Shrapnel's Battery, as they were a bit short of bodies, which was due to give demonstration firing muzzle-loading cannon (blanks only, I'm afraid) at the Royal Gunpowder Mills, from where the Battery would have obtained its gunpowder - although lieutenant Shrapnel was banging away some twenty-odd years before the RGMs started production. However, I was only too happy to oblige, if only to get out of cutting the grass.

I had not visited Waltham Abbey since the 1980s when I was with the Safety Services Organisation, MoD(PE), so was a trifle surprised to see the alterations that had taken place and especially the new way in and the visitor's entrance. I was somewhat early and was let in by the Security staff - who did not ask me to fill in a 'pink slip (to be escorted)' which I half expected, as I no longer had my 'all establishments' pass. In the old days the MoD Police would always ask me if I knew where to go, to which I would always reply "Yes Thankyou, people have told me often enough!" - followed by a long pause whilst the penny dropped.

I was amazed by the first item I saw (and every other visitor would see) on entering the site - a large rusty pile in the middle of the roundabout which I was told was once a cordite press. During the day, resplendent in my blue tailcoat and tricorne hat, I was introduced to Cathy Morton-Lloyd and had the temerity to ask if the RGM had an association of Friends or Volunteers who could wave a paint brush since I felt that the 'heap of rust' might tend to give visitors the wrong impression. I was assured that such existed and "would I like to join?" I duly received the form, filled it in and dispatched it with a cheque and was soon the proud possessor of a little yellow membership card. So, on the first Wednesday afterwards I turned up and was introduced to a few splendid gentlemen who were Friends or Volunteers (at that time I didn't know the difference) of long standing. I was told that various jobs needed to be done but what did I want to do? When I suggested that the cordite press could do with a little TLC I thought I detected the odd look of mild surprise - or did this conceal the thought that "we've got a right nutter here!" ? Cathy soon appraised me of the fact that I was now Oi/c Cordite Press Restoration which, as I had no idea what was involved or where to start, did surprise me somewhat. There were minor points of 'which bit did what, what colour were they originally and where were the bits that appear to be missing? I decide that the first thing was to remove the rust and apply an undercoat which, I thought, should not be too difficult as I had been told that the thing had been burnt to render it 'FFE' (free from explosives) so all the paint would have been removed. On closer inspection I found this was not so and that there were patches of paint left adhering to most of it - all baked on rock hard. What sort of paint used I knew not but removing it was a nightmare. I tried 60 grit emery cloth, wire brushes (even in an electric drill not much better); paint remover was of little help and the residue had to be washed to avoid contaminating the undercoat. Eventually I had to use a welder's chipping hammer, which took ages but did the trick. Once all the bits of paint had been chipped off an area it was gone over with a wire brush to remove any rust, after which it was wiped down with thinners and so was ready for undercoating. Luckily there was a large tin of red oxide available so this was slapped on and then another bit cleaned off. When it had all been given two coats of red oxide what top coat was to be used, bearing in mind that it would subject to the weather.

I decided to use Hammerite smooth finish as I had found this very effective on the metal gates to my drive. The only problem was price but I am on good terms with a market trader who would buy it and the special thinners needed when his wholesaler had them on special offer and this worked out at about half the normal shop price. As for colour, my preference was for the McLeod Hunting Tartan (a bright yellow and black creation) but unfortunately Hammerite do not stock it. Talking to various people who had seen the press *in situ* and looking at archive photos, most of it seemed to be a cream colour, but at that time Hammerite only produced 'Magnolia' (which was later re-named Cream although it was exactly the same specification), so I bought a large tin of this and a small one of bright yellow and did a bit of mixing until I got what I thought was somewhere near the right colour. This was made up of 350 grams Magnolia and 12 grams of yellow, carefully weighed out on my wife's kitchen scales - but I didn't tell that was what I was using them for!

So the cream bits had two coats of this cream paint on them and then we had to decide what to do with the vertical supports for the top cap. I had thought that these would have been 'bright steel' colour, necessitating an awful lot of rubbing down but was relieved to learn they had been nitrated and so had a blackish finish. It was agreed that Hammerite Black satin finish should be used and this didn't look too bad (at least in my opinion).

Certain bits needed to be bright metal finished (e.g. the main hydraulic ram and two secondary rams). These were de-rusted using emery paper and 'wet and dry'. The problem was how to preserve them in this condition. The 4 vertical top cap support columns had interesting nuts at top and bottom which were not hexagonal but round. These were tightened using a 'tommy bar' inserted into holes drilled in their circumference. There was no paint on these and I decided to leave them as a bright metal finish. After all, this would add a bit of variety to the colour scheme (the heart of an artist obviously beats beneath this engineer's breast!) and, more to the point, I could use them as guinea pigs for the other bright metal parts. Once cleaned off I applied yacht varnish but a week later found they had started to rust again. Hammerite do not make a clear paint that dries hard but eventually I found that an American product - PlastiKote - did the trick, or has so far. Unfortunately the press is not complete in that the gunmetal pot which contained the cordite dough is missing (probably because of its scrap value). Also missing was one of the 4 stops from the vertical cap supports but some Friends procured one from a similar press which was rusting quietly away behind one of the incorporating houses.

So now the job is finished but it has taken about a year to do as, living in Tonbridge in Kent, I can only come up one day a week. I must stress that this was a combined effort and I could not have done it without the wholehearted support and help from the hard core of Friends, those few (so very few) who slave away to keep the RGM going.

In 1952 I had to study Shakespear's Henry V for English Literature. A partly remembered (and slightly modified) quote seems appropriate:

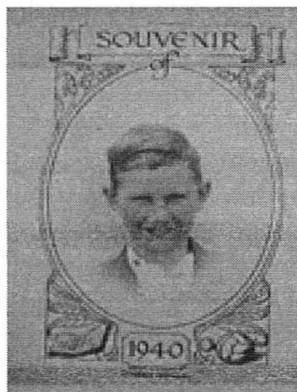
"We few, we happy few, we band of brothers,
For he today who works with me,
Shall be my brother: be he otherwise idle,
Such work shall gentle his condition,
And gentlemen in Essex now abed,
Shall think themselves accursed they were not here."

I owe them a great debt of thanks! Gerry Miller.

[As we owe an even bigger debt of thanks to Gerry! Ed.]

WARTIME REMINISCENCES AT THE FACTORY

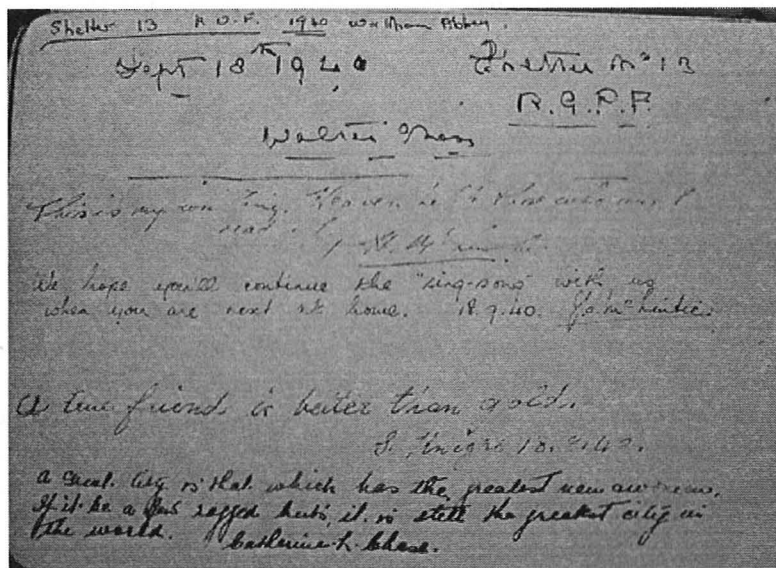
These are copies of pages of my autograph album dated 18th September 1940. These people, amongst others, slept in the Factory Shelter No.13, next to the lodge and the Ack-Ack gun. The photo is of young David Poole who came with his parents (his father was the Fire Brigade Officer) and they opposite Government House in one of the cottages. Although most of the people who signed it will be no more, David was only about 10 or 12 at the time.



Mr. and Mrs. McLintic and Mr. Knight were all in the book given to my father when he retired as the last Superintendent of the RGPF.

Catherine Chase used to have some of the young chemists lodging with her. There were two houses opposite the main entrance to the factory and to get to them you had to cross a little bridge. Mr. Alec Baines, Laboratory Assistant, and Mrs. Chase lived in the two houses and the McLintics and Knights in other factory houses.

We all sang so loudly when the bombing started or when the gun went off!
Madeline June Cox née Knapman



NON-LISTED PRINCIPAL STRUCTURES OF THE ROYAL GUNPOWDER MILLS

Part III DEVELOPMENT OF CHEMICAL EXPLOSIVES

Section 3. 20th Century - The South Site Guncotton Factory and Guncotton Drying

Further to the outline of guncotton development given in **Touchpaper March 2003** the following expands the commentary to describe manufacture at the South Site guncotton factory and subsequent drying. All trace of explosives manufacture has been removed from the South Site and this commentary is therefore an historical record rather than a record of any existing buildings.

To recap : Following the patenting by Frederick Abel in 1865 of his method of manufacture of guncotton including boiling, pulping and compressing, which materially eliminated previous problems associated with incomplete acid removal/purification and the elimination of the dangers involved in the storage of dry guncotton by the discovery by EO Brown of the Woolwich Laboratory in 1869 that guncotton in wet state could be safely stored, handled and detonated by a fulminate of mercury detonator, a 250 t.p.a. production unit was established at Waltham Abbey in 1872 utilising previous saltpetre buildings abutting on to Highbridge Street in the centre of the town.



Sir Frederick Abel

The South Site Guncotton Factory 1890

In 1885 the Mills land holding had been extended to the south of the town by the purchase of 100 acres at Quinton Hill, later termed the South Site. Demand for guncotton for use in military demolition, sea mine and torpedo warhead filling was steadily increasing and in 1890 a guncotton factory, constructed on land along Cobbins Brook to the north of Quinton Hill, commenced production. At this time the forerunner plant at Highbridge Street closed.

The guncotton manufacturing process involved :-

Raw waste cotton which had previously been degreased and washed picked over by hand -

Teasing out by machine - Drying and cooling - Nitration - Boiling - Beating (Pulping) - Potching (Washing) - Blending - Pressing (Moulding).

1. Raw Cotton

The cotton received was waste material in bales from cotton mills which had previously been used for cleaning etc. and had been degreased and cleaned by boiling and wringing. [Cotton waste was a significant item in the Mills purchase costs; e.g. for the year 1936/37 taken at random the total cost of cotton waste exceeded that of such major items as coal, sulphuric acid and acetone].

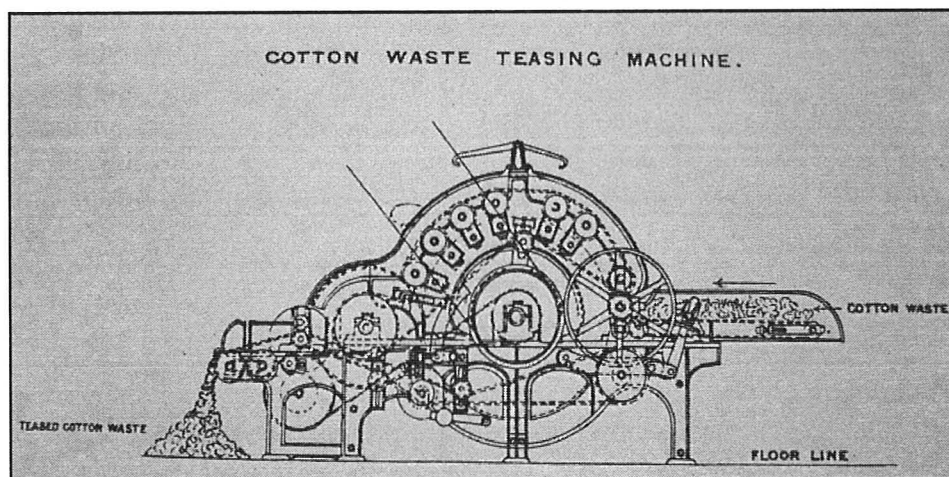
2. Hand Picking

The material was picked over by hand to remove any obvious foreign objects - string rags, wood etc.



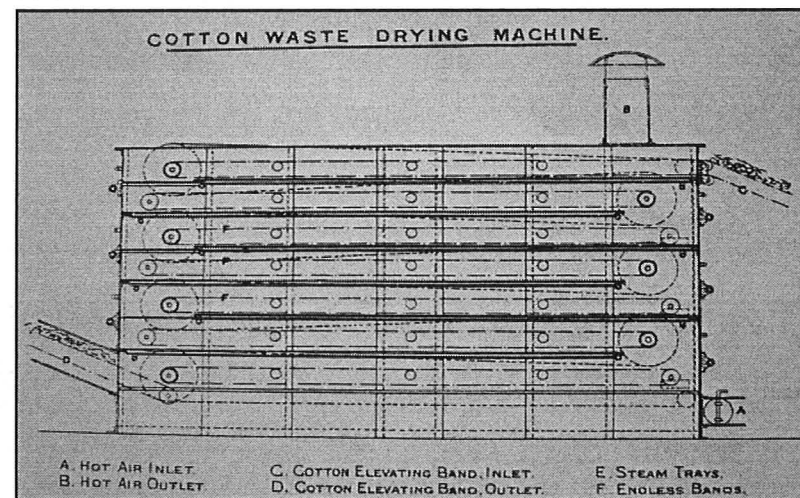
3. Teasing

It then passed to teasing machines which opened out any knots, lumps etc. in order to allow acid to contact all surfaces.



4. Drying

The cotton was then dried by a current of warm air to reduce moisture content and cooled.



5. Nitration - Nathan-Thomson Displacement Process

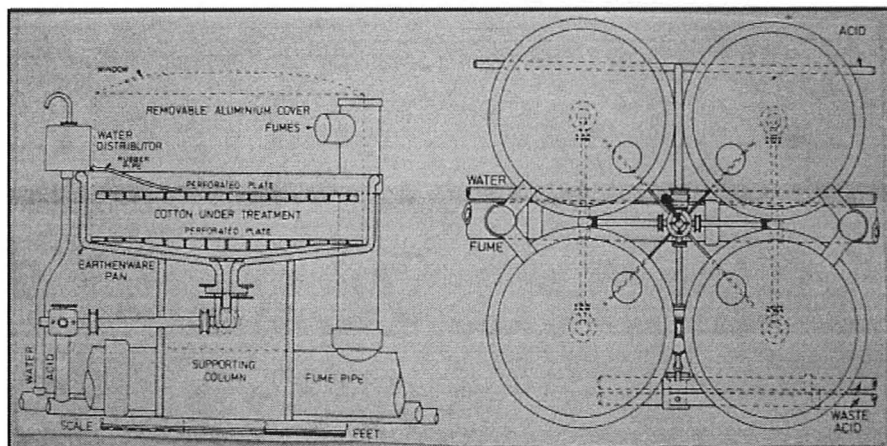
The next stage was the core process of nitration (see **Touchpaper March 2003** Development of Chemical Explosives Sec.1). This employed acids bought in from the East London chemical industry. These were purified and concentrated in an acid factory adjoining the guncotton factory.

From 1905 the system employed was the displacement process devised by the brothers W.T. and J.M.Thomson, chemist in charge of guncotton production and factory manager respectively and Bt.Col.F.L.Nathan who was Superintendent of the Factory. In 1935 in the Transactions of the Institution of Chemical Engineers W.MacNab gave the following graphic description of the process :

"In this beautiful process the acid is contained in a series of shallow circular earthenware pans provided with perforated false bottoms. The charge of cotton is forced under the acid and sectional perforated earthenware plates laid on top to keep the cotton down and a thin layer of water is run on top of the acid to prevent the escape of fumes. When nitration is finished the spent acid is allowed to run off slowly from the bottom while water is distributed at the same rate over the surface and displaces almost completely the acid from the nitrocotton."

Probably only a chemical engineer could call it beautiful but it was extremely effective compared with what had gone before and reflected great credit on the Thomsons. MacNab also emphasised the chemical engineering expertise involved in control of the equipment - pipes, pumps and valves. 1905 was a year of particularly successful process innovation at Waltham Abbey since in that for nitroglycerine nitration was patented, again having at its core the principle of displacement (see **Touchpaper June 2003** Development of Chemical Explosives Sec.2).

The displacement process was a notable improvement on the Abel based nitration method previously employed, which involved a laborious process of dipping the cotton into the mixed acids, acid squeezing, immersion in water pots, centrifugal removal of acids, further immersion, and centrifugal washing in water.



In 1909 Col. Nathan listed the advantages gained by displacement:

Great simplicity compared with the Abel system.

Dipping was much less laborious and heavy labour of acid squeezing eliminated.

Loss of acid and guncotton due to fume-offs and broken pots together with the danger of nitrous fume poisoning almost entirely eliminated.

Process free from fumes compared with Abel system.

Much lower acid usage.

Less acid pollution of escaping wash water.

Recovered waste acid much cleaner.

Water required for washing reduced by 4/5 and more thorough washing obtained.

Less boiling required.

Saving in power for centrifugals.

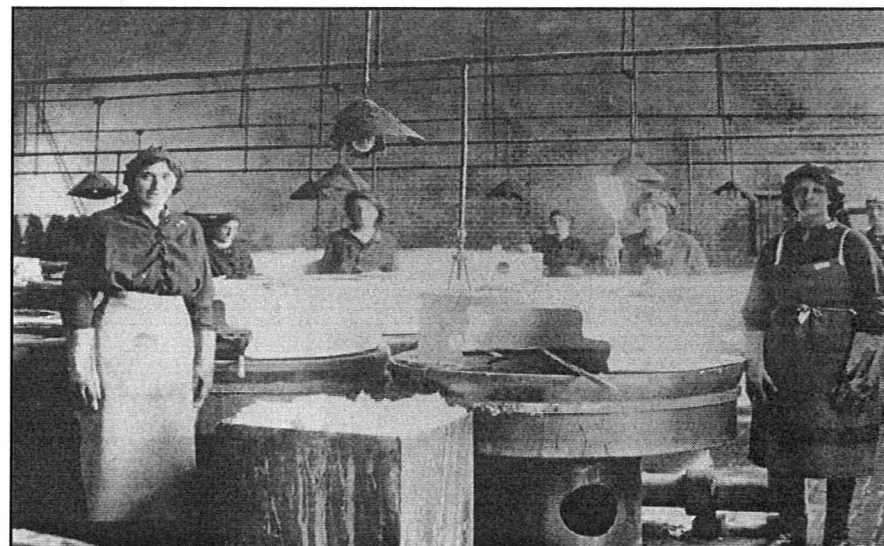
Labour required cut by 2/3.

Cleaner more stable product of more uniform composition.

Overall cost reduction of 50%.

Col. Nathan was careful to state that fumes were lower in terms of comparison with previous. They could not be entirely eliminated and a guncotton nitrating house was not a healthy place to work.

Guncotton had two functions - in finished form for direct service use in demolition etc. and as a mine and torpedo filling and secondly as one of the two components, the other being nitroglycerine, for double base cordite production (see **Touchpaper March 2003** Development of Chemical Explosives Sec.1).



Nitration of Cotton (July 1917).

Background worker is holding aluminium fork used to push cotton under.

The replacement of gunpowder by cordite had been progressing from the late 1880's and at the same time as the establishment of the guncotton factory in 1890 a cordite factory was erected on the South Site. From 1897 a cordite factory had been built up on the North Site and at the same time as introduction of displacement in 1905 the South Site factory was enlarged to serve the growing requirement for guncotton for cordite production at the North Site (cordite will be dealt with in a forthcoming Touchpaper).

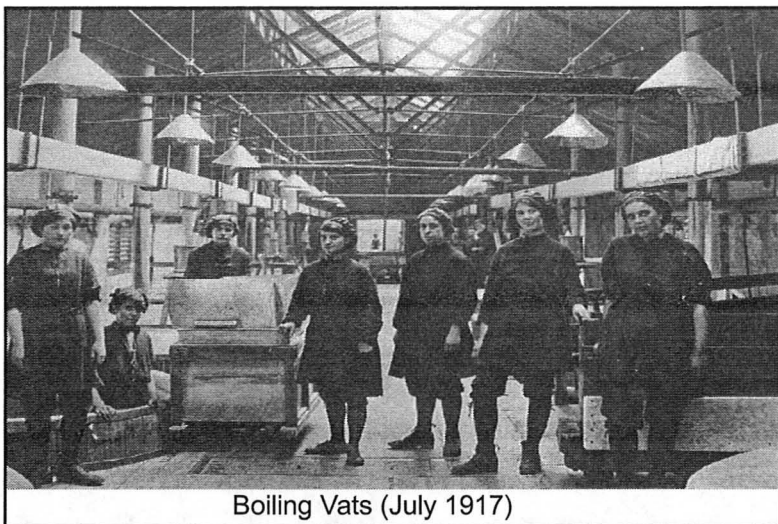
Further Purification

The following stages represent the work of Sir Frederick Abel in achieving the purity of product which made guncotton practicable.

6. Boiling

The next stage was boiling in water in wooden vats which were lined in anti corrosive antimony-lead alloy. Apart from explosive performance one of the greatest concerns in explosive development was performance in storage - an unstable product liable to decomposition and combustion in storage would be useless. Acid was the greatest contributor to instability and boiling was the initiator of the processes to remove as completely as possible the acids of nitration.

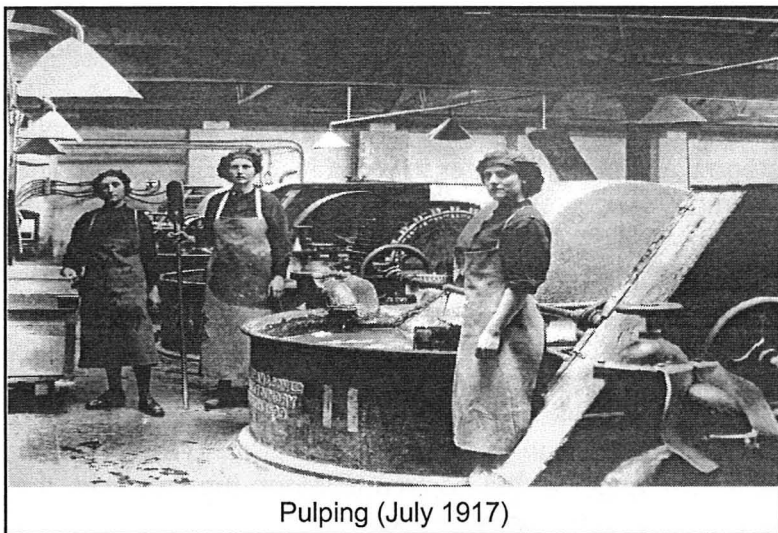
Extensive investigation by another famous Waltham Abbey name, (later Sir) Robert Robertson, refined the process demonstrating that 7 boils was the optimum, with two longer at the commencement; the first acid, the second almost neutral and with the balance alkaline.



Boiling Vats (July 1917)

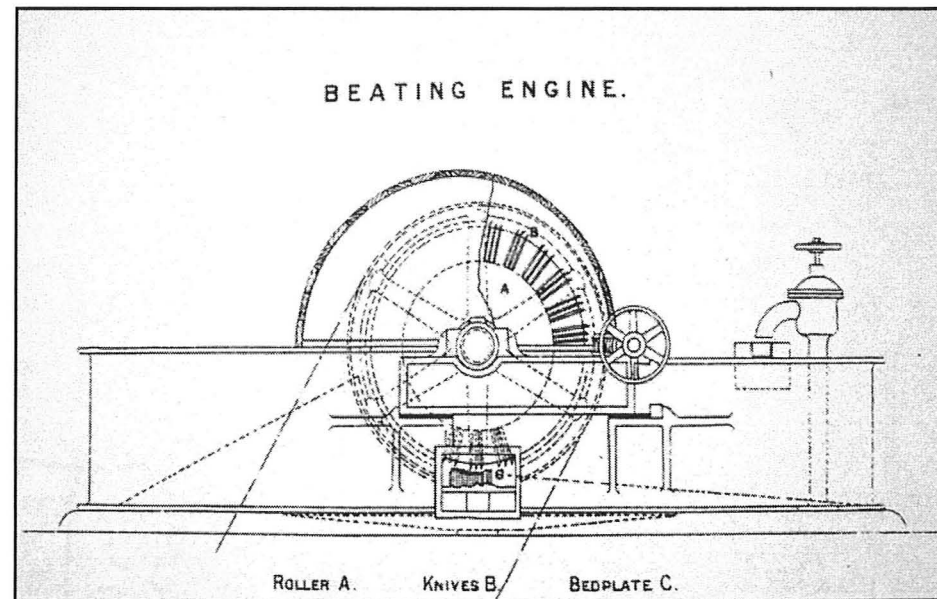
7. Beating (Pulping)

The boiled material was then pulped underwater in beating machines similar to those in the paper industry where a roller with steel blades rotated and reduced the guncotton to a pulp between these blades and similar static ones mounted on the machine bedplate. The intention of pulping was to break down the fibrous, capillary structure of guncotton so that washing and boiling could remove all remaining free acid and resinous matter and other unstable impurities remaining. Waltham Abbey pursued a policy of continuous process improvement, to the benefit of other governmental and private industry. Typical of this was the patenting in 1903 by A.W. Williamson of the Mills of a portable milling cutter driven off the beater shaft.

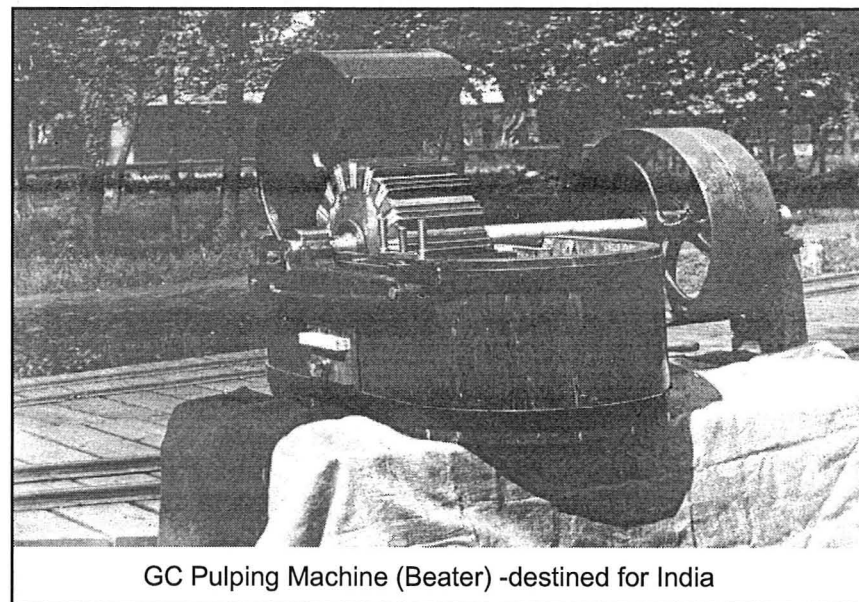


Pulping (July 1917)

Whilst the equipment was basically as employed in the paper industry guncotton had to be cut into short lengths.



This required frequent dismantling for blade sharpening, which was uneconomic. The portable cutter enabled the work to be done more economically *in situ*.



GC Pulping Machine (Beater) -destined for India

Guncotton Drying Stoves
1894-1914

Quinan Stove
1936

ROYAL GUNPOWDER MILLS
WALTHAM ABBEY

Guncotton Drying Stoves
1908-1914

NORTH SITE

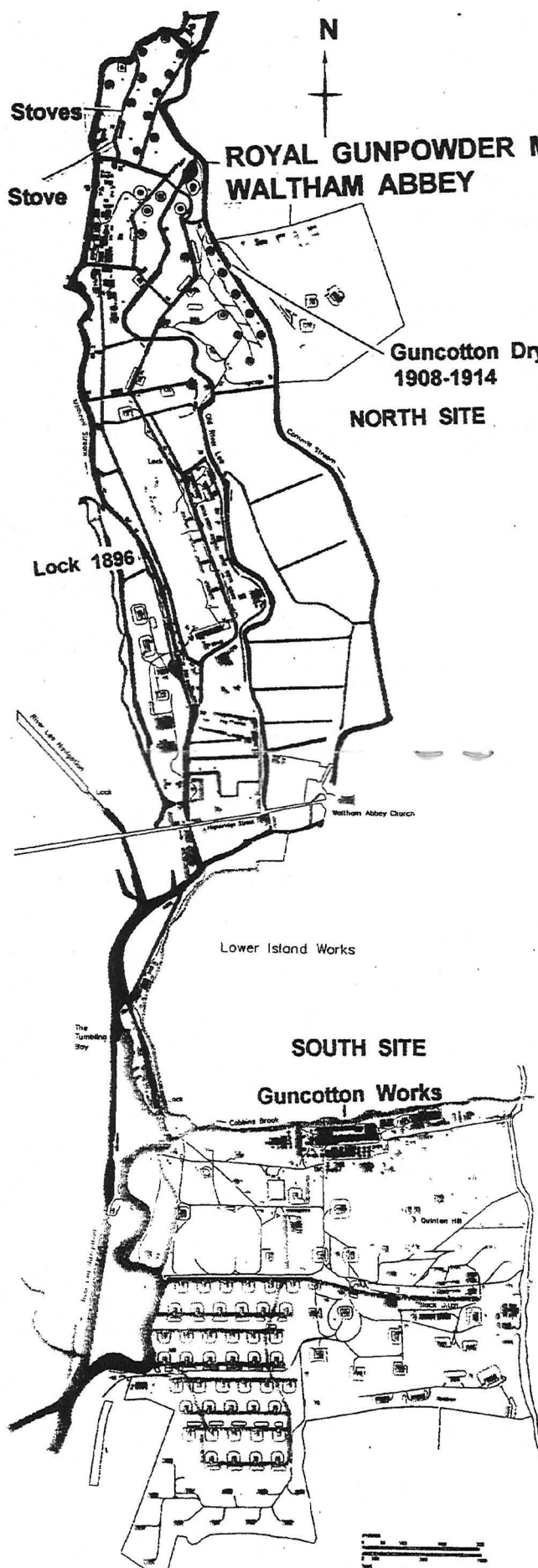
Lock 1896

Waltham Abbey Church

Lower Island Works

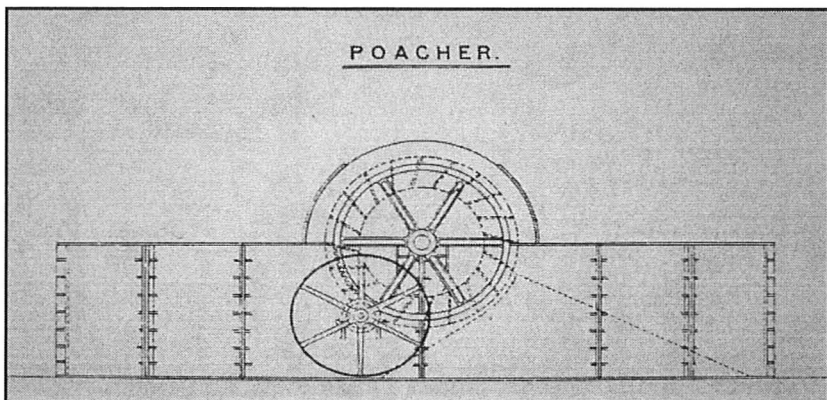
SOUTH SITE

Guncotton Works

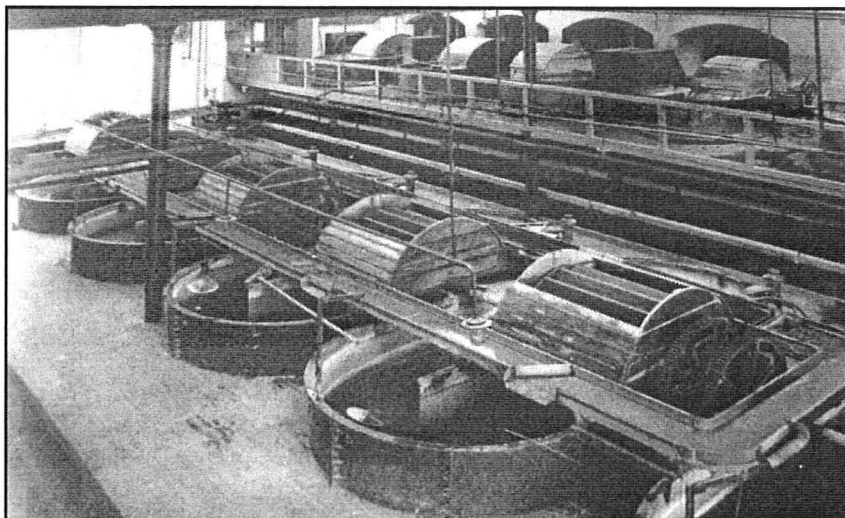


8. Potching (Washing), alternatively termed Poaching, and Blending

The final stage in purification was further washing in vessels termed potchers or poachers. Again methods and equipment reflected paper industry practise. However this was not entirely satisfactory and again a Waltham Abbey development became the explosives industry standard. This was the Bowden-Parsons Tangential Potcher which came into operational use for potching of 2 ton batches in 1937.



It had been found that the existing use of a pump to circulate around an elliptical vessel would not cope with a 2 ton batch as it would require an impractically large pump. The tangential potcher achieved the necessary high circulating velocity by injecting the pump discharge of pulp tangentially into a circular vessel. This was later extended to blending to achieve a uniform nitrogen content of 13.2%. After washing the guncotton settled and the wash waters were skimmed off, removing insoluble impurities and any soluble materials released from the centres of the nitrated fibre by pulping.



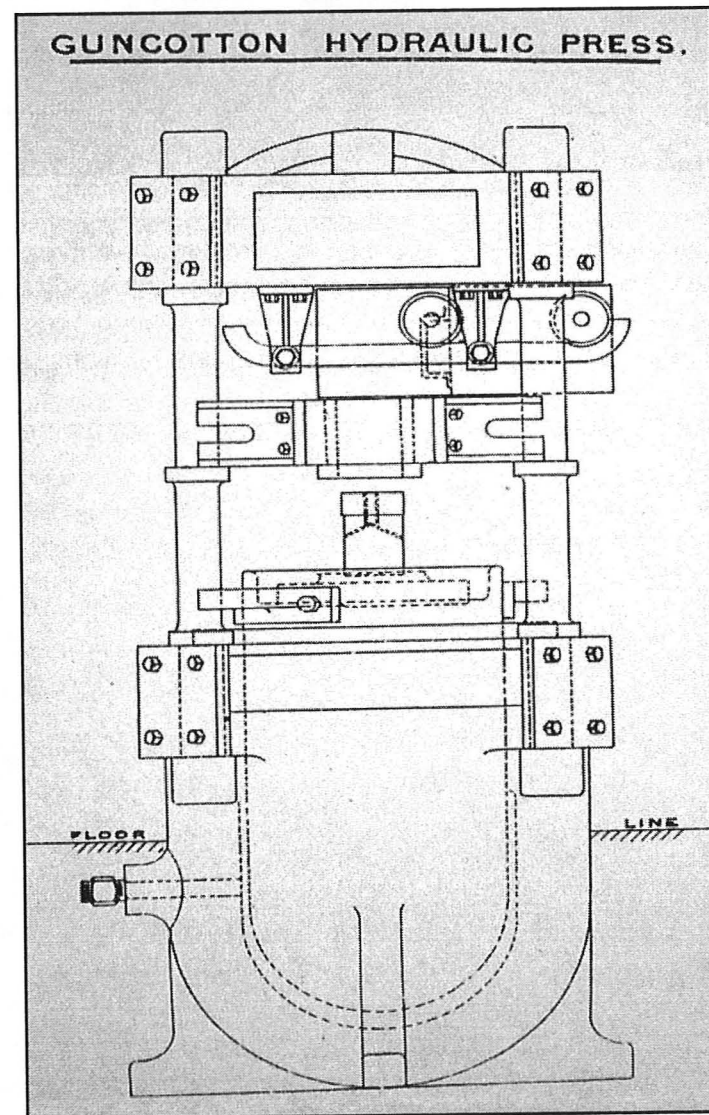
Potchers (July 1917)

9. Foreign Matter Removal

After washing any remaining foreign matter, such as grit or metal, was removed by centrifuging.

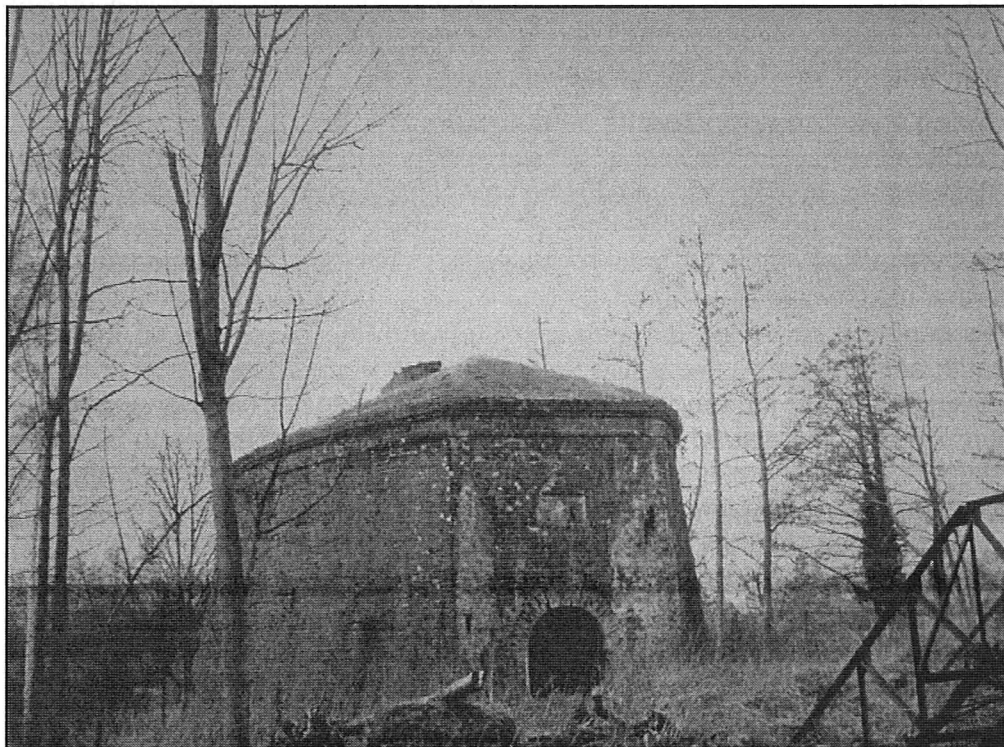
10. Moulding (Pressing)

The final stage was moulding the moist material into slabs, which with detonator inserted would be for direct use in demolition, or cylinders of around 5in. diameter, termed primers, which moved initially for storage to the Wet Guncotton Magazine at the Grand Magazine in the north (see **Touchpaper September 2002**).





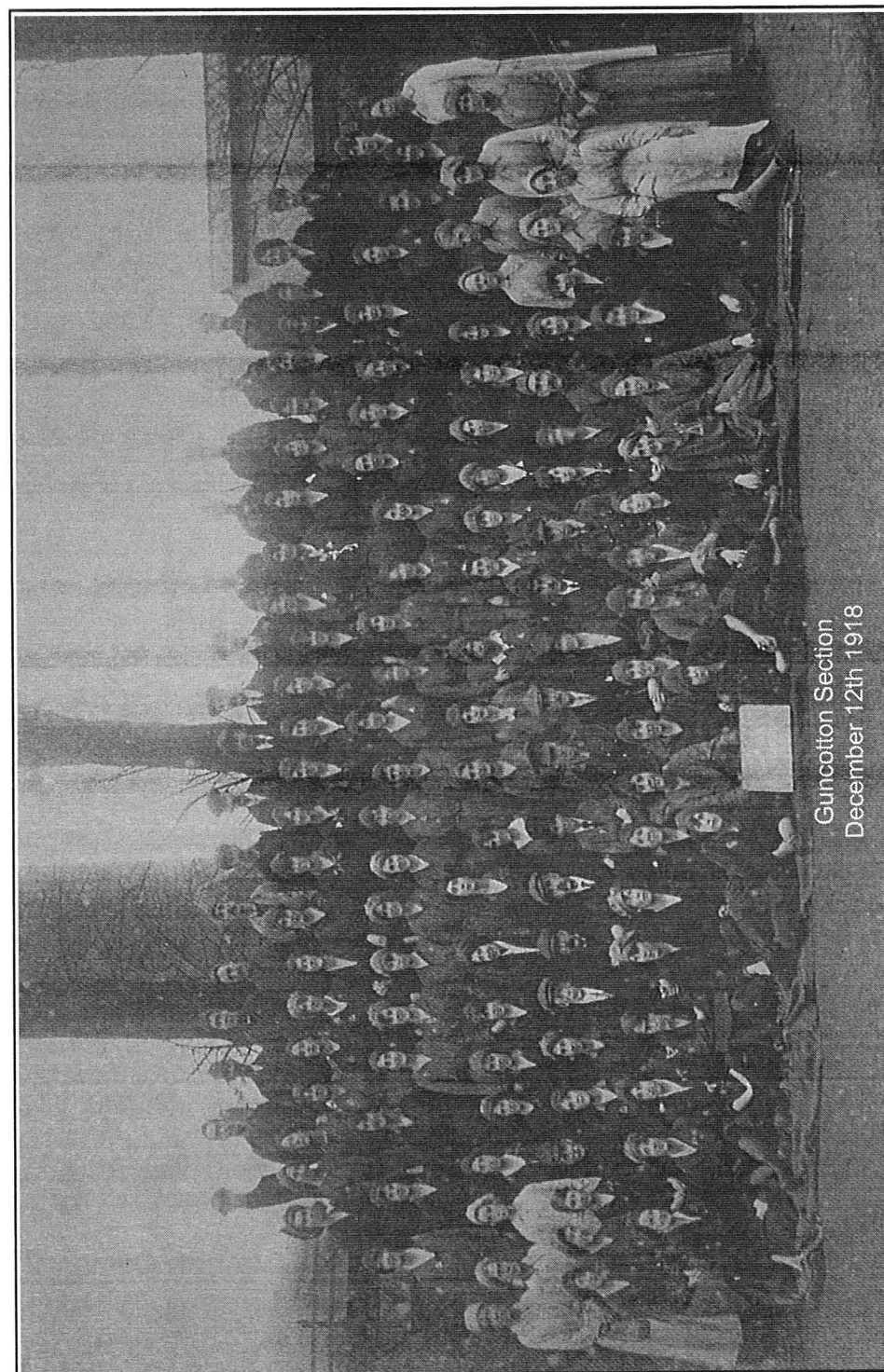
The stoves were normally in pairs with an engine house between them driving fans which drew air over a heat exchanger into the stoves. For drying the guncotton was placed on trays stacked on metal racks.



Bldg 26 - Originally Boiler House for Gunpowder Steam Stoves.
Converted (1894) to Engine and Fan House for GC Stove No.1.

This system continued as standard until the introduction of the Quinan stove in 1938. Originally developed in WW1 this design was intended to improve the safety of the procedure and increase throughput. Although later overtaken by the development of a process involving the pumping of a wet nitrocellulose slurry to the cordite facility, thus avoiding the need to dry guncotton, the Quinan system was highly innovative and productive in its day. Its story and that of its creator is interesting and will be told in the next **Touchpaper**.

With the onset of WW1 the Cobbins Brook factory became of core significance and in 1915 was enlarged to cope with demand placed on it. Until closure in 1943, when newer factories in the west took over from Waltham Abbey, it played a vital part in supplying the Forces guncotton requirements, both for direct use and for cordite production, and by 1940 was producing around 120 tons per week.



Guncotton Section
December 12th 1918

RAILWAY NEWS



"Guncotton Workers' Late 19th Century.
(Acid Carboy in front)

Guncotton was at the heart of chemical explosive development in the latter part of the 19th and first half of the 20th century, both in direct use and as one of the two components of cordite. The research led by Sir Frederick Abel and crystallised in manufacturing procedure at Waltham Abbey was fundamental to its development into a safe and effective product, with Waltham Abbey methods being widely influential in outside manufacturing practise, and enabled the South Site Guncotton Factory to successfully supply an important part of the requirements of the British Forces over 50 years, including two world wars.

Les Tucker



I am sure that you are all aware of the 18" gauge steam loco- "The Woolwich" and the associated rolling stock which has been under tarpaulins by the side of the Volunteer Base since the opening of the Site to the public. Until funds are available the plan to lay track and run these on the site for visitors they will have to stay in storage.

What you may not be aware of is the donation of a Hunslet 0-4-0 diesel locomotive and rolling stock from Bishopton.

Unlike The Woolwich the Hunslet is a 2'6" gauge loco and again, unlike Woolwich, we are going to run her and some of the wagons in the very near future. Thanks to one of our volunteers, Robin Parkinson, who works for Thames Water, we have acquired over 200' of the appropriate rail which they were scrapping and this has given us the basis for a running track of 2'6" gauge.

The engine house and workshop is based in Building 83B which was the engine house for the Acid factory and was currently being used as an archive store, The building is weatherproof and lockable, so is ideal for our purposes. Unfortunately there is no mains power but we do have a generator so things are not too bad.

We heard of the donation back in the Spring so Robin and I set to work to clear a working space within 83B and then started to lay track. We got 1870' laid up to the 24th July when the locomotive, some very sorry looking wagons and a lot of rusty, but probably usable, track arrived on two articulated lorries. All of that Wednesday afternoon, up till 7.00pm was spent unloading said lorries and Robin and I were very tired by the time we left site.

The plan is to run the Hunslet Diesel and a few wagons over our short length of track to demonstrate how an industrial line would have worked.

Initially the 2'6" system will not be a passenger carrier. As the length of track grows we hope that the land train can make a short stop so that the public can get a better view of the rolling stock and loco working.

There are six usable wagons, which are in a very poor, though repairable state. Unusually the wheel hubs are steel with bronze tyres brazed to the hubs; obviously to avoid steel running which could cause sparks and lead to an explosion. There are a further six chassis which are little more than scrap but may be useful for spare parts. There is a considerable amount of track, four sets of points and even a turntable, so things are looking good.

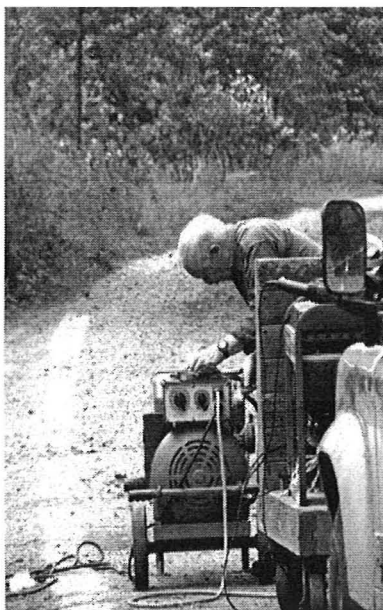
We have also been busy on the 18" gauge system. Back in the early Spring we cleared 100' of the original 18" track on the land train route at the northern end of the site with the aim of placing some cordite wagons back on rail.

So far we have converted two wagons back to 18" gauge use by removing the existing road wheels and fitting bogies to the chassis and they are both nearing completion and will soon be ready for display.

We have also repaired and repainted two 2'6" wagons that we found in 83B when we took it over. One has an extraordinary overhang in relation to its wheel base. Does anyone know the history and purpose of these two wagons as they were designed to be pushed by hand and no one seems to know where they came from. They are certainly not from WARGM.

The next time you visit the site why not pop up and see us. I am always on site on Wednesdays and Thursdays and will always be pleased to show you around and explain our aims.

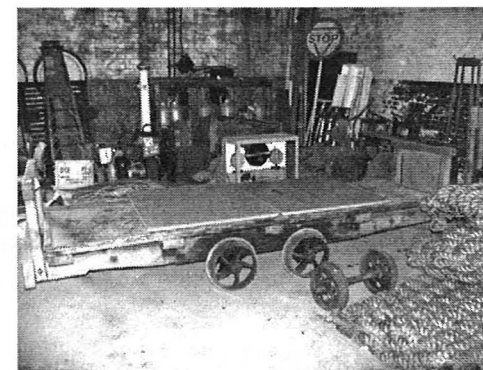
John Wilson



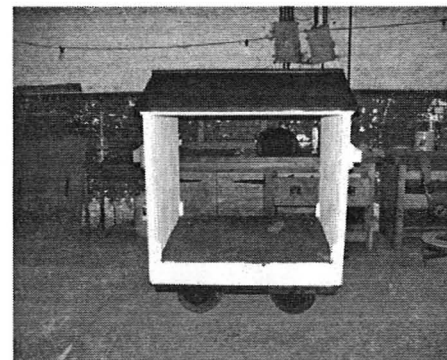
Robin Parkinson



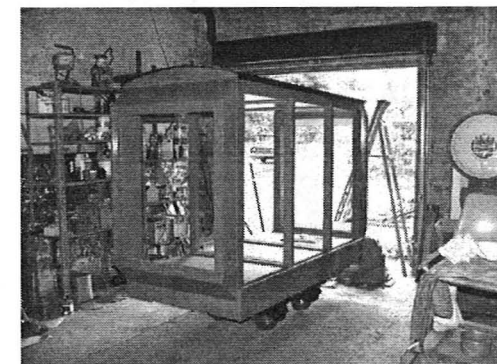
Track Laying June 03



Wagon Blending Type 73S



Small Wagon 83bPS



Cordite Drying Wagon 83bPS



Green Wagon Short Type PS

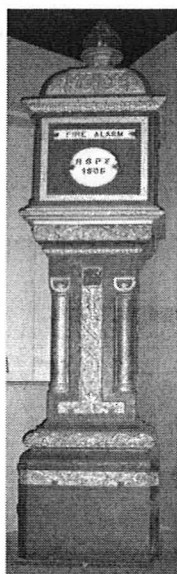
TOUCH

SNAP!

I thought you might be interested in this! This was in road near the Spandau Arsenal, Berlin, another one is in the museum in the citadel museum.

I've sent a copy to Les Tucker with note, suggesting it might provide an item for the next newsletter. Les thinks the WA examples were manufactured by Siemens, which would no doubt provide the link. Apologies for the quality, the scan is from a 35mm slide.

Wayne Cocroft English Heritage



'Ours' for comparison

LAYOUT DAYOUT

With essential assistance from Brian Clements we took the Royal Gunpowder Factory layout to the Enfield Town Model Railway Club's exhibition. It involved dismantling the layout on Saturday afternoon and setting up at Kingsmead school in the evening then doing the whole thing in reverse on Sunday evening/ Monday morning. We spent the day of the exhibition (Sunday, June 29) running the trains and talking about the Powdermills. There was a lot of interest and scores of leaflets given out, including several for group visits. We hope that this publicity effort will result in more visitors. Whilst there we were invited to take the layout to two other exhibitions in 2004!

Tony and Beryl Barratt

BYTES

DEEF You asked for feedback as to what we do or do not like to read in Touchpaper so here are my comments:

I enjoy the historical pieces about the site and the letters in Touchbytes. I can imagine it is hard to fill the magazine sometimes as it seems only a small handful of readers take the trouble to write to you with their contributions.

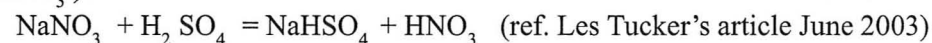
You will see that I have made an attachment to this message - it is a bit of fun that was sent to us by a friend. Hope it makes you smile! (*see over. Ed.*)

I am surprised that no one writes about the re-unions for example, for those who cannot make it in person. Also has anyone been on the site tour and what did they think of it? Some ex neighbours of mine went to Waltham Abbey earlier this year and decided to take the tour. They thoroughly enjoyed it, despite having no connections with the site. I would also like to read about fantastic holidays, business projects, family news etc. from old workmates. Is their anyone out there?

Another thing I appreciate is finding out who is living and who is not, as most people are not interested in writing letters these days so Touchpaper is often the first news I have about people who have died. And thankyou for printing the full list of subscribers last time. It's much appreciated.

Well thanks for listening! Best wishes from,
Sandra Day.

CHEMISTRY ...For the lapsed chemists among us, an old text book gives the equation for the production of nitric acid from Chile saltpetre (naturally occurring sodium nitrate NaNO_3):



The reaction is actually reversible but the removal of the more volatile nitric acid by condensation in cooling coils ensures that the reverse reaction does not take place.

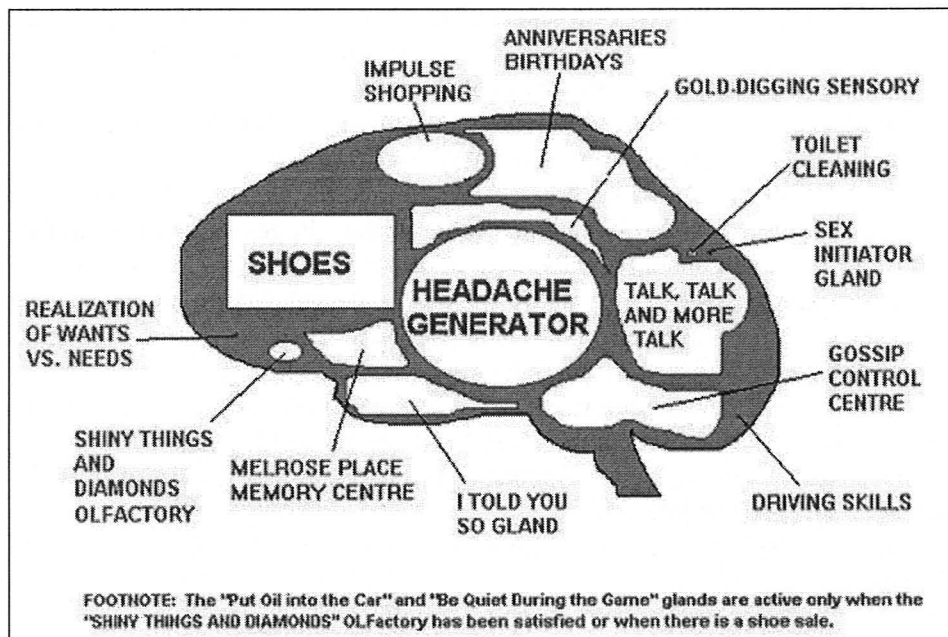
In normal practice, described as carried out in cast iron retorts with the nitric acid collected in earthenware vessels the reaction was stopped before completion in order that the liquid residue could easily be run out of the retorts. It is this residue, consisting of a mixture of sodium bisulphate (NaHSO_4) with a little sulphuric acid that was known as 'nitre cake'. Nitre cake was once extensively used to manufacture hydrochloric acid from common salt and may account for the observation that the Royal Naval Cordite Factory at Holton Heath was able to dispose of substantial quantities to a domestic chemical manufacturer. A nitre cake shed, nitre cake pans with roof/covers over, possibly used for the emptying of retorts and initial storage are evident in the 1923 map of the RGPF, including the acid factory in particular.

Two 'Nitrate Soda' stores are shown, apparently including building E10 said to be standing today. A third building is marked 'Glycerine and 'N.S. Store'.

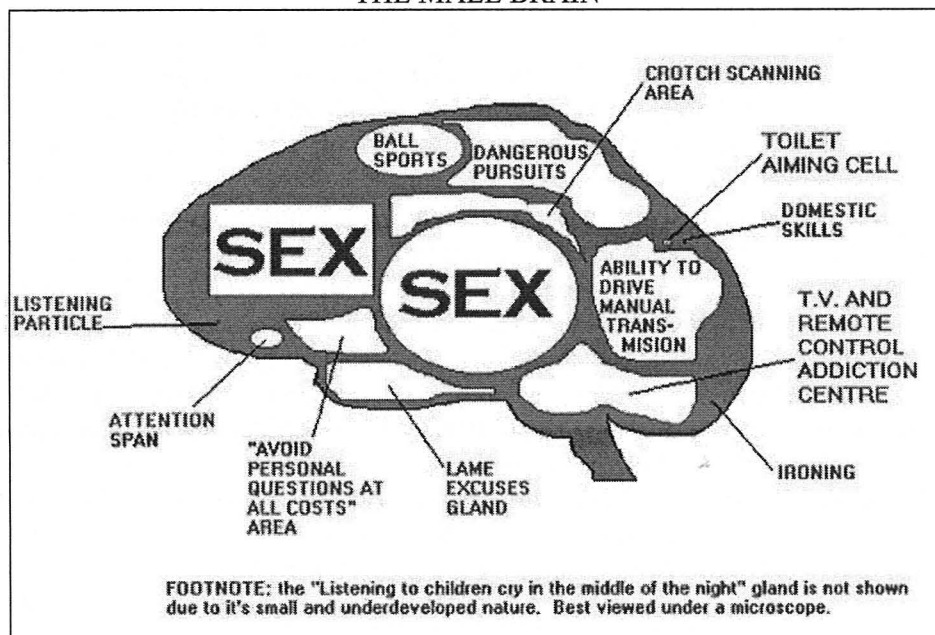
Dave Hartley

DON'T FORGET
DEADLINE FOR THE December 2003 ISSUE:
15th November 2003

THE FEMALE BRAIN



THE MALE BRAIN



MEMBERSHIP

We printed a list of current members in the last issue.

Unfortunately the list had been 'sorted' by membership number rather than by surname and some members had difficulty spotting their names - apologies.

We also omitted to give those on our 'overseas' list -

AUSTRALIA

Allen Clarke
Roy Macleod
Peter Pearce

USA

Andrew Sanderson
Doug Tasker

NETHERLANDS

Rutger Webb

AND A WARM WELCOME TO NEW MEMBERS:

Bob Almond
Mary Hirst
Frances Hazel

Elizabeth Cornish
David Hartley
Gary McKinney

Timothy Corke
Tony Hazel
Len Stuart