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BLAST FROM THE PAST

The covert canals of Royal Gunpowder Mills

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BLAST FROM THE PAST

Ahead of IWA's Festival of Water at Waltham Abbey,
Christine Richardson explores the history of its
Royal Gunpowder Mills - the canal network nobody knows about



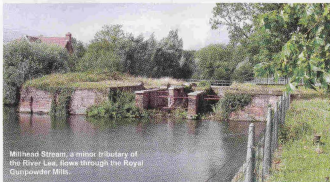
By 1662 there was more gunpowder being made at Waltham Abbey "than in all England besides". The River Lea had made such developments possible – providing water transport for the supply of raw materials, and the relatively safe distribution of finished products. Via the Lea and the Thames, gunpowder was carried by boats to the Royal Arsenal at Woolwich, and the great magazines at Purfleet.

Historically, most armaments production took place in the south-east of England because the threat was from continental Europe. To the north-east of London the Waltham Abbey site was admirably placed and in 1787 it was taken into government ownership and given the title 'Royal'.

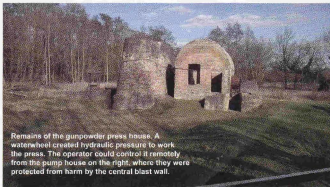
OLD RIVER LEA

For safety reasons the production buildings were spread far apart and the least risky way of moving items between them was by water. Therefore, a network of canals was created, crossing the area and linking with three ancient main channels, which also provided water-power for the gunpowder mills. Of those three main channels, two already had a significant past. The Old River Lea had been the through-route for navigation, with a type of flash-lock at what is now known as Newton's Pool. This caused the usual clashes between boatmen and millers, as a result of which the Cornmill Stream was improved to navigable standard and a pound-lock built to drop boats down to the old river. Not just any lock – the first one in Britain with mitred gates at both ends, completed in 1576. Riots destroyed it in 1592, and it is thought that no traces remain. In 1767 Smeaton moved the Lea through navigation to the west – and left the old bypassed channels to form the outline of the gunpowder mills' waterways.

The aftermath of the French Revolution led England into an almost continuous period of warfare, culminating in the battles against Napoleon. War meant that bulk supplies of munitions were needed, so



Millhead Stream, a minor tributary of the River Lea, flows through the Royal Gunpowder Mills.



Remains of the gunpowder press house. A waterwheel created hydraulic pressure to work the press. The operator could control it remotely from the pump house on the right, where they were protected from harm by the central blast wall.

"The peak of production during the Napoleonic Wars was in 1813, when 250 men were employed, and the canals were used by nine powder-boats, five barges, two ballast-barges, and six punts"

many new buildings were added at Waltham Abbey, and the canal system was enlarged considerably. Charcoal – one of gunpowder's three components – was brought by boat from Fernhurst in Sussex, and Favcrsham, Kent. Of the other two raw materials, tons of saltpetre came up the rivers Thames and Lea from Bengal. Together with sulphur they were taken to the various production buildings via the site's canals. Damp gunpowder from Royal Navy ships was also carried, to be dried in stoves.

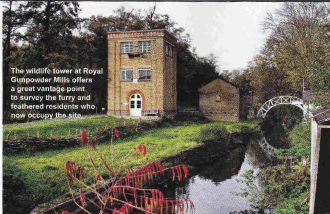
By this time the production systems had evolved from south to north, with the finished gunpowder being stored in the Grand Magazine. From there it was loaded onto spritsail barges which used the Powdermill Cut to reach the Lee Navigation.

GRADUAL EXPANSION

The peak of production during the Napoleonic Wars was in 1813, when 250 men were employed, and the canals were used by nine powder-boats, five barges, two ballast-barges, and six punts. But demand for armaments slumped with Napoleon's final defeat at



A powder-boat with its distinctive barrel-shaped roof.



The wildlife tower at Royal Gunpowder Mills offers a great vantage point to survey the busy and feathered residents who now occupy the site.



An old aqueduct over one of the site's canals.

Waterloo and by 1822 the workforce was only 34. However, various conflicts in Britain's growing Empire meant that bulk production of explosives was often required. More canals were gradually added to the network, with waterways on two levels linked by locks. Two cast-iron aqueducts carried one canal over the Old River Lea, both marked with the Royal VR cipher, and the dates 1878-9. A distinctive style of footbridge was built. They were a semi-circular shape and made of an open grid of wrought iron. At each side were boot-scrappers to prevent grit being trodden onto the bridge that might fall on top of shipping explosives boats. Such detritus of gunpowder or sawmill materials could cause an explosion during the grinding processes.

In 1869 there were 15 covered boats on the system – varying in length between 2ft and 30ft, and 5ft 11ins to 8ft 6ins beam – used to carry dangerous cargoes. Their barrel-shaped roofs were designed to stop explosive dust settling on them, and phosphor bronze nails and fittings were used to prevent sparks. There were also 16 open boats for general errands, carrying charcoal, timber, stores, and acting as ferries.

VOLATILE CARGOES

By now the spritsail barges were carrying over 40,000 barrels of gunpowder from the site every year. But evermore larger guns needed more efficient explosives and soon nitroglycerin was added to the dangerous products at Waltham Abbey. This required the on-site boats to carry acids and chemicals – supplied, stored and moved in dark-green glass carboys, covered in wicker. However, nitroglycerin is so volatile that even water transport was not smooth enough; instead it was moved between processing buildings by gravity – slow-flowing along pipes and gutters.

Such volatility meant that nitroglycerine could not be safely used as an ornament. Instead, after 1890, it was mixed with other elements to form cordite, a chillingly efficient explosive. As the products became more effective, so did the carrying of them on the canals. By now the boats on the internal network had evolved into two types, both carved-built in timber, double-ended and capable of holding a 5-ton cargo.

The boatsmen pulled or poled their craft through a pretty, thickly wooded landscape. Before electricity was available they worked daylight hours only, as few of the buildings could have flames to provide artificial light. With structure spreading thinly among 400 acres there was nothing fearful to see; only the knowledge that some buildings had floors covered with leather hides, held down with copper nails, and kept moist all the time to stop explosive dust spreading. Those producing cordite and nitroglycerine had floors of lead sheet, so that the dust could be seen and cleared up.

TRAGEDIES

Boat crews were never hurried – it was policy that no one on the site was pushed to do a certain amount of work in a day. People under pressure make mistakes. Nevertheless, at times of war when production targets were high there were tragedies at Waltham Abbey's Royal Gunpowder Mills. On 7th May 1894 one building exploded. The design of the area, and the blast-walls, should have contained the damage – but they did not. Three other buildings, also containing explosives, were completely destroyed. The blast was heard 12 miles away in Hyde Park, where people thought it was a gun-salute for the Queen. The trees were supposed to help contain a blast but they proved totally

ineffectual. Seven men died – one was blown into a canal, five of the others over the river to the Essex marshes. Understandably, the failure of the blast containment system caused considerable alarm among the workforce.

Unhappily, that was not the only catastrophic one on the site. In 1902 there was a similar explosion, and twice in 1940 when the production pressures of World War II resulted in the devastation of cordite mixing-houses. But heavy workloads did not always result in mistakes. In 1917 the horrendous demands of World War I caused the workforce to be increased to an all-time peak of 5,000 – the majority women working shifts to secure continuous production.

“The blast was heard 12 miles away in Hyde Park, where people thought it was a gun-salute for the Queen”

INFILLING

Explosives manufacturing ceased in 1943, with production switched to areas of Britain out of the reach of enemy bombers. Many of the canals were infilled in the 1950s, but traces remain. The timber piling of their banks can be found, and the clay-linings still retain any dampness, with marsh plants thriving.

The remaining waterways were put to non-navigable use in the 1960s during the research and development of non-nuclear explosives of every kind. Newton's Pool, the site of the 16th-century flash-lock, now saw flashes of another kind when it was used to test the underwater effectiveness of new explosives – the results of which were recorded by high-speed cameras capable of 1,200,000 exposures per second.

The final closure of the Waltham Abbey site was on 30th June 1991. Since then the Ministry of Defence has carried out a decontamination programme, including the removal of dangerous materials from the canals – a task done without damaging the clay-puddle. The canal system survives partly as open waterways, partly as earthwork features, while others have been infilled and lost. But the Old River Lea still flows through the centre and the site, which has been largely closed to the outside world over most of its history, is now open for public visits and educational events.

Book into IWA's Festival of Water at the Lee Valley Showground next door to the Gunpowder Mills and visit the site before and after the festival.
waterways.org.uk/festivalofwater
royalgunpowdernmills.com

THE LONG AND THE SHORT OF IT



It's set to be a busy summer for IWA's Lee & Stort Branch, with two festivals and a carnival cruise among events lined up over the coming months. *Waterways* meets its new chairman, MIKE NEWMAN, to find out more

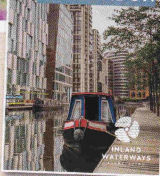
It's impossible to talk about the Lee & Stort these days without mentioning the elephant in the room: London. Although the branch covers an area north of the M25, the challenges faced by waterways congestion in the capital can't help but impact further along the network too. Mike Newman, who only took over as chair in March, says the Lee & Stort's position as something of an outlier on the system has only been exacerbated by this. Its sole connection with other waterways is through the city, and so the increase of boaters and subsequent logjam at services and moorings is, essentially, slowly cutting it off.

"A lot of members now base themselves elsewhere as a consequence of this," Mike states matter-of-factly. "Of course, it's not the only reason, but it does affect where members choose to leave their boats. Many are now retired and so not constrained to weekend-only use of their boat. It's no great shakes if they have to travel elsewhere to pick up their boat."

CRUISING FRUSTRATIONS

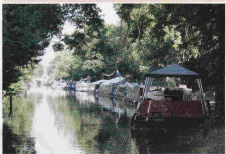
As a narrow boat owner himself (he joined the branch shortly after buying one in 2010, following early retirement), Mike has a lot of sympathy for the problems overcrowding is posing. Although readily admitting the issues facing his patch aren't half as bad as other London branches, he is nevertheless worried about the impact it is having on boating the Lee & Stort. "To some extent we narrow boaters have it easy," he quips. "Normally these craft can accommodate longer journeys, so we just have to grit our teeth and get through London. But for branch members who own cruisers, there's no easy answer. Typically they tend to boat closer to home, but nearly all visitor moorings are currently occupied. As a result, boat club outings are getting harder and harder to organise. You just can't guarantee there'll be adequate space to tie up. Fortunately the Canal & River Trust has been very helpful making arrangements locally to free up mooring space, but it does remove the spontaneity of cruising club trips."

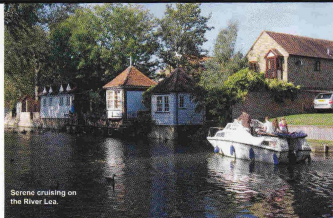
IWA'S VISION FOR LONDON



ABOVE & BELOW: The annual Ware Boat Festival is the highlight of the Lee & Stort's social calendar.

RIGHT: The branch has been working closely with IWA's London Region to launch its Vision for London report.





Serene cruising on the River Lea.

In an attempt to find solutions to the problem, the branch is committed to a more active role in IWA's London Region, which covers seven branches in and around the capital. Recently it launched its *Vision for London*, an in-depth report evaluating the complexities faced by the many different users of the city's rivers and canals. It will be used as a sort of manifesto over the coming years, applying pressure to create more affordable permanent mooring sites, so-called 'community moorings', and pre-bookable visitor moorings, especially on sections of the towpath that are not currently available for them. In conjunction with this, extra rangers and increased enforcement are being advocated to help stop overstaying, while providing better facilities is also a priority issue (see more on page 16).

WARE BOAT FESTIVAL

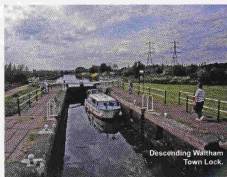
Despite these challenges, the branch still finds plenty to celebrate locally, not least its enduringly popular boat festival in Ware, on the River Lea, over the first weekend of July. One of the most successful festivals on the network, it typically attracts between 60 and 70 boats and is run in conjunction with Ware Town Council's 'Ware Week', incorporating, among other highlights, a carnival and music festival.

With the river running right through the centre of the town, visiting boaters are guaranteed to be in the heart of the action. The format is pretty much the same each year, kicking off with a towpath barbecue on the Friday evening. Saturday, meanwhile, comprises a themed boat parade followed by a boat-handling competition. But the real highlight, says Mike, is the Saturday evening quiz for boaters, which takes place in a local hall. "Over the years it has become increasingly raucous and lighthearted – expect to see people dancing on tables! I must pay due credit to my predecessor, Craig Haslam, for that. As branch chair of at least 15 years, he was exceptionally good at organising these sorts of public events. An awful lot of the attraction of that evening stemmed from the way he meticulously planned it in the weeks leading up to, and on the day itself." Despite having stepped down as branch chair, Craig remains the festival's dedicated quizmaster.

Before Ware, there's opportunity to explore the branch's other waterway, the Stort, as part of Bishop's Stortford Carnival Parade and Fun Day in June. Although on a much smaller scale than the Lea gathering (an average of 13-14 boats), and without any boater-specific activities, waterborne visitors can nevertheless imbibe the town's festive atmosphere and benefit from allocated mooring space.

AUGUST EXTRAVAGANZA

Finally to IWA's Festival of Water, which is back at Waltham Abbey on the Lee Navigation in August for the first time since 2000. As always, a turnout of around 120 boats is expected, alongside the usual throng of foot visitors. Mike assures festival-goers that a warm welcome is guaranteed, although he concedes that passage to the event might be more problematic than recent venues because of the London mooring issues. Organisers have negotiated priority for festival-goers on a new and existing CRT pre-bookable moorings through London (see waterways.org.uk/festivalofwater for more details). Plus there's always the option of taking the Thames route. However, while Mike agrees going upstream from Limehouse can be "great fun", going downstream "is more challenging and requires careful timing. It's not something we'd advocate without a good deal of prior thought."



Descending Waltham Town Lock.

Those who make the journey, however, will be amply rewarded when they reach the branch's waters. "The Stort is a beautiful navigation," says Mike, "a tree-lined, very rural and charmingly meandering river. It's a joy to travel on. The Leato, for most of its journey to London is through a regional park, which provides a green corridor almost in the heart of the city. It's only really when you get beyond Tottenham that you meet an urban environment. It's absolutely extraordinary that you can get so far into London and still be surrounded by greenery, wildlife and open landscape. We hope visitors seize the opportunity to come and explore this summer."

DATES FOR THE DIARY

STORTFORD CARNIVAL CRUISE

14th-16th June

Bishop's Stortford Town Council welcomes boaters to Carnival Day on 15th June. To book your mooring email stortfordmooring@gmail.com or phone 07721 654410.

WARE BOAT FESTIVAL

5th-7th July

Ware Boat Festival, on the River Lea in Ware, is a weekend of fun and frolics on, in and around the river and town. The theme for 2019 is 'space'. Entry price is £30.

Find out more at waterways.org.uk/leeanandstort/ware_boat_festival.

FESTIVAL OF WATER

24th-26th August

Boat, campsite and trader booking forms are now available for this year's IWA Festival of Water at Waltham Abbey on the Lee Navigation.

The event offers a weekend of fun for boaters, campers and all who love spending time by the water, with entertainment each evening and an illuminated boat procession on the Sunday. An on-site bar will make your weekend go with even more of a swing.

Find out more at waterways.org.uk/festivalofwater.

FIND OUT MORE:

waterways.org.uk/leeanandstort

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BLAST FROM THE PAST

The great canal of Royal Gasworks Mills



COVER PICTURE: Passing through Feildes Weir Lock on the River Lee.



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