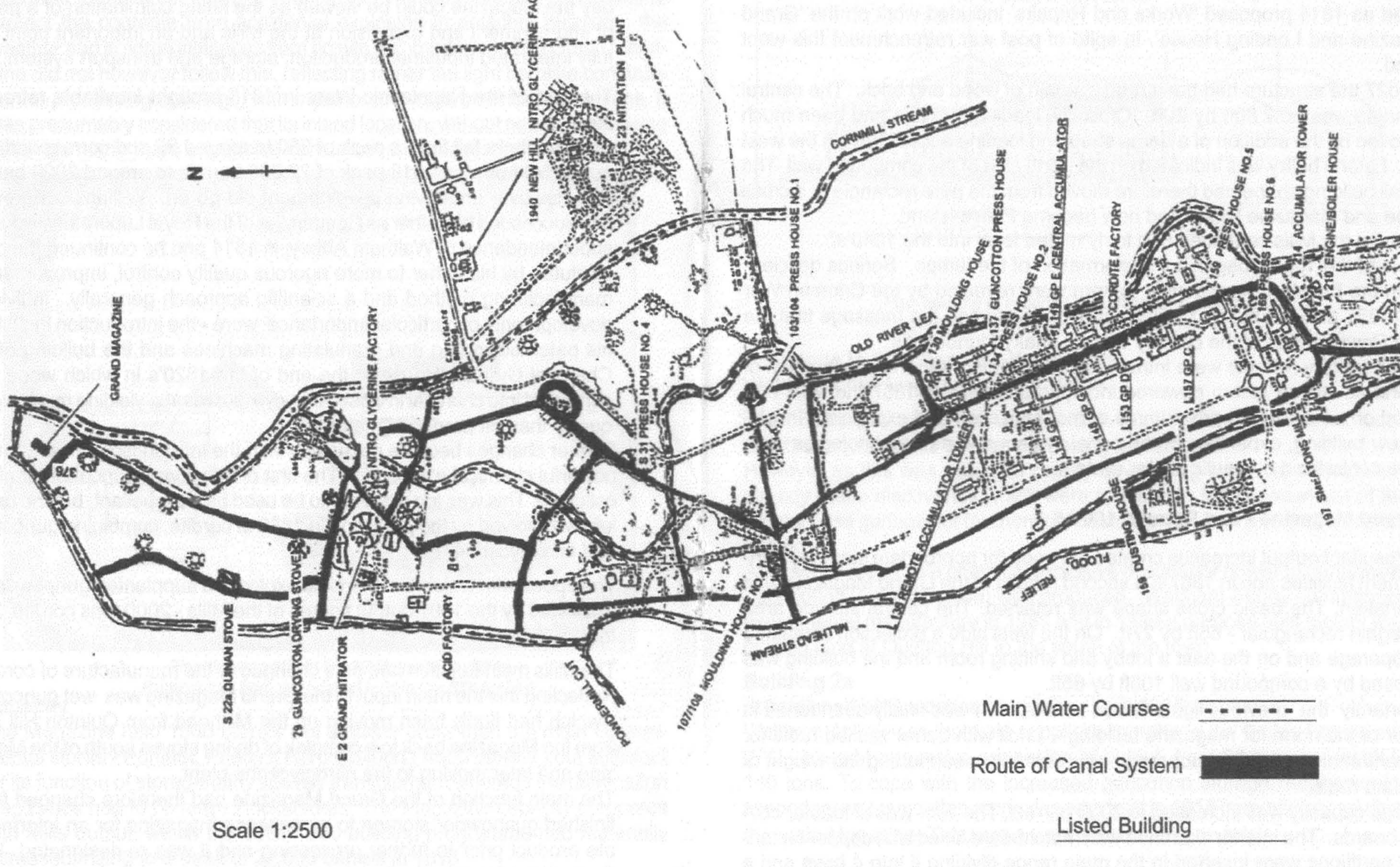
THE ROYAL

GUNPOWDER FACTORY

WALTHAM ABBEY

★★★★★★★★★★★


GRAND MAGAZINE
376
S 22a QUINAN STOVE
29 GUNCOTTON DRYING STOVE
E 2 GRAND NITRATOR
NITRO GLYCERINE FACTORY
ACID FACTORY
POWDERMILL CUT
1940 NEW HILL NITRO GLYCERINE FACTORY
S 23 NITRATION PLANT
S 31 PRESS HOUSE NO. 4
107/108 MOULDING HOUSE NO.4
103/104 PRESS HOUSE NO.1
CORNMILL STREAM
MILLHEAD STREAM
OLD RIVER LEA
L 130 MOULDING HOUSE
L 137 GUNCOTTON PRESS HOUSE
L 134 PRESS HOUSE NO.2
L 149 GP E /CENTRAL ACCUMULATOR
L 145 GP F
L 148 GP G
L 153 GP D
CORDITE FACTORY
L 157 GP C
158 PRESS HOUSE NO.5
169 PRESS HOUSE NO 6
A 214 ACCUMULATOR TOWER
A 210 ENGINE/BOILER HOUSE
197 SMEATONS MILLS
136 REMOTE ACCUMULATOR TOWER
166 DUSTING HOUSE
FLOOD RELIEF
N
Main Water Courses
Route of Canal System
Listed Building
Scale 1:2500

RGPF.

POWDERMILL LANE.

This was an entry into dangerous and secret activities. This section of the Lane at Highbridge Street is now replaced by the roundabout. The houses on the left are demolished, but the bank of the river on the right remains.

A221 THE LODGE. BUILT EARLY 19th CENTURY.

Situated on the eastern boundary flanked by the River Lea. Built of yellow brick with a slate roof it is redolent of military quarters seen in the older parts of garrison towns such as Aldershot. There were various alterations and extensions, e.g. the front entrance porch was added around the middle of the 19th century. Continuing the theme of power, if the buildings above represented the technical the Lodge represents the administrative. It was the senior officer's residence, ranging from; Clerk of Cheques in 1821, Captain Instructure in 1859, Staff Officer in 1897 and becoming the Director's residence after WW 2 when the site became a research establishment.

Of archaeological interest in the spacious gardens is what now appears to be an almost surreal sight in a domestic setting - a WW2 brick built octagonal gun site with indented circular base plate marking in the concrete, probably indicating that staple of British light anti-aircraft defence - a Bofors 40mm quick firing gun.

RGPF WALTHAM ABBEY.
Mixing House (left) and Saltpetre Melting House (right) constructed soon after the governments's acquisition of the factory in 1787.

RGPF WALTHAM ABBEY.

Walton's House, named after the last private owner of the works but built as offices soon after the government purchased the works in 1787.

RGPF WALTHAM ABBEY.
WALTON HOUSE 18th Century.

Management required premises to carry out their functions and house their staff and the building now termed walton House, originating earlier in the 18th century was utilised.

The original building was two-storeyed, of two bays by one bay, in red/brown brick of rectangular form in Flemish bond. The roof was hipped with pegged trusses (original carpenter's marks still visible). In the 19th century various extensions were added. In the early part of the century a third bay of two storeys was added on the north side then, from 1860 a two storeyed wing two by two bays and another two storeyed wing. These additions resulted in the building ultimately having a U shaped plan. There was a progression of official titles - Storekeepers Office, by 1865, superintendents Office and by 1917 the Main Offices. In 1865 plans were drawn up for conversion to Master Workers living quarters but it is not clear whether this ever took place. The shield on the frontage with animal head and winged angel appears to relate to previous owners rather than the Waltons. Perhaps, not surprisingly, in view of the large number of additions and the high water table, settlement has taken place. This is visible but to determine on which side is not as straightforward as it might appear. Certainly the north side has a considerable lean as evidenced by the sloping internal floors.

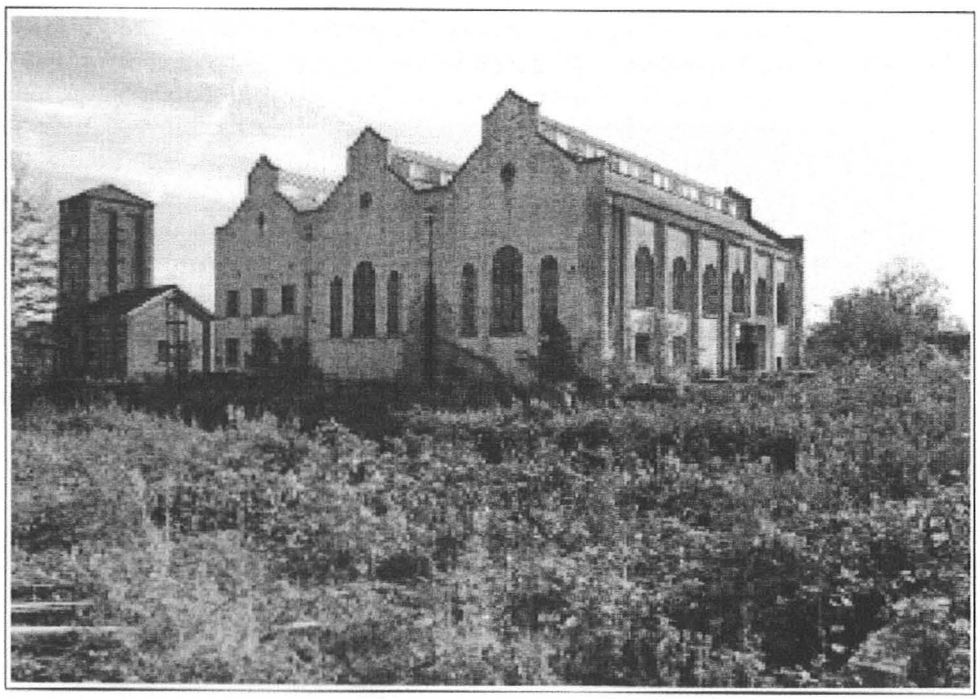
RGPF.

L176 BOILER HOUSE. BUILT 1857.

This is situated immediately south of the L 168 Engine House and supplied steam for the Group A engine. As part of the original steam complex it is Grade 2* listed.

The roof trusses are of iron with decorative cast iron compression members. There is a record of installation of new boilers in 1902 but since the Group A Incorporating building was not rebuilt after the 1861 explosion these would have only been used to power the Mechanics Shop facilities. During the time of the site's history as a research establishment the building was the 'Rigger's Shop' and store.

L176 has now been renovated and houses the site's cafe and restraurant facility. While the major structural features have been retained the original large wooden sliding doors on the north side have been replaced with a glass panelled entrance for the cafe.



RGPF.

L177 DYNAMO HOUSE,BUILT 1902.

As could be expected, electricity was first employed at the Mills, in the late 1880's, for lighting rather than motive power. The fundamental move from steam to electricity for production power occurred from around the beginning of the 20th century. A power house was constructed on the South Site in 1905 and the main power house (A210), with 3 Bruce Peebles generators, which is a prominent feature of the North Site was built around 1908.

The Dynamo House, also termed the Swichboard House, abuts on to the east side of the Boiler House, It had 2 dynamos and an accumulator shelf and its function appears to relate to a change from steam to electrical power supply to a building on the original Group A Site which had become a cordite reeling house.

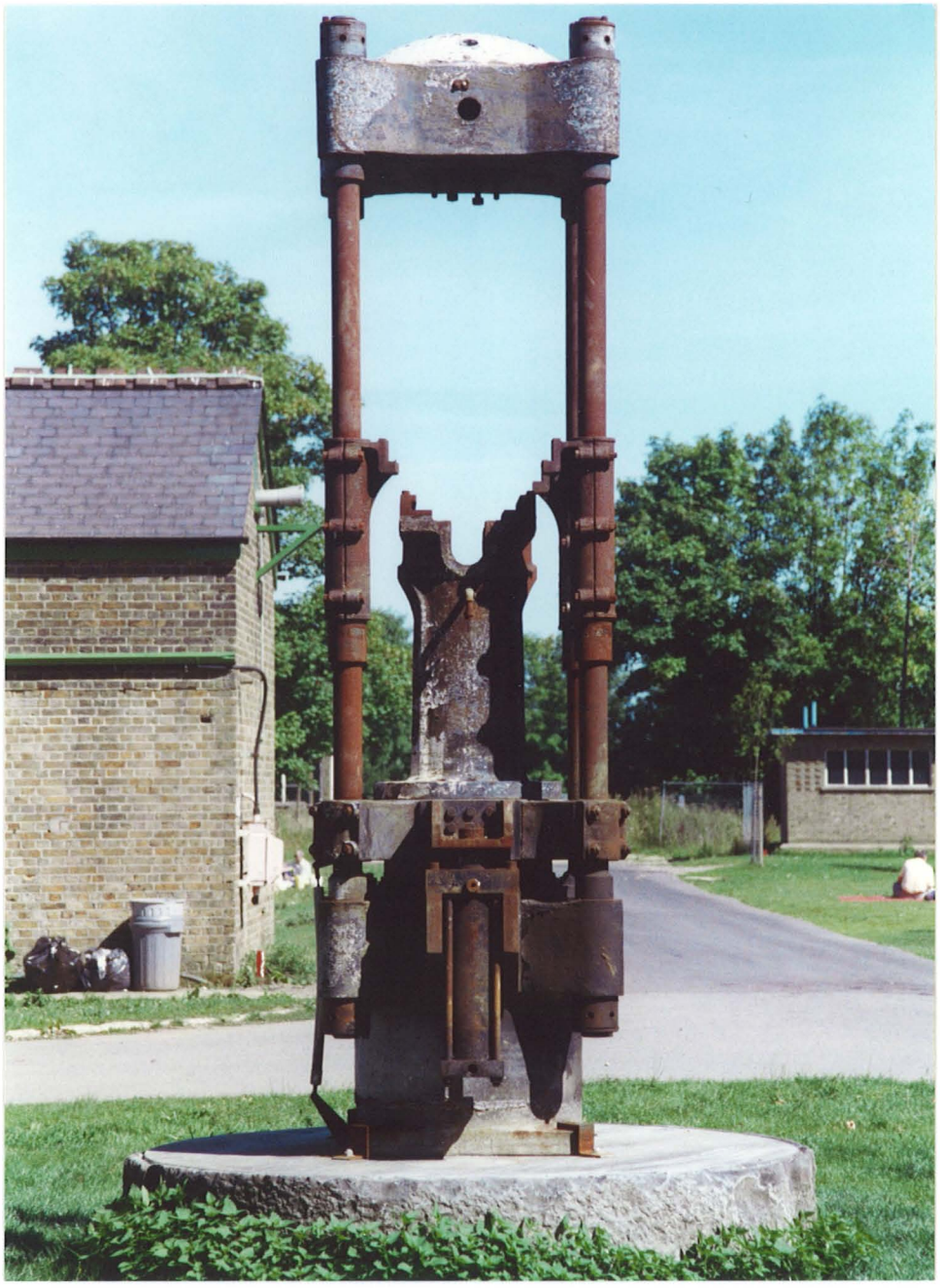
Originally a 30v DC supply was used to power cordite machinery. With the introduction of mains electricity to the area the Dynamo House was subsequently used as a general machine shop but the main boiler houses continued to raise steam for heating and processes around the site.

QUINAN STOVE.

NORTH SITE.

QUINAN STOVE.

RGPF WALTHAM ABBEY.
North Site.
Tangyes Cordite Press 1939.
Used for pressing the cordite dough through different size holes.



RGPF WALTHAM ABBEY.

Hand propelled waggons with peaked roofs WW1. These smaller waggons were used within the process areas.

RGPF WALTHAM ABBEY.

NORTH SITE.

E 2 NITRATOR.

RGPF WALTHAM ABBEY.

NORTH SITE.

E 2 NITRATOR.

RGPF WALTHAM ABBEY.

NORTH SITE.

E 2 NITRATOR.

Inside the Nitrator.

RGPF WALTHAM ABBEY.

NORTH SITE.

E 2 NITRATOR.

Inside the Nitrator.

Through this arch the Nitroglycerine was passed onto leadlined gutters to the washing houses.

RGPF WALTHAM ABBEY.
Footbridge over canal, built in 1878.

THE ROYAL GUNPOWDER FACTORY.
OLD FOOTBRIDGE.
1878.

RGPF WALTHAM ABBEY.
North Site.
WOMEN's HOSPITAL,1916.

THE ROYAL GUNPOWDER FACTORY.
SANDHURST HOSPITAL.

Opened by Lord Sandhurst, about 1895.- "It stands close to one of the myriad streams that intersect the vast grounds of the factory, and was intended solely for the benefit of the injured workmen".

RGPF WALTHAM ABBEY.

NORTH SITE.

NEWTONS POOL.

Newtons Pool.

Used for testing explosives.

ROYAL GUNPOWDER FACTORY.

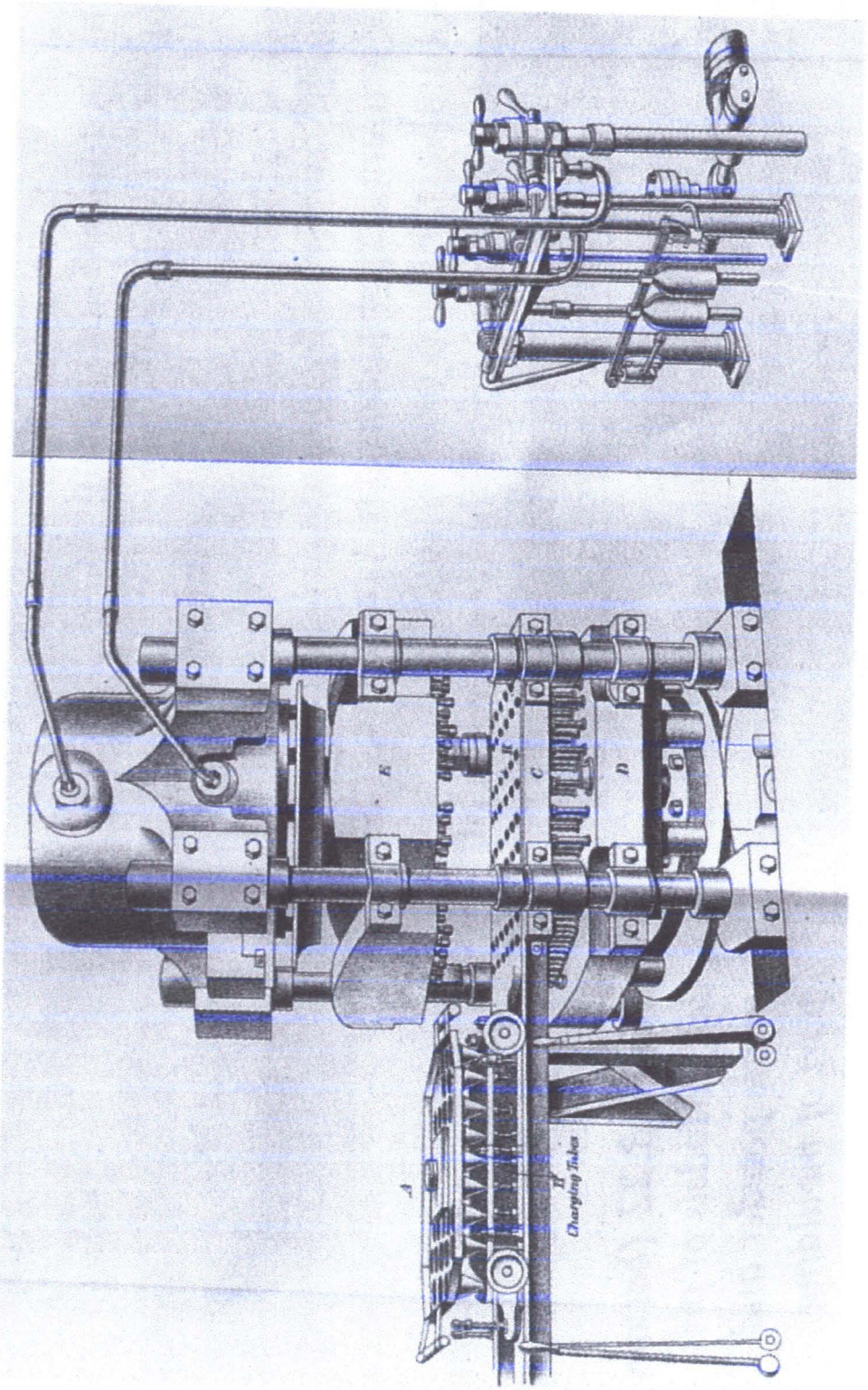
GUNPOWDER MOULDING HOUSE.

Here the massive "E" shaped concrete traverse of the Moulding House formed two compartments in which there were two press houses. These would have been timber-framed structures set on brick foundations..

Most of what remains today is the traverse - an early use of concrete - which aimed to contain the blast in the event of an explosion.

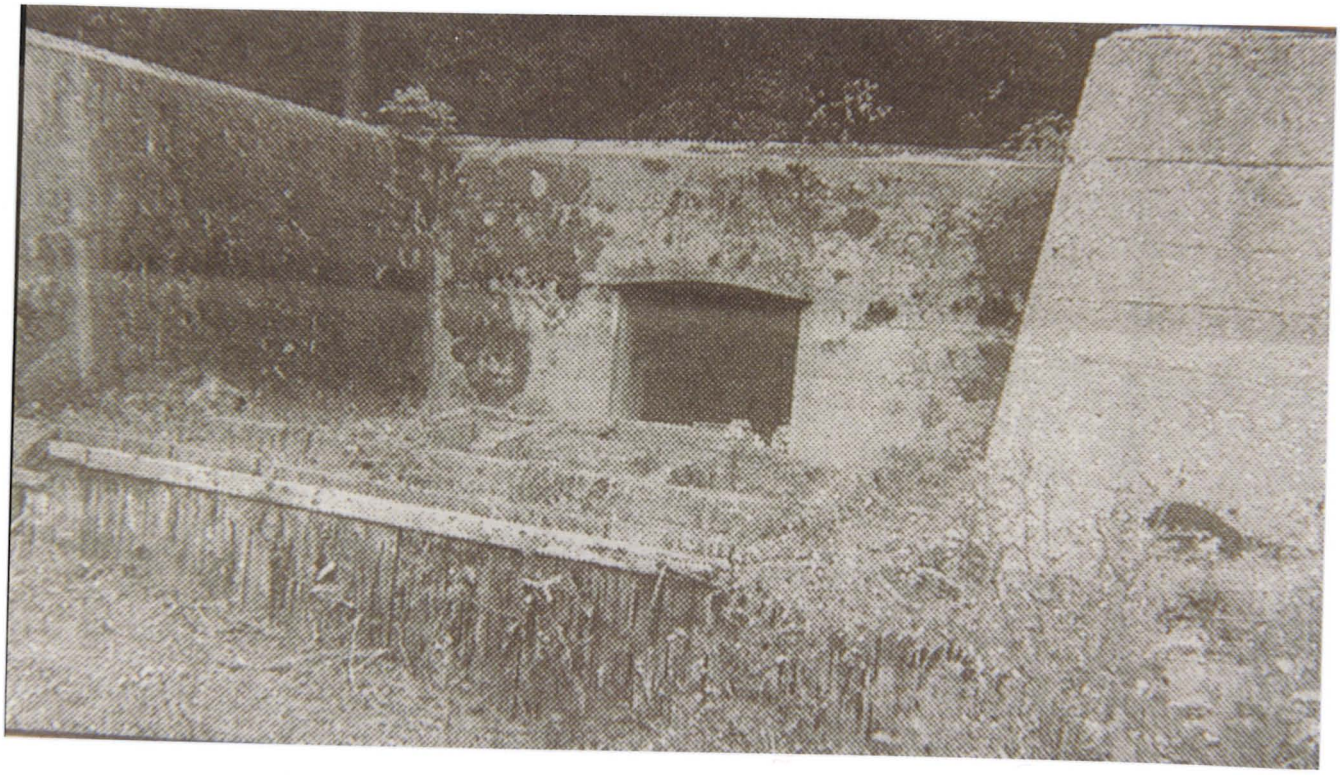
It was built in two phases, with the first on the left in 1882. The less well finished bay was added in 1884. You can still see the marks made by the timber shuttering.

The moulding house was built alongside a canal, now dry, it was later converted to the production of cordite. Then, after World War 1 it became a packing house for the high explosive 'tetryl'.



GUNPOWDER MOULDING HOUSE
1882.

GUNPOWDER MOULDING HOUSE.



RGPF WALTHAM ABBEY.

Mass concrete traverse formerly enclosing two free-standing timber-framed gunpowder moulding houses.

That on the left dates from 1882; the less well finished right-hand bay with its timber shuttering still visible was added in 1884.

RGPF WALTHAM ABBEY.

Mass concrete traverse formerly enclosing two free-standing timber-framed gunpowder moulding houses.

RGPF WALTHAM ABBEY.

SOUTH SITE.

GUNCOTTON DRYING STOVE 1897.

RGPF WALTHAM ABBEY.
L 135 'TRAY MAGAZINE' 1882.

The phrase "powder magazine" tends to convey an image of a substantial building storing large quantities of gunpowder, or other explosives, often away from the site of manufacture. However a different type of magazine, of smaller size, performed a usual function within the manufacturing areas.

This was a cordite tray store situated on the opposite side of the canal with around arched canal footbridge to the north. After incorporation cordite was extruded into the cord-like strands (which gave it its name) which were laid on trays for storage and onward processing. The much photographed L 135 and footbridge is the epitome of the magazine of the Mills. The loading platform with covered porch and elephant hide floor covering fixed with copper nails still survives. The distinctive 4 point lightning conductor on the roof is the standard pattern applied over the whole site from 1858.

ROYAL GUNPOWDER FACTORY.

LOCKS AND CANALS.

THE ROYAL GUNPOWDER FACTORY.

LOCKS AND CANALS.

ROYAL GUNPOWDER FACTORY WALTHAM ABBEY.

On 5th February 1902 this 'idyllic' spot was the scene of a terrible explosion when the Blank Cutting House blew up. It was immediately rebuilt and the result is the building that can be seen across the canal. The traverse on one side, built to contain explosions, dates back to around 1865. Then it protected the original gunpowder breaking down house where 'millcake' was broken down into fragments before going to the press house. The small building on the right is a magazine built in 1862. In the distance a proof stand and firing chamber dating from the 1950s.

ROYAL GUNPOWDER FACTORY WALTHAM ABBEY.

ROYAL GUNPOWDER FACTORY WALTHAM ABBEY.

ROYAL GUNPOWDER FACTORY WALTHAM ABBEY.

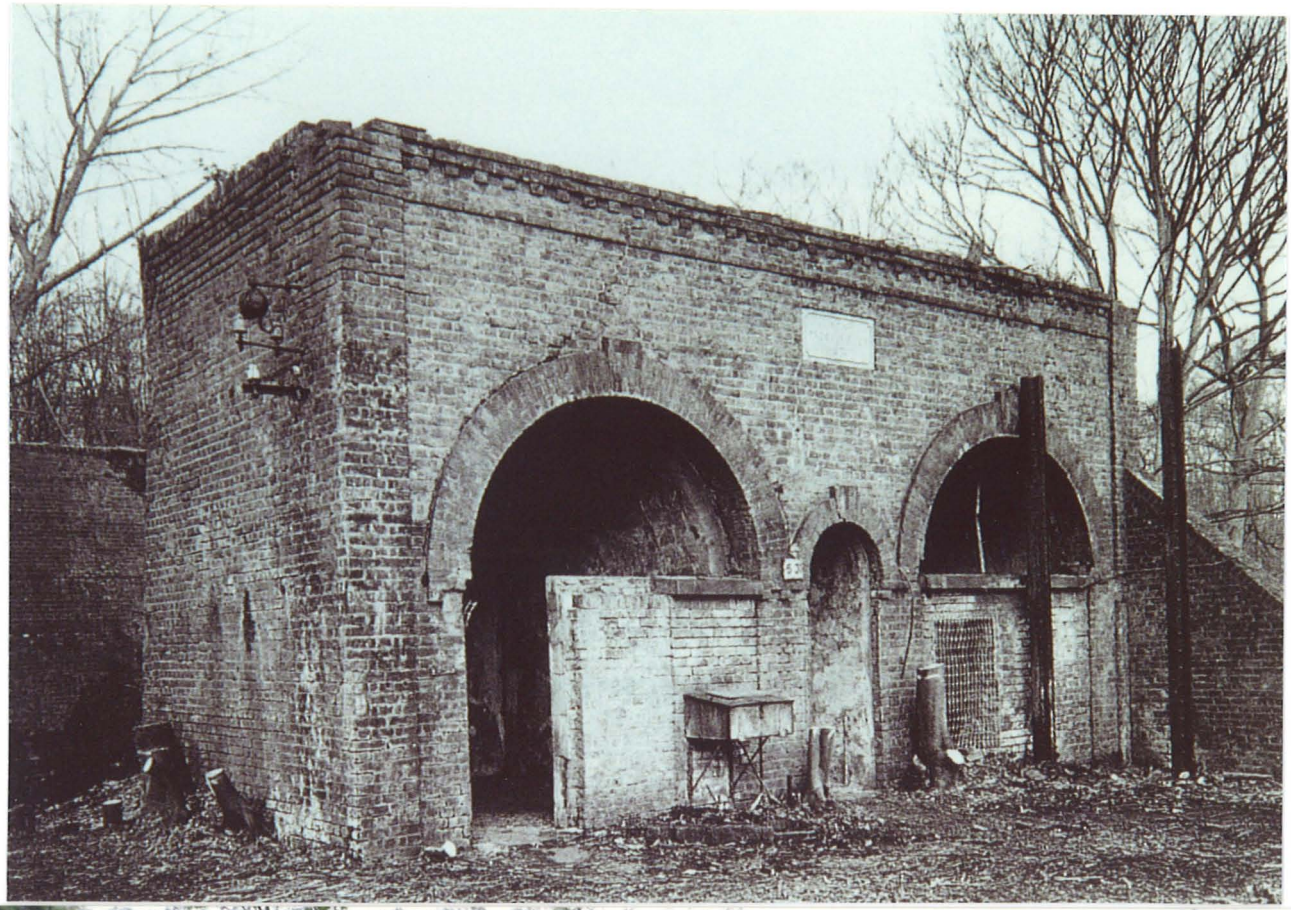
LOOP ROAD BRIDGE.

The area shows an old cordite store which was serviced by barge, and, in the background, a picturesque loop iron bridge. A view that would have been typical in the late 1800's.

ROYAL GUNPOWDER FACTORY WALTHAM ABBEY.

Small gauge railway still can be seen.

RGPF WALTHAM ABBEY.
PRESS HOUSE No.4. 1879.



RGPF WALTHAM ABBEY.

Early nineteenth-century corning house traverse. To the left stood the corning house and to the right the press house, both light timber structures not surviving. The barge sits in the former canal basin.

RGPF.
HYDRAULIC GUNPOWDER PRESS HOUSE.
1879.

RGPF.
HYDRAULIC GUNPOWDER PRESS HOUSE.
1879.

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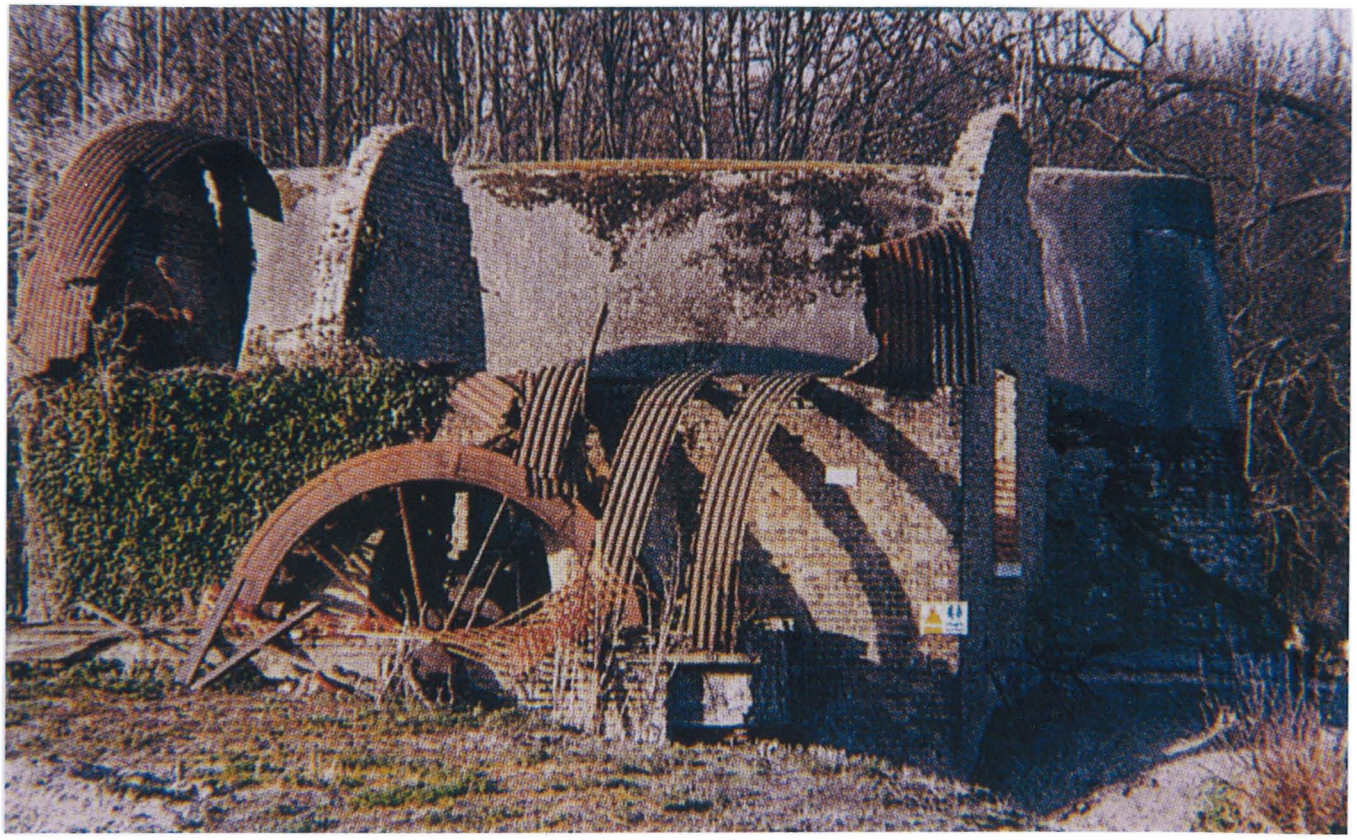
HYDRAULIC GUNPOWDER PRESS HOUSE.
1879.

WATER-POWERED PRESS HOUSE.



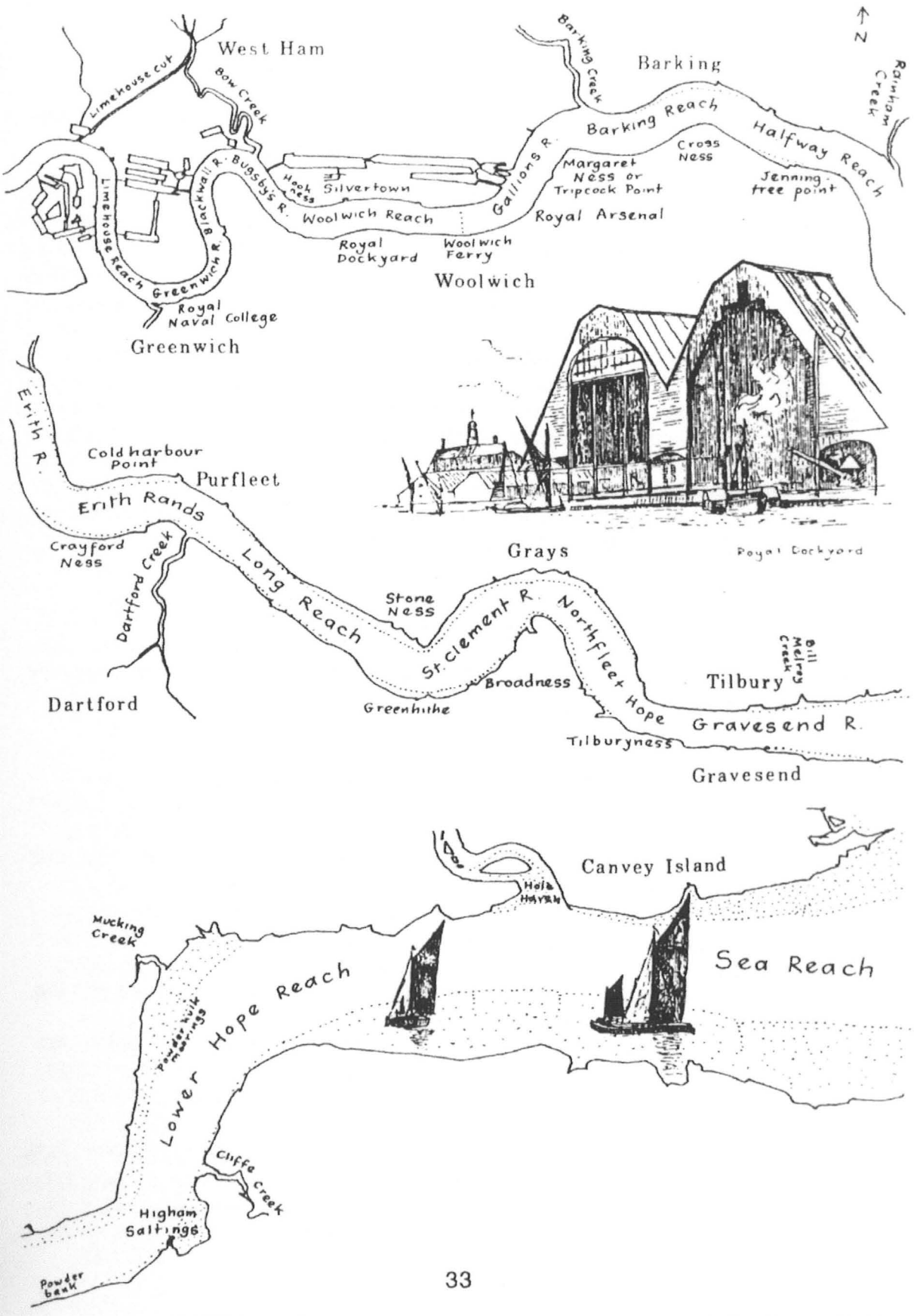
WATER-POWERED PRESS HOUSE.

RGPF WALTHAM ABBEY.
FACTORY POWDER BARGE.

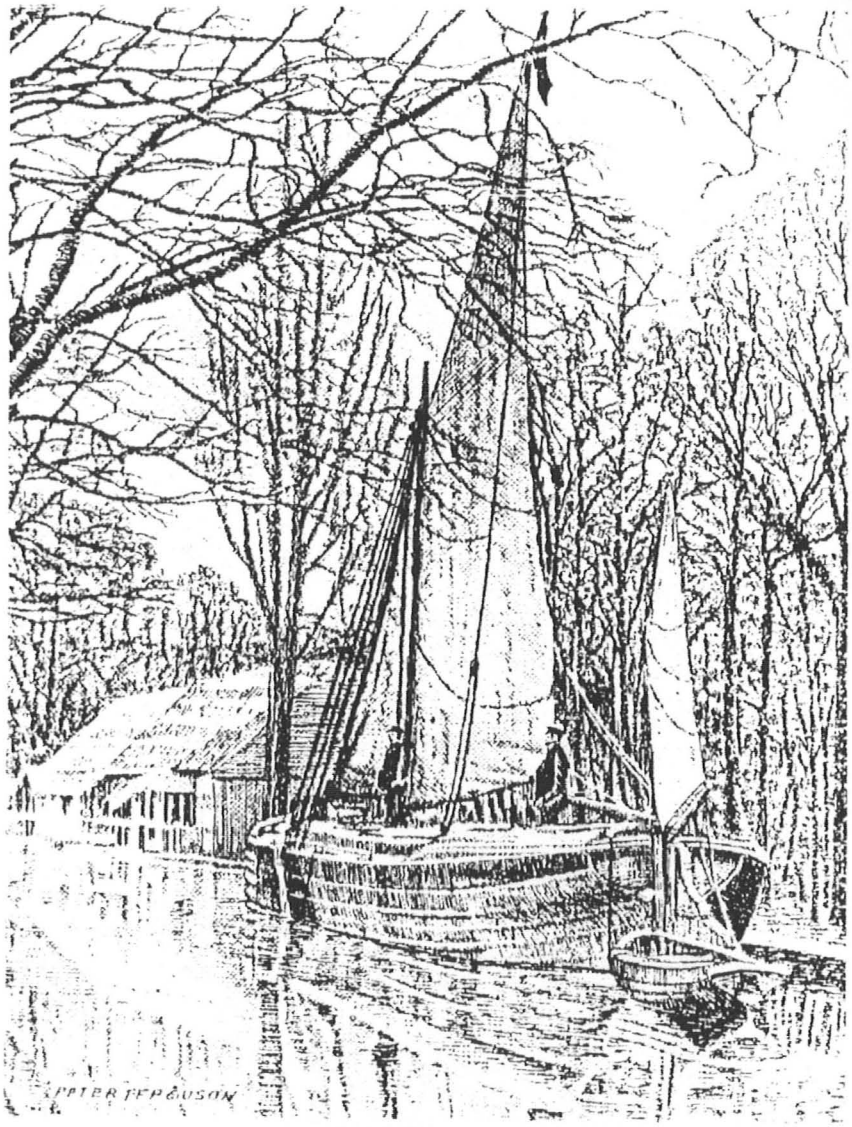
RGPF WALTHAM ABBEY.
MILLHEAD, OCTOBER, 1897.
Showing barge porches and swim-ended barge, perhaps in this instance used as a maintenance.

POWDER BARGES.

The Thames Tideway



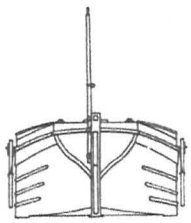
RGPF WALTHAM ABBEY.
POWDER BARGE IN THE FACTORY CANAL.



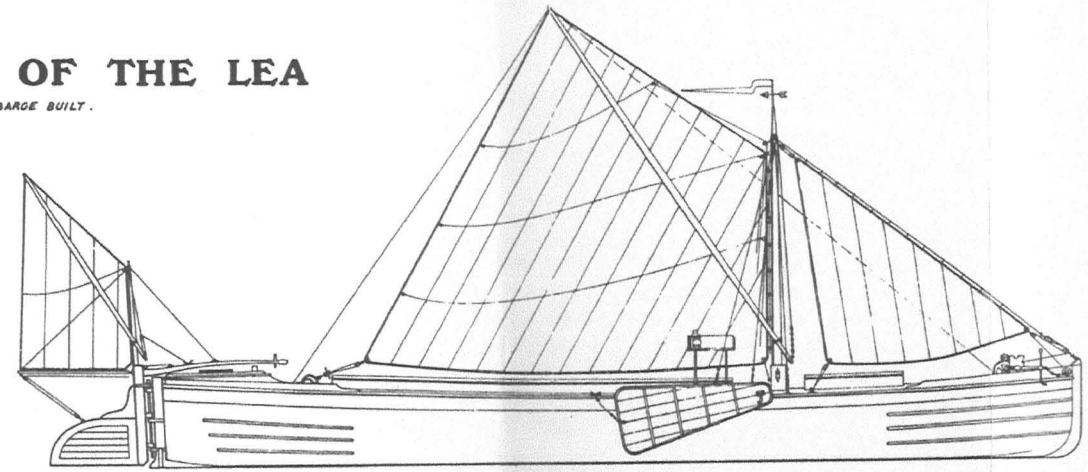
Powderbarge in the factory Canal.

s/b LADY OF THE LEA

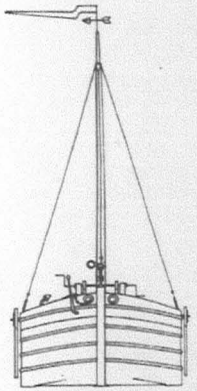
THE LAST WOODEN SAILING BARGE BUILT.



Stern Elevation

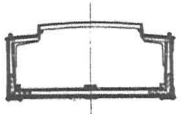


Starboard Elevation and Sail Plan

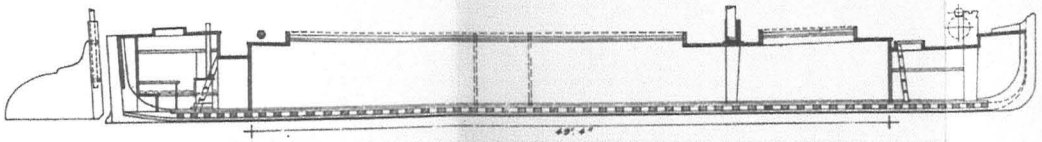


Bow Elevation

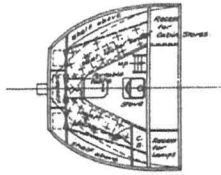
Built by Hyam and Oliver, Rotherhithe in 1931 for H.M. War Department Service at Waltham Abbey and Woolwich Arsenal.



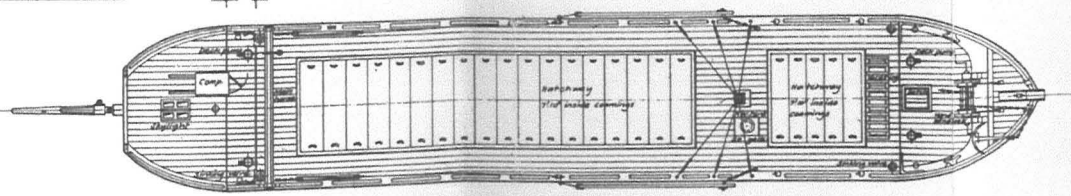
Midship Section



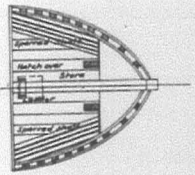
Longitudinal Section



Cabin Plan



Deck Plan



Forecastle Plan

DIMENSIONS		FT. INS.
LENGTH	extreme, stem to stern	72 - 0
BREADTH	at gunwale outside plank	13 - 0
DEPTH	bottom of keel to top of deck at side amidships	4 - 9

30 20 10 0 5 10 15 FEET

DRAWN BY PETER FERGUSON
From photographs of the original builder's plan and the barge after conversion to a house barge.

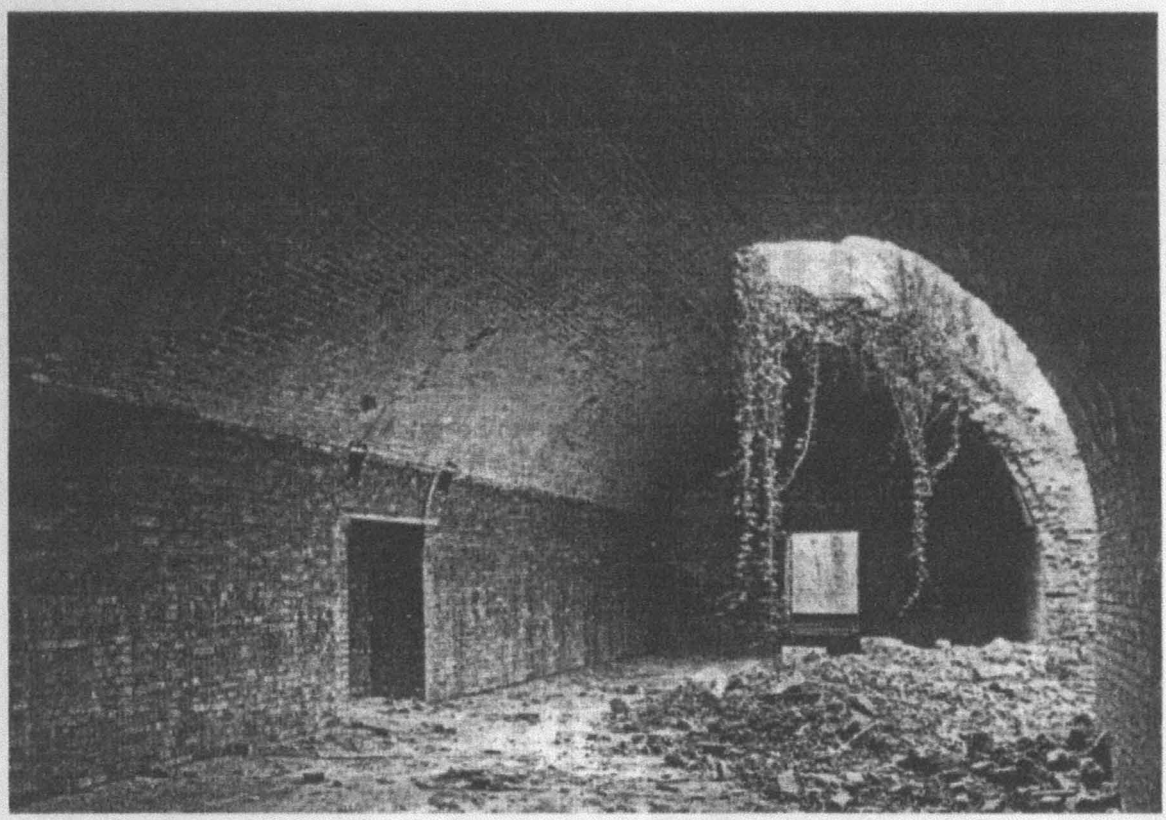
RGPF WALTHAM ABBEY.

The recovery of a powder barge from a canal at Waltham Abbry in 1994. River barges such as this were used to bring raw materials to the works and carry finished powder south down the Lee Navigation to government magazines at Purfleet and the Royal Laboratories at Woolwich on the Thames. Smaller barges and punts were used for transport within the works, which had 5-miles of nanigable waterways within its boundaries at the beginning of the twentieth century. The remains of seventeen barges have been discoved by archaeologists working on the site.

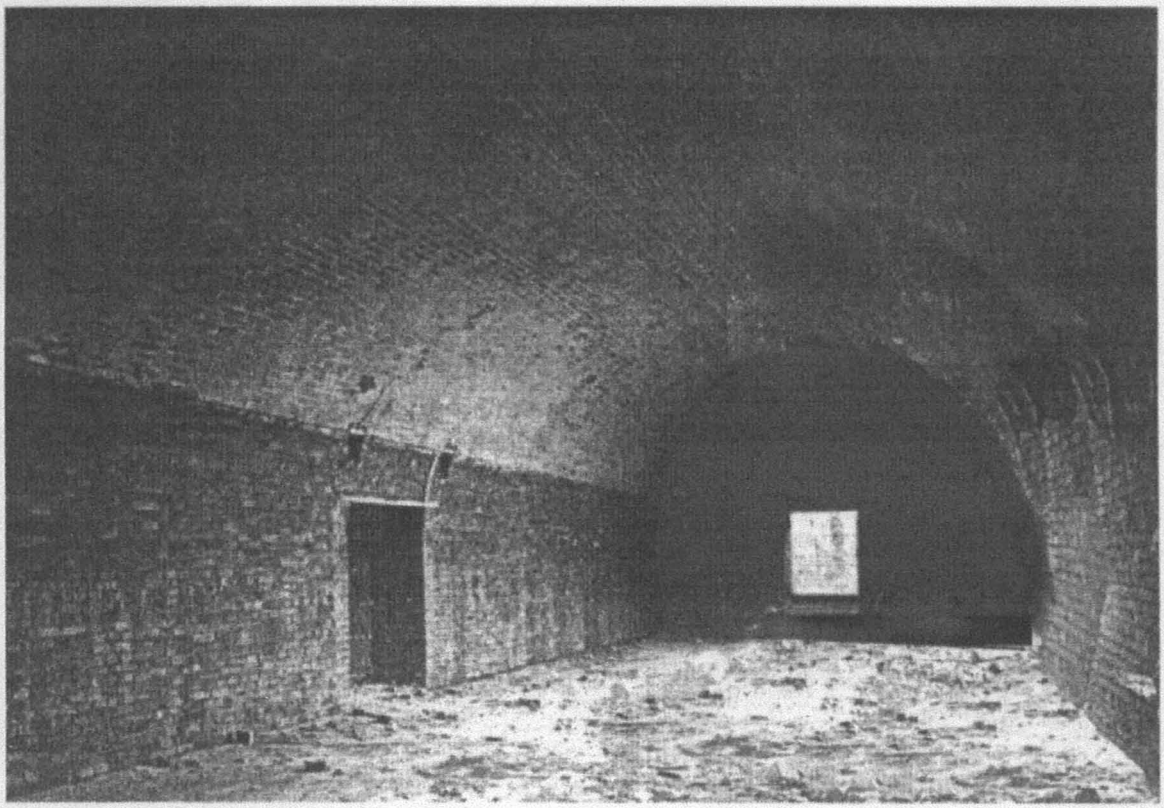
RGPF.
FACTORY POWDER BARGE.

THE ROYAL GUNPOWDER FACTORY.
POWDER BOAT.

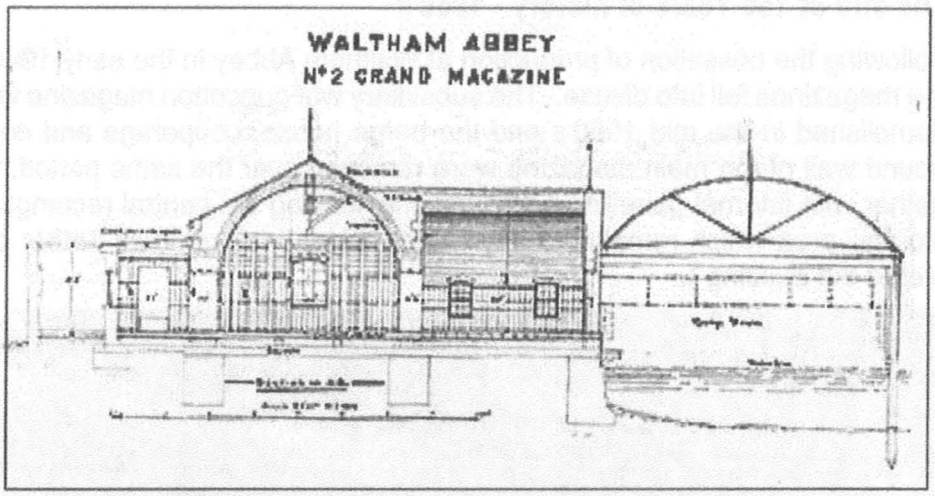
ON SHOW IN THE MUSEUM



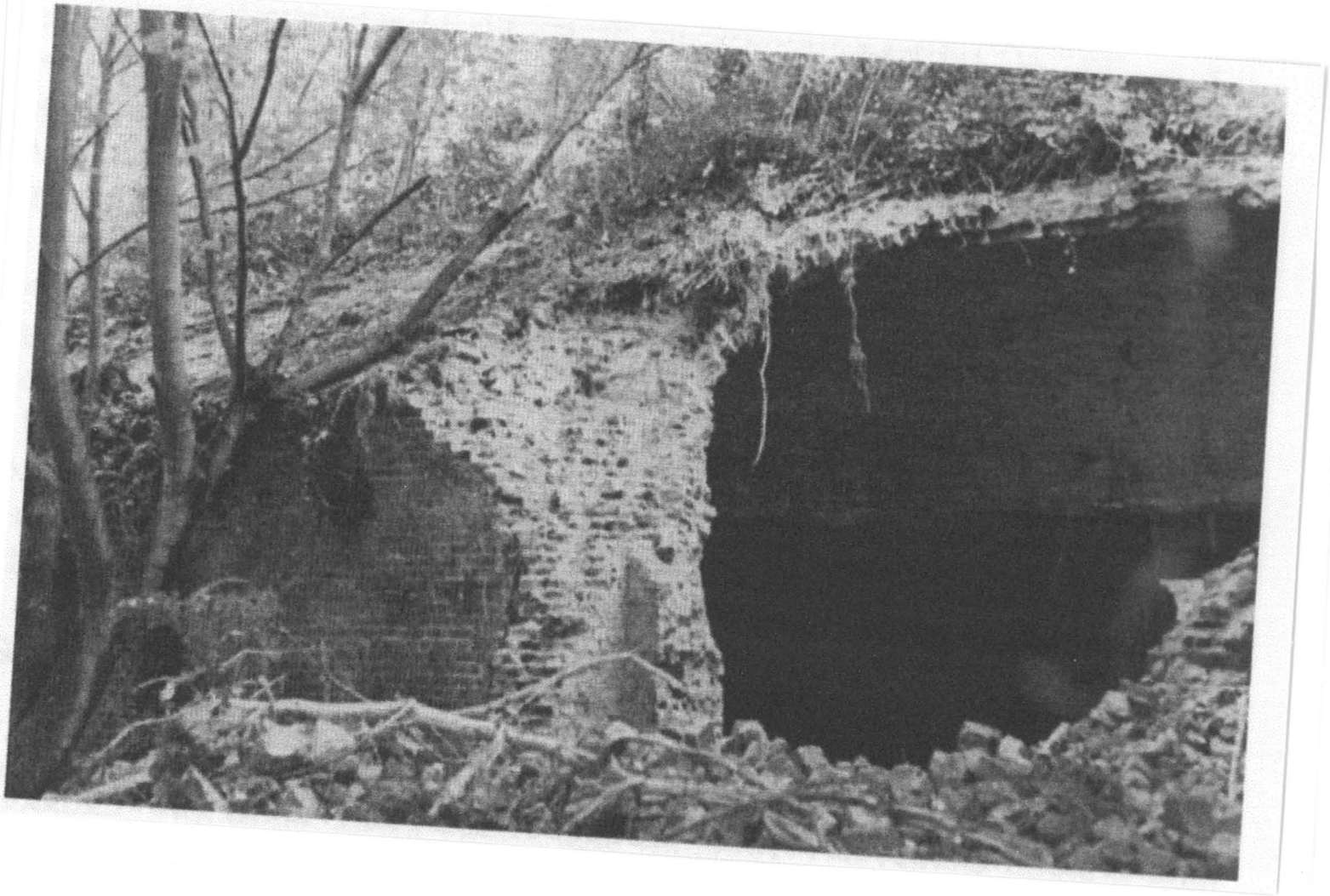
Interior of the central main storage area showing results of illegal brick removal
The MoD Police caught a builder who had broken in at the North end of the Site and was in the process of demolishing the building for the bricks!



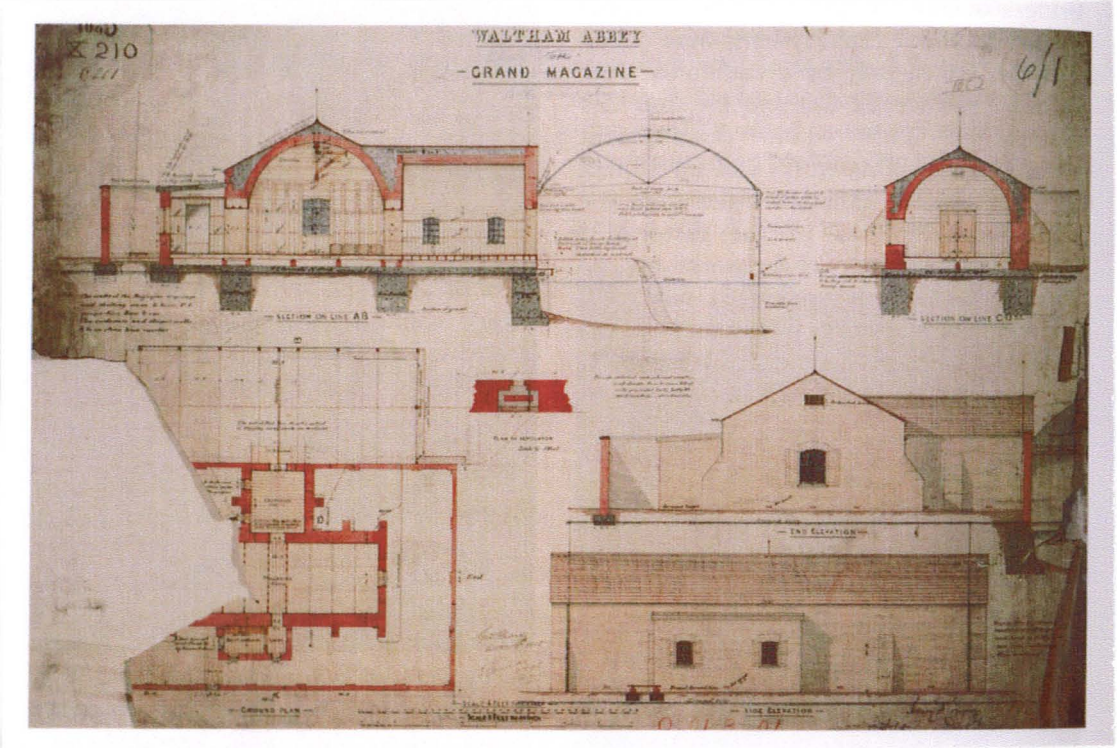
Digital reconstruction - How it would have looked before
Originally the roof and walls were lined with matchboard which was removed for safety reasons in the 1970's since it was found to be saturated with explosive.

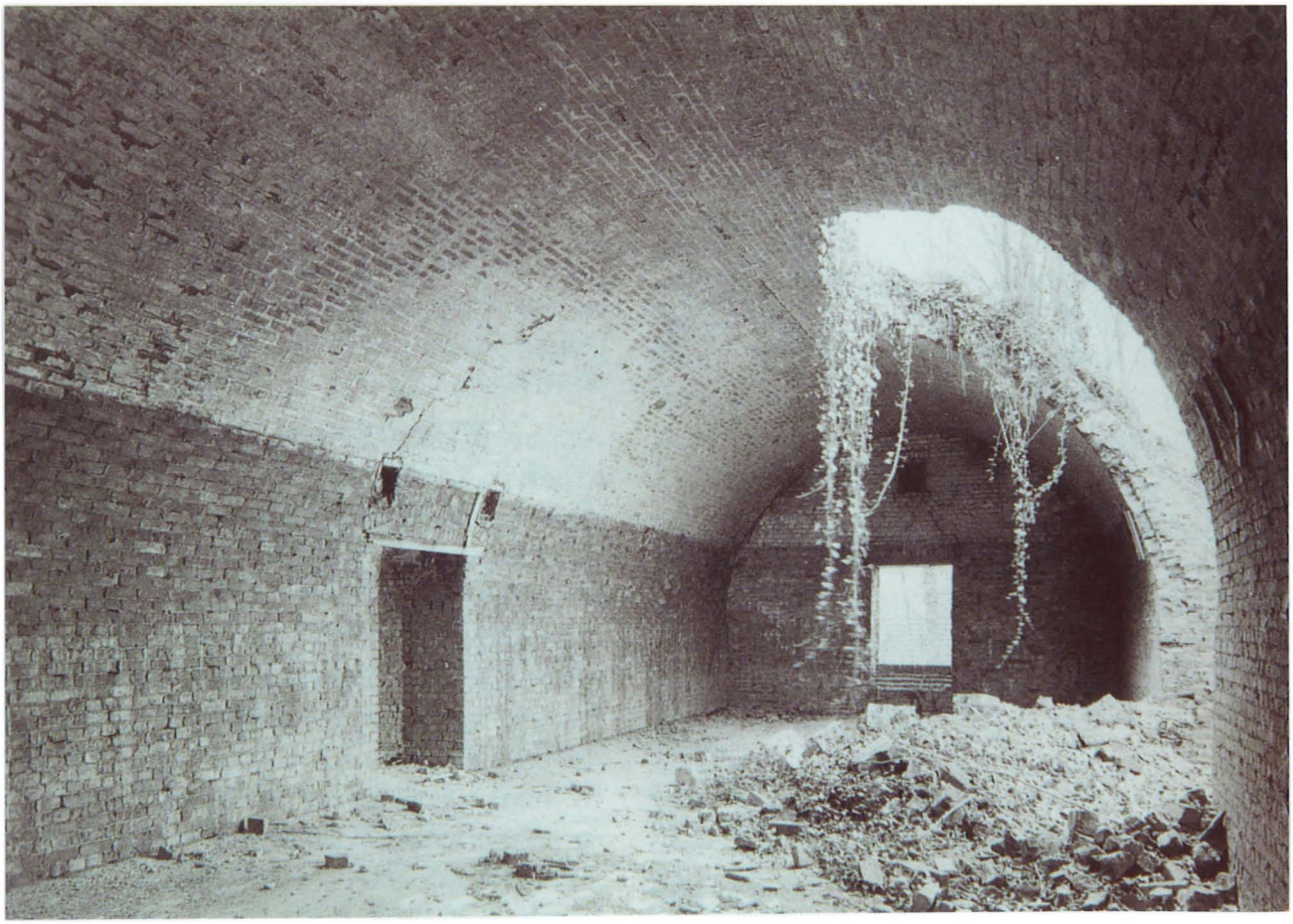


Plan drawing of second Grand Magazine building.
Reproduced from the original held in the Site archive.

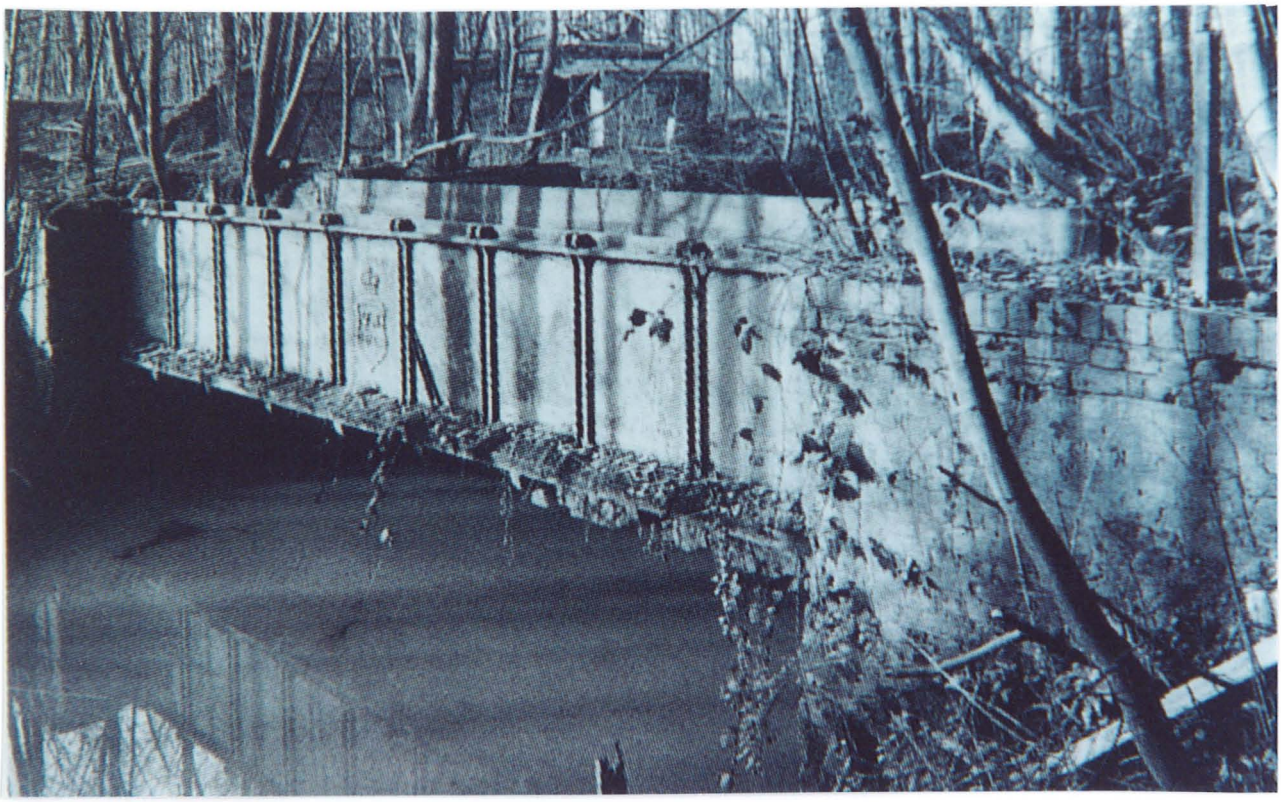


RGPF WALTHAM ABBEY.
Grand Magazine 1867-8.





THE ROYAL GUNPOWDER FACTORY.
CAST IRON AQUEDUCT
Dated 1877-8.



RGPF WALTHAM ABBEY.

Brick and mass concrete traverse enclosing a boiler house at the centre of a steam heated gunpowder drying stove, 1883-4.

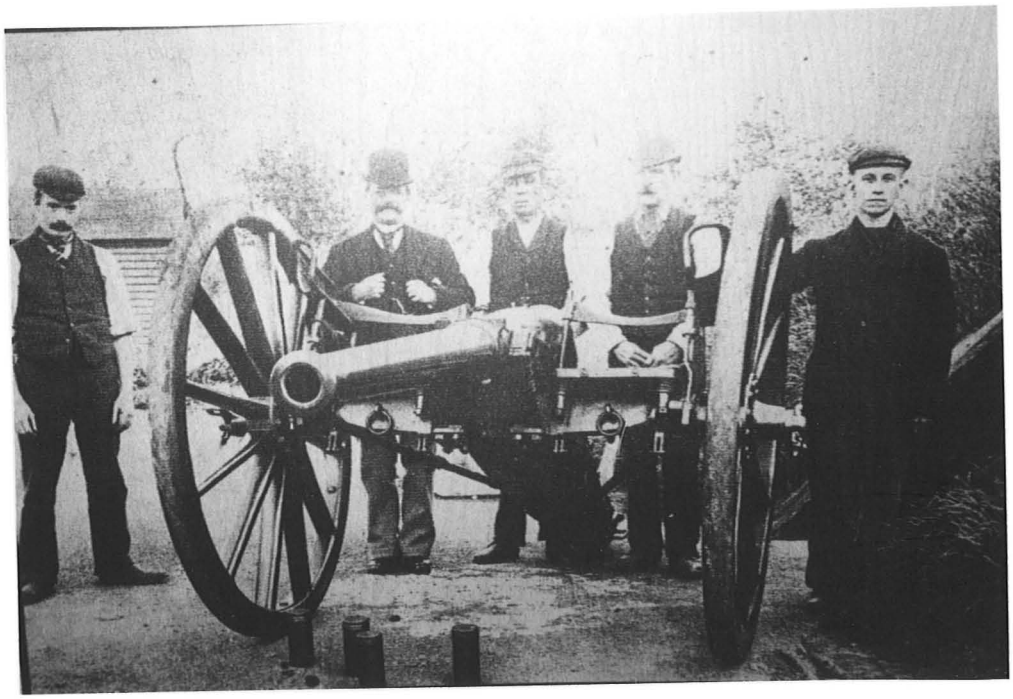
RGPF WALTHAM ABBEY.

Brick and mass concrete traverse enclosing a boiler house at the centre of a steam heated gunpowder drying stove, 1883-4.

THE ROYAL GUNPOWDER FACTORY.
PROOF RANGE.

The testing armoury and proof range were at Quinton Hill, and in the boundaries of the factory.

"It is most interesting to behold the array of field artillery and naval quick-firers, all clean and bright and with business-like appearance. On the occasion of our visit, a 6-inch quick-firing gun was mounted in a sort of cave formed of earth and masonry so as to minimize danger in case of the weapon bursting. Remember, the powder is being tested, and no one knows what may happen. When the gun is ready to be fired, every person leaves the vicinity: the electric switch is moved in the instrument room some distance away, and with a terrific roar accentuated by the confined space, the gun hurls its projectile 17-feet into the sand of the distant butt. A blank cartridge, is first fired so as to warm the gun."



ROYAL GUNPOWDER FACTORY.

SECRET RESEARCH.

On 28 July 1945 the Royal Gunpowder Factory had formally closed its doors but had re-opened a few months later as a Research Establishment. These Climatic Test Cubicles were constructed in 1951 for testing the stability of explosives at various temperatures.

"NG STOOL"

Batch nitration consisted of spraying glycerol into a large vat of nitrating acic while stirring and cooling. The temperature has to be closly monitored and, if it rose above a predetermined level, the batch was 'drowned' by dumping into a large tank of water underneath.

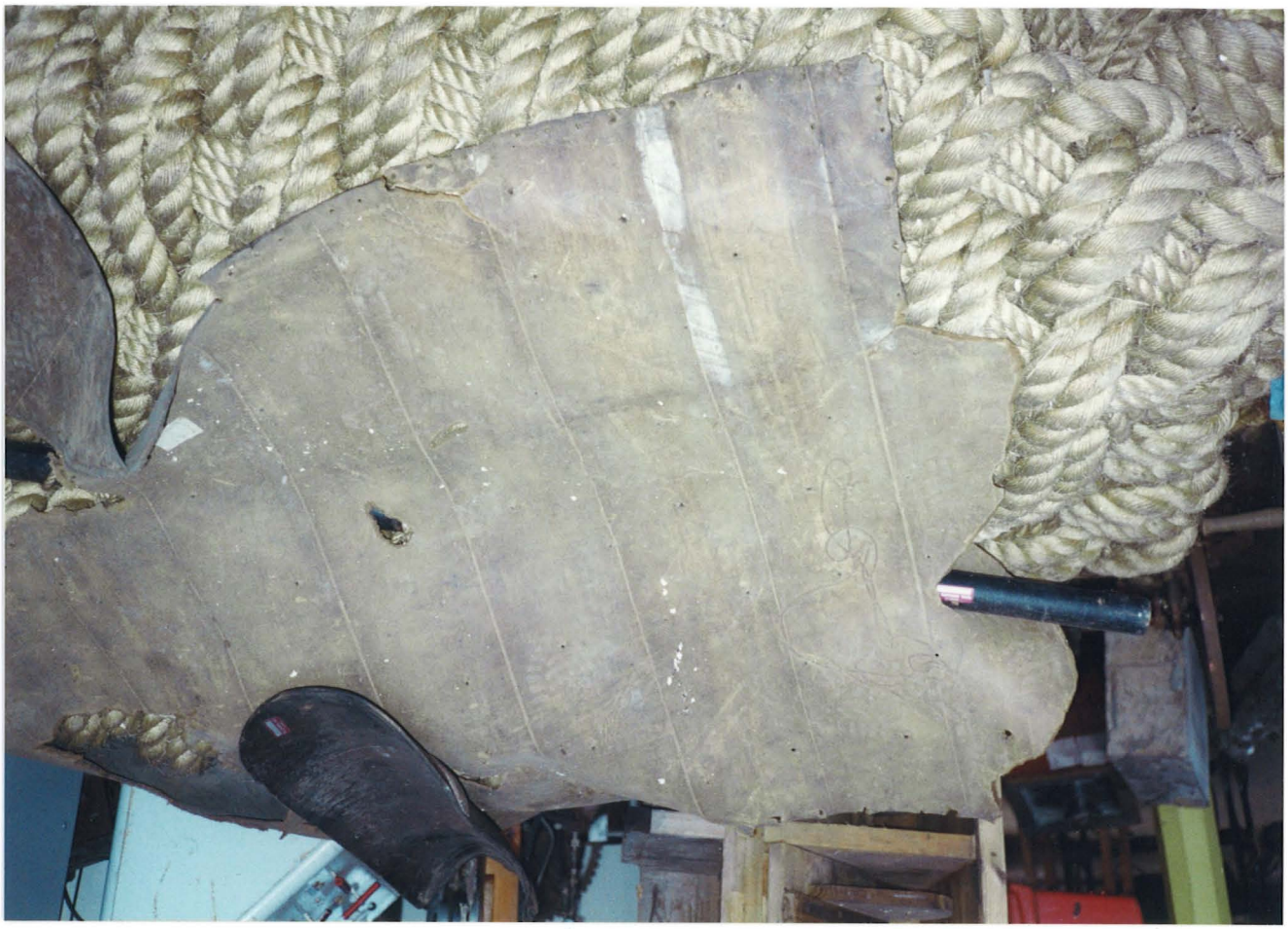
Waching the thermometer for 8 hours a day was rather soporific and in the early days there was a tendency to 'nod off'
Since this could lead to a dangerous event the operator was therefore provided with a one-legged stool. If he 'nodded off' he 'fell-off'.

When Alfred Nobel started his factory at Ardeer in Scotland in the 1880's the NG stool was installed and ever since it has been tacitly implied that it was their ides.

However it has been discovered that the concept is 2-3 hundred years older. Before charcoal burning was mechanised the burner would make a wigman of wood, cover it with clods of turf and set light to it. If fire broke through the wood would burn rather than char. To keep an eye on the process the burner would set a log vertically in the ground to sit on. If he 'nodded-off' he 'fell-off'. So much for new ideas!

THE ROYAL GUNPOWDER FACTORY.
ELEPHANT SKIN AND ROPE MANTLE.

Elephant skin was used for lining the floors of dangerous buildings,fixed by copper nails.
The rope mantle that can be seen under the skin was used to protect the workers in case of explosions. This was originally used in battleships.



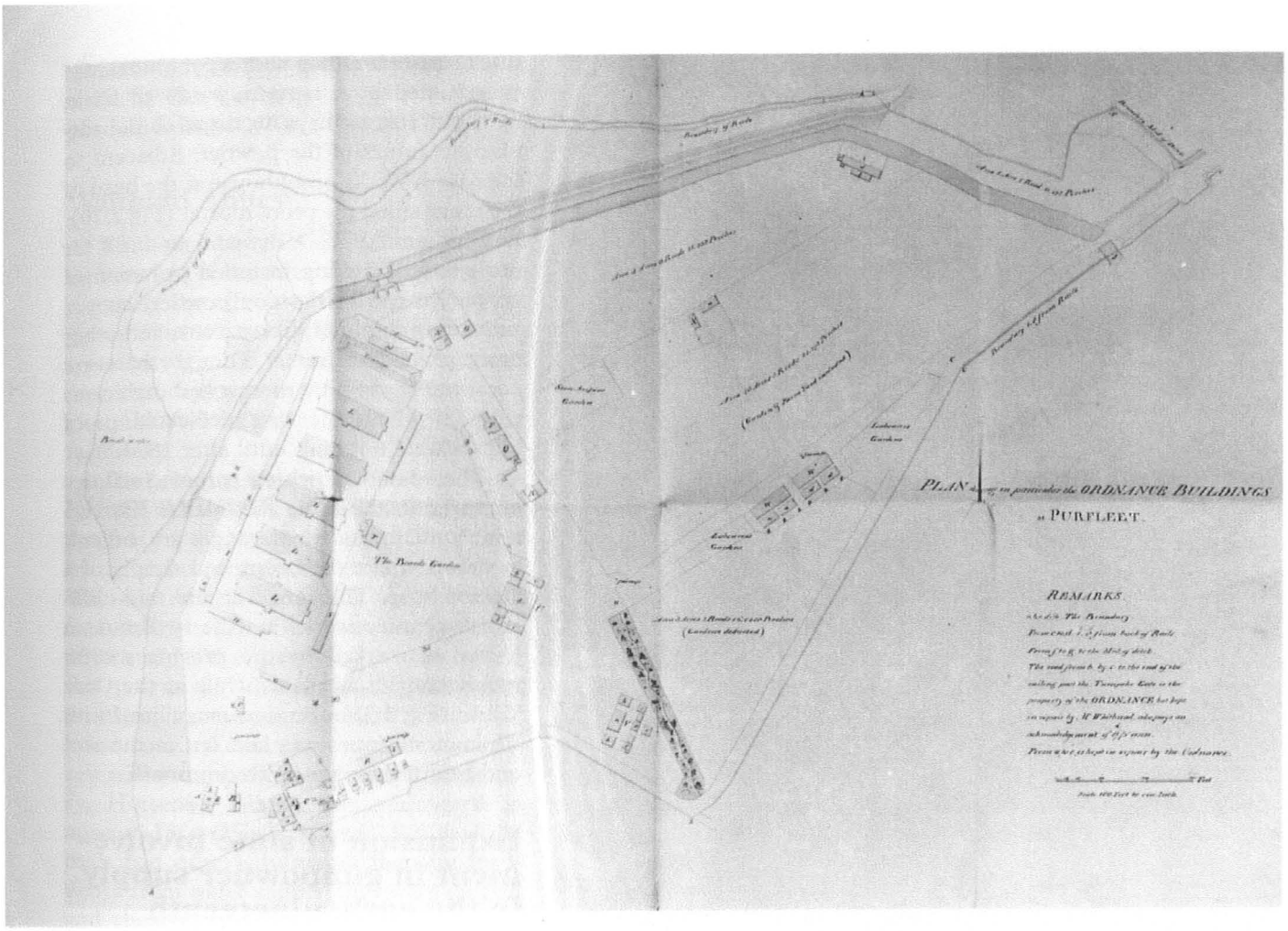
THE ROYAL GUNPOWDER FACTORY.

ROPE MANTLES.

RGPF WALTHAM ABBEY.

Brick and mass concrete traverse enclosing a boiler house at the centre of a steam-heated gunpowder drying stove, 1883-4.

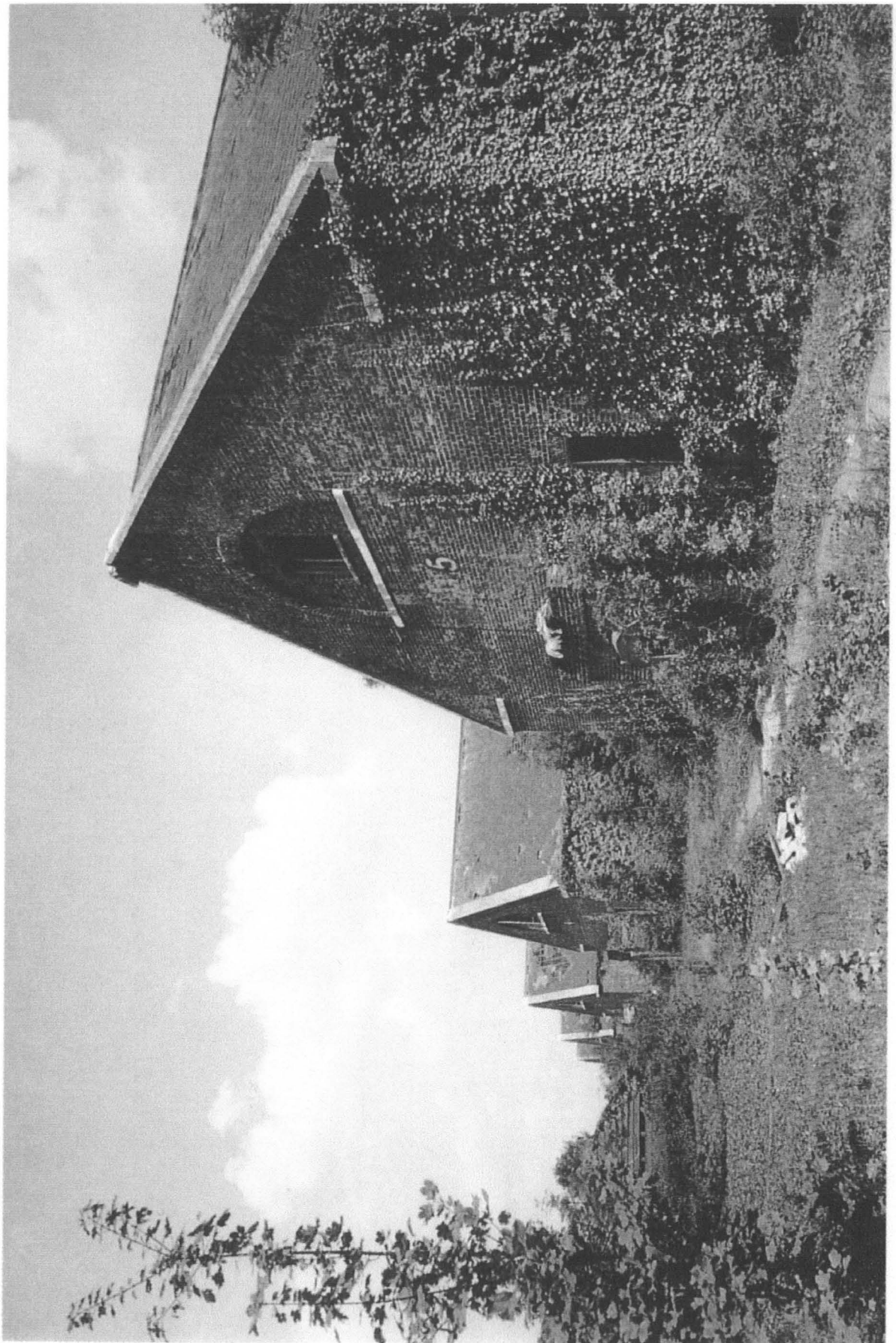
PERFLEET ESSEX.
PLAN OF ORDNANCE COMPLEX.
Magazine(L) Flashing House (T).



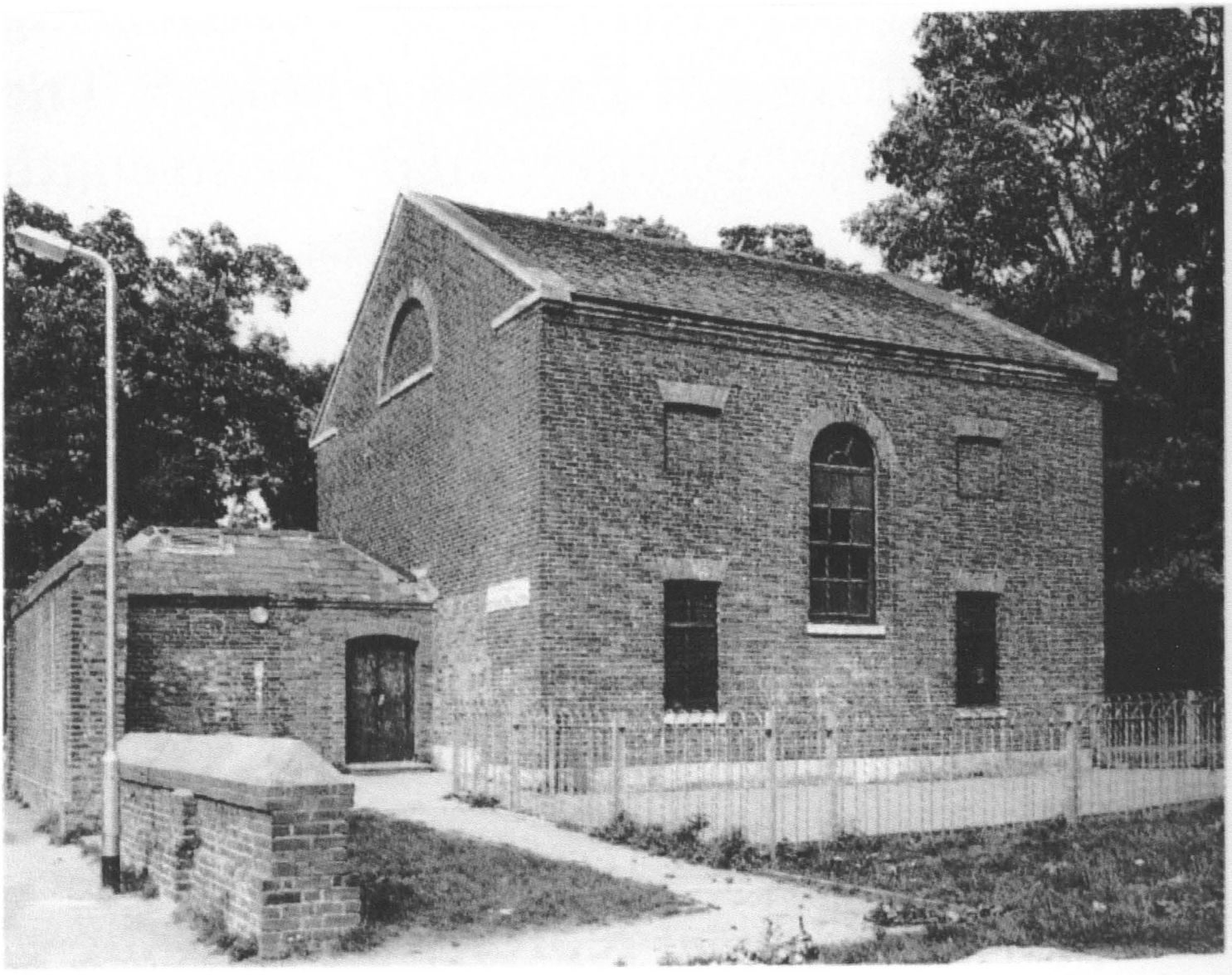
PERFLEET ESSEX.
POWDER MAGAZINES.

Magazine No.5 in the foreground is the sole survivor of this group of magazines.

Board of Ordnance magazines, often sited close to naval installations, were commonly designed to withstand bombardment as evidenced in the massive construction at Perfleet.



PERFLEET ESSEX.
PROOF OR 'FLASHING ' HOUSE.
1760.



PERFLEET ESSEX.

Proof of Powder Perfleet in 1796.

In this method of proof, a carbine or musket barrel was mounted in a frame placed 39ft 10-in away from a frame holding 17 wet elm boards. The boards were each 12.5mm thick and placed 19mm apart. To pass proof, a steel ball had to pass through 15 or 16 of the boards.