

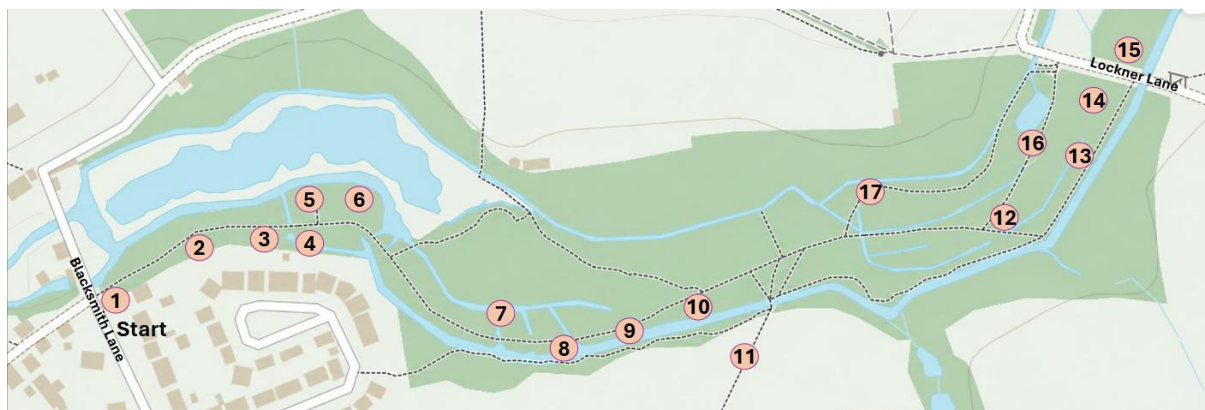
Chilworth Gunpowder Mills

A self-guided walk through 300 years of industrial history

Over almost 300 years, from 1626 to 1922, Chilworth Gunpowder Mills was one of Britain's most important explosives factories. Today, the central section of the site is a Scheduled Monument owned by Guildford Borough Council.

The walk follows a 1 km route from Blacksmith Lane to Lockner Lane, with several side paths to explore. As you walk through the site, the River Tillingbourne is on your left, while the 17th-century man-made 'New Cut' runs on your right. Water from the New Cut powered the waterwheels that drove much of the manufacturing process.

Over three centuries the mills constantly evolved. Water power gave way to steam, a tramway was built to transport coal and gunpowder, and the workforce grew from a handful of men to more than 600 during the First World War. After production ended, the machinery was sold and many buildings were later demolished. What survives today offers a glimpse into one of Surrey's most important industrial landscapes.



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|---------------------|------------------------------------|-------------------------------------|
| 1. West Lodge | 7. 1860s Steam Incorporating Mills | 13. 1880s steam incorporating mills |
| 2. Dusting House | 8. Swing bridge | 14. Charge House |
| 3. Expense Magazine | 9. Bridge Abutment | 15. Smokeless Powder Factory |
| 4. Dragon's Teeth | 10. Wharf | 16. Boiler House |
| 5. Corning House | 11. Tramway | 17. Prismatic Press |
| 6. Mixing House | 12. Chilworth Mounds | |

Start Point

1. West Lodge – Entering a dangerous workplace



You enter the heritage site through the original green factory gates. The small building on your right is West Lodge, (now a private residence), where workers reported before starting their day at 6:00 am.

Before entering the factory, every worker was searched for matches and other prohibited items and then changed into special “powder kit” clothing made of hard-wearing denim with no pockets, turnups or buttons. They also put on special over-boots made with wooden pegs designed to reduce the risk of sparks.

Each worker was issued with a numbered brass token. In case of an explosion casualties involved could be identified by the tokens that had not been returned.



Photo Andrew Norris



A special ‘over-boot’ made with wooden pegs to avoid sparks.

2. Dusting House – One of the final stages

About 100 metres along the path, look for the marker post labelled DH.

Only fragments of this once large building remain. A diagonal line of bricks, once the front wall, cross the path and parts of the rear wall are among the undergrowth to the right.

One of the final stages of gunpowder production, powder from the nearby Corning House was placed in silk-covered rotating reels, where the finest dust was separated from the finished grains before packing.

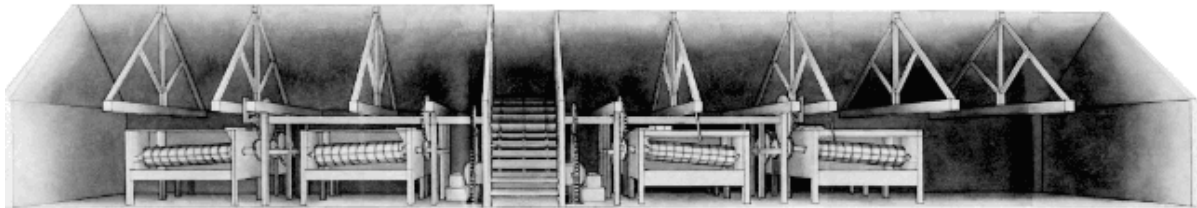


Illustration: An 1830s Dusting House from the Waltham Abbey Collection.

3. Expense Magazine – Safe storage between each process

Continue a short distance to the brick building on your right, beside the bench.

Expense magazines were used to store gunpowder safely as it moved through the manufacturing process. This building was supplied by barge from the New Cut behind it.

Before moving on, look carefully at the brickwork where the date **1873** can still be seen. It marks a period of major expansion as new magazines were built across the site.



[AndyScott, CC BY-SA 4.0](#), via Wikimedia Commons

4. Dragon's Teeth – Defending Britain in the Second World War

A little further on you'll find two marker posts: DT on the right and CH on the left.

The concrete cones beside the path are known as Dragon's Teeth. They formed part of the **GHQ Stop Line**, a defensive barrier installed during the Second World War intended to slow any German advance towards London.



5. Corning House – The shocking explosion of 1901

Opposite the Dragon's teeth is the CH marker post. Walk a few paces and you can look down onto the remains of the Corning House. (Please take care here as there is a steep drop over the edge).

This building was destroyed by a huge explosion in 1901 that killed six men. The blast was the worst accident in the history of Chilworth Gunpowder Mills, blowing doors open in Bramley, shaking houses in Shere and being felt as far away as Cranleigh.

The Corning House had been a two-storey brick and tile building, partly above and partly below ground level. What remains of the double walls of the lower chamber can still be seen.

Here, pressed gunpowder was broken into grains of different sizes for use in everything from pistols to heavy artillery. On the day of the explosion, two corning machines were about to begin work.

Investigators concluded that the accident probably began outside the building, when a spark from a hob-nailed boot ignited gunpowder being loaded onto a cart. A second, much larger explosion followed, destroying the building hurling large pieces of machinery over 50 yards. A handle from the wooden cart was found north of the ruins. It helped investigators reconstruct what had happened, as it could not have travelled up and over the building if the Corning House itself had exploded first.

For a detailed contemporary account of the explosion and the inquest, see reports published at the time in the *Surrey Advertiser*.

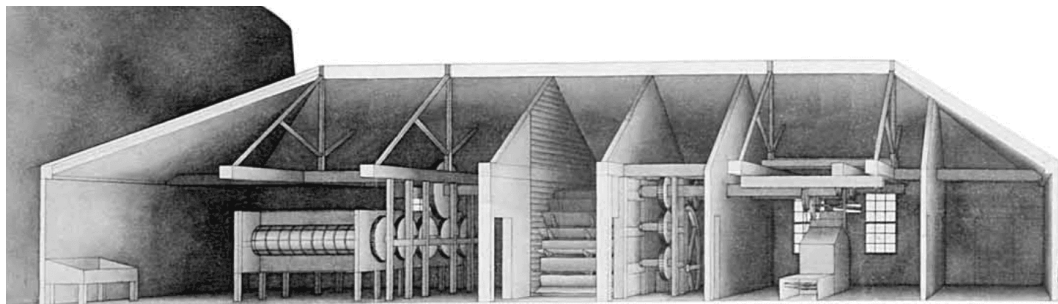
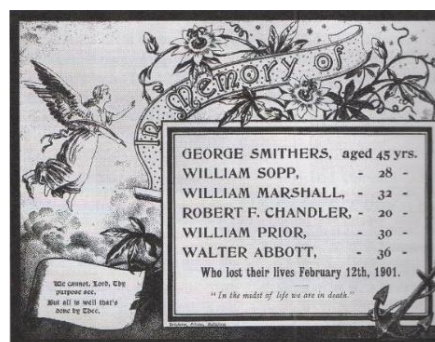


Illustration: An 1830s Corning House from the Waltham Abbey Collection.

Memorial card for the
victims of the 1901
explosion.



6. Mixing House – Preparing the ingredients

Return to the main path and continue until you cross a channel running under the path taking water to the Tillingbourne.

Here are the remains of a mixing house where the three ingredients of gunpowder—saltpetre, charcoal and sulphur—were first blended together in carefully measured proportions. The mixture was then taken to the incorporating mills, where it was crushed into a fine, uniform powder.

7. 1860s Steam Incorporating Mills

Continue along the path until you come to a row of edge-runner millstones each weighing around three tons. They mark the site of the first steam incorporating mills, where the ingredients were crushed together beneath two heavy vertical stones running in a circular trough.



There are several millstones around the site. Worn millstones were stood on their side and covered in earth to provide protection from accidental blasts.

[AndyScott](#), [CC BY-SA 4.0](#), via Wikimedia Commons

Some stones date from the 1600s. The maker's mark can still be seen on the rear of the 7th millstone (second from the right).



Here you can see the remains of a complete bedstone, with space beneath to accommodate the gearing, alongside fragments of a broken bedstone to its right.

Originally powered by water, the mills were later driven by steam as the factory modernized. This was one of the most important—and potentially dangerous—stages in the manufacture of gunpowder.



From the [Waltham Abbey Special Collection](#).

8. Swing Bridge – Crossing the New Cut

About 75 metres further on, look for the marker post labelled SB on your right.

This was the site of a swing bridge which carried the narrow-gauge tramway across the New Cut.

The bridge could be swung aside on this pivot to let punts pass up and down.



Photo by Andrew Norris

Remains of another swing bridge can be seen further along which connects the site with Chilworth station.

(See Tramway at 11 below)

9. Bridge Abutment

About 100 metres further on, look for the marker post labelled BA on your right.



Photo by Andrew Norris

This bridge was probably used by locals walking to Guildford through the mills. In later years, the route was closed for security reasons and was used solely for access within the site.

10. Wharf – Loading by water

Walk about another 75 metres and look for the marker post labelled W on your right.

Punts moored here to load and unload materials. Similar wharfs were built beside each Expense Magazine, allowing gunpowder and supplies to be moved safely around the site. Look for the remains of a sluice gate and channel.



Men working the small punts on the mill stream, circa 1913.

11. Tramway – Britain's earliest known metric-gauge railway

Continue to the picnic area. Opposite the picnic area and to your right, cross the bridge and, after a few paces, you will see a straight path leading directly to the station. Now known as Vera's Path, this used to be the part of the tramway linking the station to the site.

Today's main footpaths follow the route of the tramway, installed around 1885 as the works expanded. Workers pushed wagons carrying gunpowder and coal safely around the site. Wooden wagons helped reduce the risk of sparks and were pushed by teams of two men. Brass-bound wagons were

used within the factory, while steel-bound wagons carried coal from the railway siding to the furnaces



The swing bridge carried the tramway into the site from a siding at Chilworth railway station. Vera's path follows its exact line today.



Some of the tramway tracks can still be seen used as fence posts along Vera's path

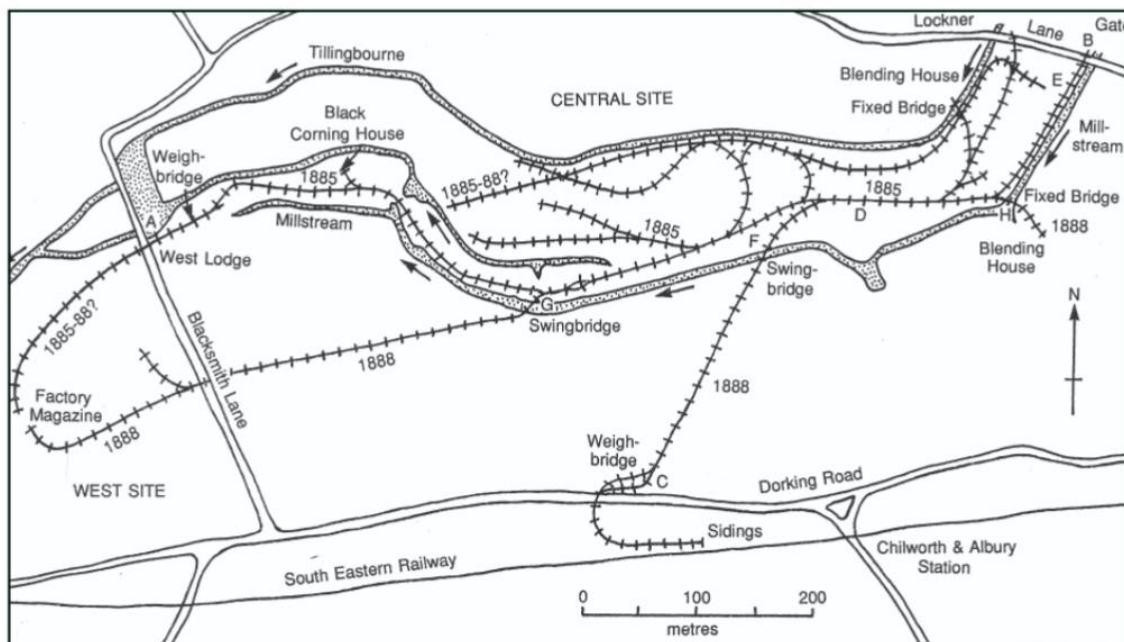
From a weighbridge at the top of Vera's path, the route ran downhill, and workers used to jump onto the wagons to get a free ride back to the site.



A glass tram presented to Mr Edward Puttock after 25 years' service. The model tram was mass-produced in pressed glass.

From 'Damnable Inventions' Glenys and Alan Crocker. Presentation glass model tram

A map showing the extent of the tramway around the site in the 1880s



Reproduced from 'The Tramway at the Chilworth Gunpowder Works' by Alan Crocker (Surrey Archaeological Collections, 82)

12. Chilworth Mounds – adopted nationally

Walk back across the bridge and return to the main path. Continue for approximately 250 metres until you see the marker post CM on the path.



Photo by Andrew Norris

First used at Chilworth, these were known nationally within the explosives industry as **“Chilworth mounds”**. Found all around the site they were huge mounds of earth, reinforced with corrugated iron drums, which protected neighbouring buildings and workers against blasts.

13. Steam Incorporating Mills – beginnings of a major expansion

Just beyond the Chilworth Mounds you will see the large incorporating mills.

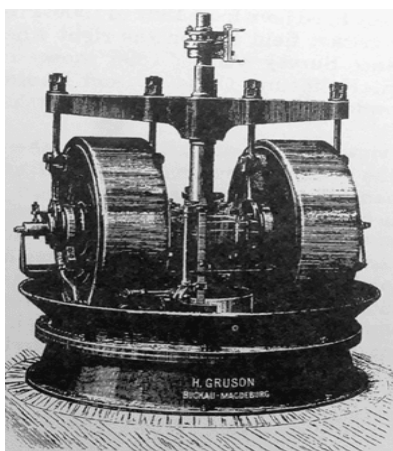
The Steam Incorporating Mills were the beginning of a huge expansion at the site.

In 1885 the business became **The Chilworth Gunpowder Company**, backed by German investment. The site was modernized on a large scale, becoming the second-largest supplier of gunpowder to the British Government.

Within a few years the workforce grew from around 30 people in the 1860s to approximately 600 during World War One.

In June 1885, the company advertised for 150 excavators "wanted at once" to begin the work of building of the mills in front of you and local newspapers reported complaints about the heavy traffic bringing bricks to the site.

Look for the surviving blast walls and the gear rooms beneath the floor. Lightweight roofs and front screens were designed to direct the force of any explosion away from the machinery. A drenching system automatically flooded all bays if an explosion occurred in one of them. Look for the metal pulleys just below the roofline.



'Damnable Inventions' Glenys and Alan Crocker.

Here the gunpowder ingredients were crushed together in a pan under the rims of two vertical mill wheels running in a circular trough. One of these was installed in each of the six chambers of the building. When the estate was sold in 1922 four were dismantled and sold to Faversham.

Iron incorporating mill by Gruson of Magdeburg, Germany.

Look for the marking
"BURBACH 1884".

These RSJs (Rolled Steel Joists) were imported from Germany and are among the earliest recognised rolled steel sections used in Britain.



14. Charge House – Measuring every batch

Next to the incorporating mills stands the Charge House. CH

Here, carefully measured quantities of the gunpowder ingredients were prepared before being fed into each incorporating mill. Keeping each batch small improved both safety and consistency, reducing the amount of explosive material in any one place.

15. Smokeless Powder Factory – A new generation of explosives

You have now reached the end of the publicly accessible section of the Gunpowder Mills.



On the other side of Lockner Lane is the original old iron entrance gate to the Admiralty cordite factory which is on private land.

The Admiralty cordite factory, built between 1890 and 1915, covered around nine hectares, contained more than 20 buildings and marked another major expansion of the works.

Introduced in the 1880s, cordite replaced traditional black powder. As a smokeless propellant, it produced less smoke and residue while delivering greater power, making it ideal for modern military weapons.

Just to your right are the remains of one of a pair of Second World War anti-tank obstacles. Heavy railway sleepers would have been fitted into the slots to form a barrier.



From here, you can either turn round and retrace your steps or turn left along Lockner Lane for about 50 metres before re-entering the heritage site through the gate on your left.



Take the path ahead to pass behind the incorporating mills and the Boiler House (16) or alternatively take the riverside path to the right that leads past the site of the Prismatic Press (17). Both paths return to the main route.

16. Boiler House – Powering a modern factory



Today, little remains of this coal-fired building apart from the outline of its brick foundations and the base of what was once a tall chimney. The boiler house supplied the steam that powered the incorporating mills.

17. Prismatic Press – Gunpowder for Britain’s biggest guns



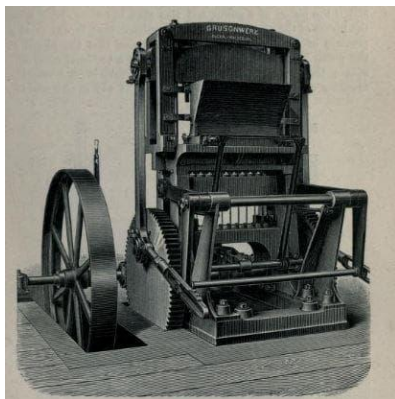
The foundations beside the river mark the site of the Prismatic Press House.

By the 1880s it had been discovered that pressing gunpowder into small prisms, each with a hole through the centre, produced a slower, more even burn. This made prismatic powder ideal for Britain’s largest naval and coastal guns.

Four presses were installed at Chilworth in 1886 - a year before similar machinery was introduced at the Government’s Royal Gunpowder Factory at Waltham Abbey*.

Powered by water wheels, they rapidly produced six prisms at a time each measuring about 25 mm × 40 mm (1 × 1½ inches).

*Cocroft Industrial Archaeology Review 2005



A cam-press for making prismatic powder. Built by the Grunsonwerk of Buckau, Germany this may well have been installed at Chilworth.

Public domain image.



The prismatic shape can be seen on the Chilworth Gunpowder Company Cricket Club logo.

Damnable Inventions
Glenys and Alan Crocker.
Photo courtesy of H Booth

The end of an era

The First World War brought unprecedented demand for gunpowder, but with peace in 1918 the market declined rapidly. Explosives manufacturers merged to form Nobel's Explosives Ltd, later part of ICI, and on 16 June 1920 the workforce was given notice that production at Chilworth would end.

The factory closed later that year, and the estate was sold in 1922. Much of the machinery was removed for use elsewhere, while many of the remaining buildings were demolished during the 1960s.

Today, the surviving buildings, earthworks and waterways provide a record of more than 300 years of gunpowder manufacture. We hope this walk has helped bring their story to life.