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Thought you might like this!  
Best wishes

  
[Arthur Percival]

*Have you visited the Heritage Centre at the Fleur de Lis?*

# Powder Port

by Arthur Percival

Faversham in Kent is not just one of Britain's most historic towns, with 2,000 years of continuous development behind it. It is also one of the most explorable — full of interesting features which link the past with the present. To get full value out of it you don't have to be intrepid (the natives are very friendly) but like other explorers you do have to cover every inch and use your eyes.

No good losing interest and turning back — this is the very moment when you are most likely to miss something fascinating. It helps, too, to break off for a pint or two of local-brewed "real ale". It's not just that the beers are good, and the pubs a delight — the company is well-informed.

Next time you lie up in Faversham Creek have a look at the area beyond the basin which marks its tidal head. These days the only vessels to use the basin are coasters and motor-barges delivering to a fertilizer manufacturer, and now that the

sluice-gates are flanked by a car park and a bottling-plant there doesn't seem much incentive to explore. But don't be deceived. Step over the creek bridge away from the town, walk between the creek and the car park for a couple of hundred yards, and then turn left along a rough metalled track which leads across the head of the creek.

Beckoning straight ahead with magnetic appeal is Davington's Norman Priory — but even that can wait for a while.

Leading between tall brick walls for 30 yards or so, the track bends slightly right and, as Flood Lane, leads into West Street there is a complete change of scene.

Nearby is Stonebridge Pond with its quota of ducks, swans and other wild life. In fact, it is a complex of man-made waterways which have become naturalized. There are even some little inlets which look like miniature docks. You are looking at the site — or rather, part of the site — of a gunpowder factory. The strange monumental

wall in Flood Lane is all that survives above ground of a blast wall, erected on the town side of the mills that stood at the head of the creek to prevent too much damage being done to people's homes by a 'blow'.

This is not quite all that survives on the pond. If you're lucky enough to gain access (it's private property) Bill Bunting who looks after it for the owner can show you several of the stone beds on which the great edge-runners of the mills revolved. They are around 150 years old and until Bill cleared them of undergrowth a few years ago hardly anyone realized they were still there.

On the other side of the road is a direction sign reading 'Chart Gunpowder Mills — Ancient Monument'. If you explored beyond the head of the *other* local waterway — Oare Creek — you might find even more remains of powder mills.

Gunpowder is a mixture of saltpetre, charcoal and sulphur — normally in the proportion of 75

Left: For safety reasons, transport from process to process was mostly done by "Service Waiters" propelling punts along narrow-gauge canals. (Courtesy of I.C.I.)

parts of saltpetre to 15 of charcoal and 10 of sulphur. After being ground individually into a fine powder the three ingredients are mixed in an incorporating, or edge-runner, mill. This is the key process and the object is to "incorporate" the ingredients as closely as possible with one another, so that the longer the mill is left to run, the better the powder. One or two edge-runners — huge wheels of stone or steel — revolve slowly round in a pan on a stone bed. In front of each edge-runner is a plough which automatically turns over the powder ahead of it. About 60 lb. of powder is mixed at a time and at this stage it is a green charge because of the muddy-green colour caused by mixing the three ingredients.

The mills at the head of the creek, and Faversham's Chart Gunpowder Mills, were incorporating mills. Though provided with deep, solid foundations to take the weight of the edge-runners (around three tons each), the superstructure was mostly of wood so that in the event of a blow there was no flying masonry to wreak havoc far and wide. However the wooden shed was rather different from the garden variety: it was about 18 feet by 15 feet and with a timber frame of massive proportions because it had to take the torque of powerful machinery connected by overhead gears to a water-wheel. On one side additional stability was imparted by the blast wall.

What came out of the incorporating mills was mill cake, compact chunks which then had to be pressed to increase specific gravity, and so the power to weight ratio still further. The next process was the most dangerous of all: the press-cake had to be corned or granulated into grains of different sizes for different purposes. This was a sieving process and it was hazardous because if one tiny particle of grit was embedded in the press-cake it might easily strike a spark off the metal meshes. Corning-houses went up most often of all. The rest was fairly plain sailing. The powder was dusted to leave nothing but the right-sized grains. It was then glazed to prevent it absorbing moisture, dried in stoves till the moisture content was one per cent. and finally packed ready for despatch.

Even in this simplified

description, six distinct processes are involved and four of them require a power-source — so gunpowder factories could not be started *anywhere*. Add to this one or two other basic requirements and we can begin to see why Faversham was chosen. Experience soon showed that it did not pay to carry out the various processes in adjacent buildings, as you would in an ordinary factory. If one went up, the chances are that there would be a chain-reaction and they all would. End of gunpowder factory. The other point was that if you then isolated the buildings from one another and used horses (with metal shoes) and carts (with iron-shod wheels) to move the powder from one to another you would almost certainly end up with just as many blows, as the sparks from the iron on the flint tracks would ignite the powder. So as well as separating the process-houses you needed to use water transport to link them with one another.

The Faversham factories were started before the Industrial Revolution and the advent of the steam-engine. Water-power was the only available unfluctuating energy source and to provide practical water-transport the stream that provided the power needed to have a slow fall.

Faversham has just such a stream — the Westbrook, which feeds the creek. It may be attractive, but it is just about as insignificant as a stream can be — only about 10 feet across at its widest and certainly no more than 18 inches deep. By careful manipulation of the stream between Ospringe, a mile away on the A2 road and Stonebridge Pond it was eventually possible to provide for more than a dozen powerful water-mills.

There were hundreds, even thousands, of other places with streams as suitable so why pick Faversham?

We need to think again about the raw materials needed for powder — and also about who needed it and how it reached its destination. Saltpetre imposed no particular constraints, at least in the early days: in a neat, if rather unsavoury, example of early resource conservation, it was reclaimed from pigeon and dove droppings. Sulphur, however, had to be imported from Sicily, so a powder factory needed to be near a port. Charcoal did not have to be imported but it still presented problems. In volume the wood needed to make it was by far the largest constituent of gunpowder: though only 15 lbs. of charcoal

were needed for every 75 lbs. of saltpetre and 10 lbs. of sulphur, 180 lbs. of wood had to be found to make that charcoal. It couldn't be any wood, either; it had to be alder, willow or dogwood.

It so happened that in Faversham and close to the first powder works there was an area — still known as the Willow Beds — just right for intensive cultivation of one of these species. The early market for powder was provided by the Navy and Army. In the days when most roads were no more than rutted tracks it was no good starting a factory away from a port or navigable river. So Faversham was an obvious place.

There is some rivalry between Faversham and Waltham Abbey, in Essex, as to which was the first to start a powder industry. Faversham's historian, Edward Jacob, writing in 1774, claimed that the local industry had been in existence ever since the reign of Elizabeth, if not before her time. Winters, writing in 1887, makes exactly the same claim for Waltham Abbey. You take your pick.

Both towns, until the Reformation, boasted large and wealthy Abbeys. Monastic houses were then considerable property-owners: many Abbots were astute businessmen.

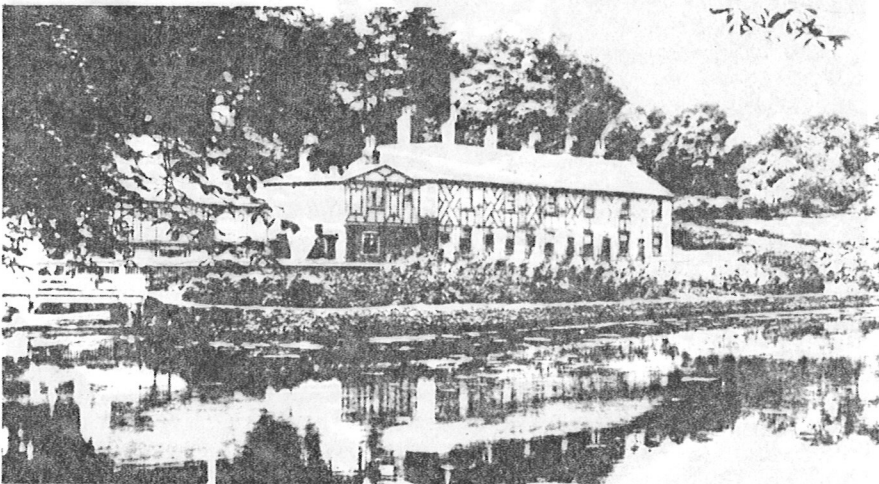
The first recorded private enterprise powder mills, in existence by 1536, were on land in Rotherhithe owned by Bermondsey Abbey — and Bermondsey was the parent-house of Faversham Abbey.

Certainly by the beginning of Queen Elizabeth's reign the lack of a substantial home industry was being felt. Most powder had to be imported, and in 1560 ministers warned that if Philip of Spain imposed a blockade there would be virtually no supplies at all. Perhaps it is significant, at least in Faversham's case, that in 1579 a factory was established at nearby Queenborough, on Sheppey, to process the iron pyrites found in the clay cliffs of Minster. One product from the factory was copperas (iron sulphate), used as a mordant in dyeing. The other was sulphur.

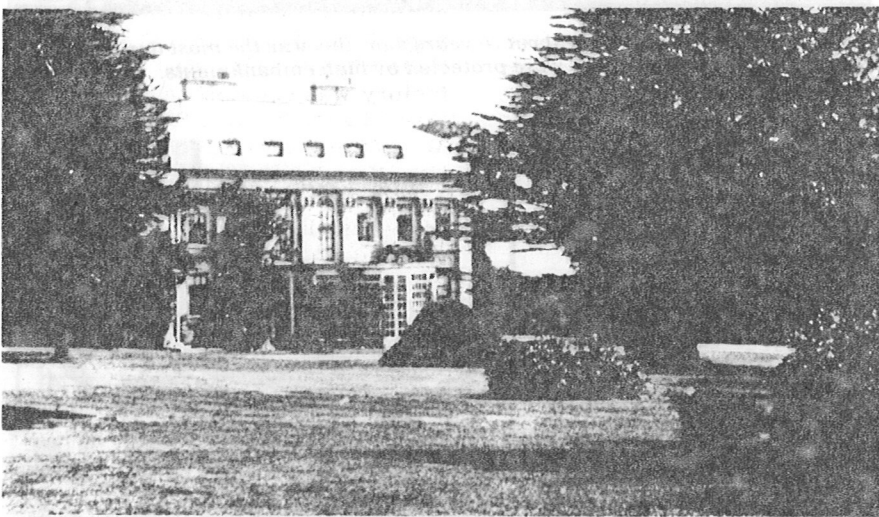
Another factory had been established the other side of Faversham, above the Tankerton Cliffs at Whitstable, in 1565. An official report suggested that this would be capable of producing 50 tons of sulphur a year — enough for 500 tons of powder. In 1601 this works was acquired by Thomas Mendfield, a wealthy local businessman who left a fortune when he died in 1614. His monument is in the church and the foundation



*Mediaeval powder-making: (left) pestle and mortar being used to "incorporate" the sulphur, saltpetre and charcoal as closely as possible; (right) using a sieve to "corn" the powder into uniform-sized grains. (Courtesy of I.C.I.)*



*Once part of Faversham's Home Works, Stonebridge Pond (beyond the head of the Creek) remains the idyllic spot it was when this view was taken about 70 years ago. (Courtesy of the Faversham Society)*



*The house that Judd built: this fine Inigo Jones-style building was mostly destroyed by fire about 15 years ago. (Courtesy of the Faversham Society)*

stone of the Almshouses he bequeathed to the town is in the Fleur de Lis Heritage Centre at Faversham.

Daniel Judd is the first person who can be directly associated with Faversham's gunpowder industry.

Between 1589 and 1641 various interests unconnected with Faversham enjoyed a monopoly of the gunpowder industry and if this was not to be infringed no powder should have been made in the town during the period. Soon after the monopoly had lapsed Judd was in business in Faversham — and making a lot of money. In 1652 he began to build himself a splendid mansion — in advanced classical taste — on top of the hill on the A2 road just west of Ospringe. Some say this was the site of the small Roman Town of Durolevum — and there have been plenty of finds there — but since 1660 its only name has been Judd Folly Hill.

Judd did not enjoy it for very long. He had aligned himself closely with Cromwell and as soon as Charles II became king in 1660 Judd was evicted.

His factory — the Home Works, as it came to be known, went on.

Faversham was a First Division smuggling town, and no commodity was exempt. In the period 1650 - 1750 authorized shipments of powder through the creek were often well over 40 tons a year, but in 1673 the Customs men complained rather sheepishly that every week large quantities were being exported "without coquet or security under pretence of His Majesty's goods, but what it is or where it goes we are not able to give any account." This was one kind of opportunism. There was another. It was not long before someone spotted that there was also a small, but steady, stream feeding Oare Creek and that alongside it was land ripe for development as a powder factory. By 1719 the Oare Works was in operation.

The proprietors were a family of Huguenot origin, the Gruebers, who had emigrated to England with thousands of other Protestants following the Revocation of the Edict of Nantes in 1689. No doubt as in Elizabethan times the Government was glad to benefit from their expertise. Faversham indeed seems to have been a mecca for refugee French powder-makers, and for 25 years or more they had their own Huguenot congregation, worshipping at Davington Church — overlooking the Home Works and handy for the

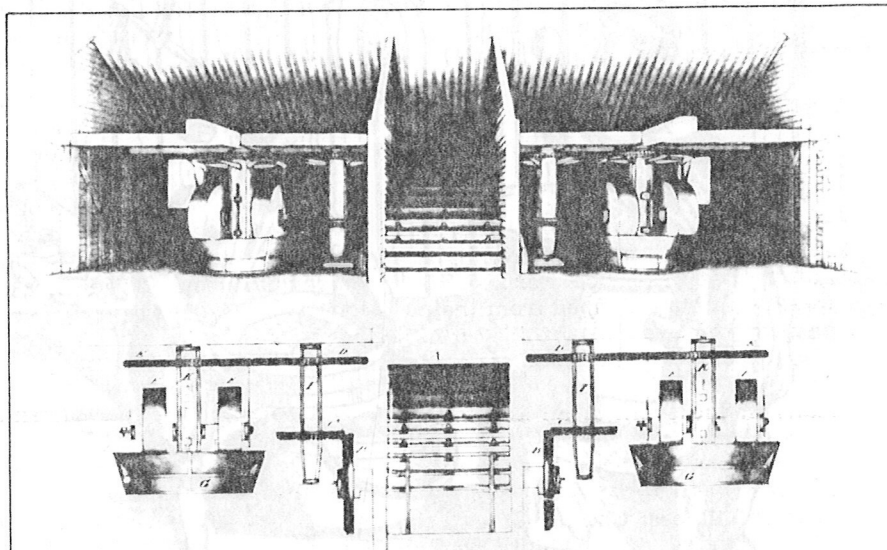
Oare Works — or Preston Church by Faversham Railway Station.

The Gruebers also controlled the Home Works and under their management both factories prospered. Like other industrialists before and since they tended to ride roughshod over the interests of local residents and they took to the dangerous practice of moving powder through the town's narrow streets in open wagons with iron-shod wheels — a recipe for disaster if ever there was one.

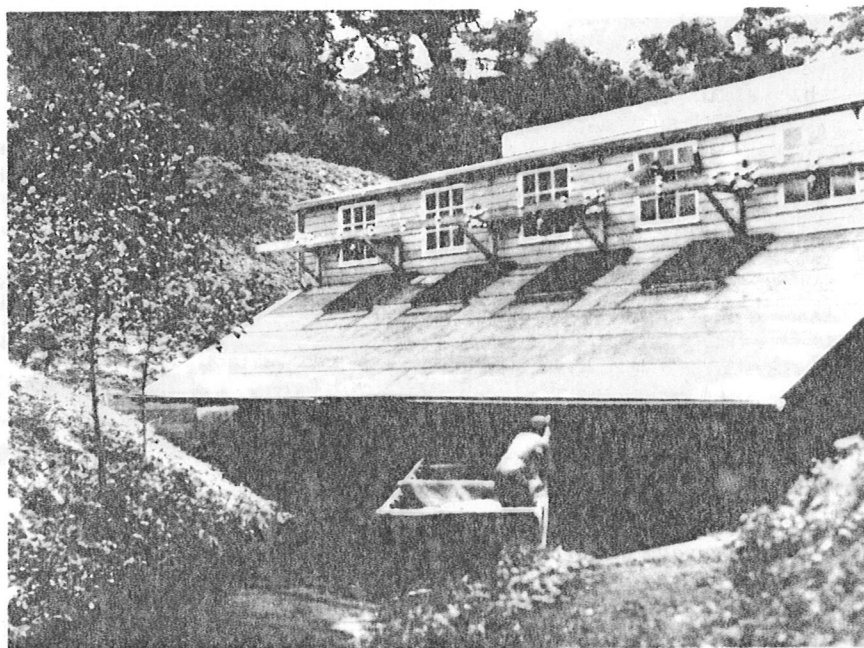
Today local authorities wary of causing unemployment might just decide to have talks with a firm about a problem like this, but Faversham's 18th century borough council had no such inhibitions and promptly made a by-law prohibiting the practice. Needless to say, the management recognized that it had met its match — and there were no redundancies.

All this time the Government was buying its powder from private manufacturers but in the late 1750s the quality and delivery-times had become so erratic that it decided to nationalize part of the industry. The most suitable factory was the Home Works in Faversham and it was acquired in 1759 for the sum of £5,682 1s 7d (precisely). Gunpowder technology was advancing rapidly and despite improvements carried out 20 or 30 years earlier under the Gruebers much of the plant was obsolete or in poor shape. A modernization programme was put in hand and in 1766/7 the foreman of the Royal Gunpowder Factory, as it was now known, paid several trips to Waltham Abbey, still privately-owned, to study innovations there. His expense account survives and he was paid 6d a mile for each journey.

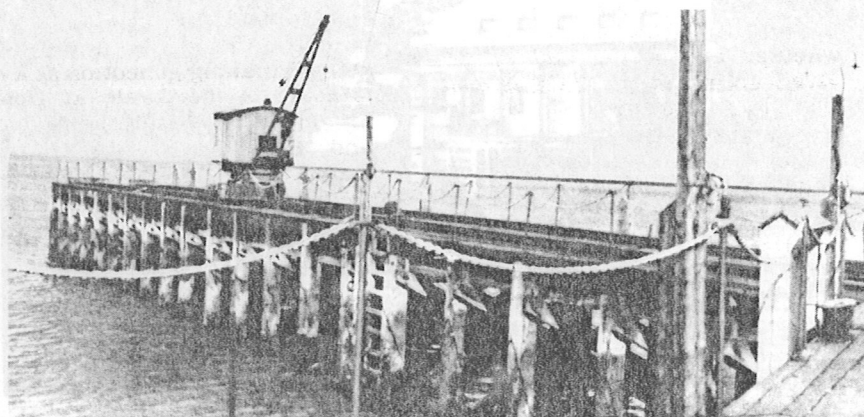
The modernization was very thorough, and bit by bit the whole factory was reconstructed. Cop-pingers, the old mansion in the middle of it, was knocked down and replaced by a handsome new Georgian house for the store-keeper (manager). To provide a constant water supply to the house an auxiliary pump was fitted to a well beside one of the incorporating mills nearby. Another new executive house, in much better taste than most modern houses of similar aspirations was built on Brant Hill, overlooking Stone-bridge Pond, and for other senior staff a terrace of three houses was built in Tanners Street, close to King's Mills. The plans for these buildings are still in the Public Record Office and except for the manager's house all are still there, and in use as dwellings. By 1774



*Perspective and section of a pair of incorporating mills at Waltham Abbey in 1830: this drawing was the basis for the Faversham Society's restoration of the Chart Mills. (By Courtesy of the Public Record Office)*



*A Faversham corning-house about 50 years ago: this was the most dangerous process of all and the houses were protected by high embankments. (Courtesy of I.C.I.)*



*The Cotton Powder Company jetty on the Swale at Uplees, about 1918: nearly all trace of this vast factory has now vanished. (Courtesy of the Faversham Society)*

output had been stepped up to 364 tons a year and the Government could feel satisfied with its investment.

The staff were well looked after, as civil servants usually are. The manager had a salary of £100 a year, his deputy £90. There was a hoy master on £31 4s, with a mate on £23 8s. Those subtle differentials are nothing new! Nor is a factory health service. For a small weekly amount stopped from their pay workers were guaranteed free treatment by a local doctor (Edward Jacob, the town's historian) in the event of an accident. In 1767, following a shopfloor request, the service was extended to cover ordinary treatment in the event of illness. Claims for extra pay for extra responsibility were often submitted (in compelling detail that would do credit to any shop steward) — and met. Among local blue-collar workers the powder-men were evidently an elite. An articulate one, too. They formed their own benefit society and at a later date were largely responsible for the formation of the local co-operative society whose first shop was close to the Home Works.

It was a dangerous industry but safety precautions were rigidly imposed and observed, and when there were accidents the problem was often less of injuries to staff than of damage to buildings in the town. Davington Priory suffered particularly badly. One very big blow knocked down one of the church's twin towers and destroyed two bays of the monastic buildings — which, unlike those of the abbey, had survived the Reformation. In 1781 there was another disaster when three tons of powder exploded, leaving the west end of Faversham looking (not unnaturally) as though a high explosive bomb had dropped nearby. In fact most of the damage was only superficial but the borough council decided it was time to get tough with the Government. Enough was enough, whether or not the factory provided employment. On this occasion the Government (in the person of Pitt) was on the point of trying the ritual industrial blackmail, and threatening to close the factory down completely, when Congreve (of rocket fame) suggested the simple expedient of moving the more dangerous processes to a new site away from the town. His proposal was adopted but the wheels of Government ground at a snail's pace and it was not until 1786 that the corning, drying and some other processes

were transferred from Stonebridge Pond, in the Home Works to the new Marsh Works, on a site in Ham Marsh south of Oare Creek.

The move came none too soon. Within five years, on 20 February 1791, there was another huge explosion — but this time at the new works. A drying-stove blew up so completely that no trace of it was left. Heavy timber beams, a foot square and 12 feet or 14 feet long, were hurled several hundred yards.

Said an eyewitness: "There was an immense column of smoke, which, as the day was perfectly serene and calm, rose up in so beautiful and, at the same time, so awful and tremendous a manner, as infinitely to exceed all possible description." In the nearby coastal town of Whitstable the shock felt like an earthquake and "some of the inhabitants who were out upon the Shawls in a boat, had shortly afterwards their hats covered with ashes."

This report was carried in the Newark Herald of 6 March and probably 18th century newspaper readers got the same macabre enjoyment out of reading of successive Faversham blows as their 20th century counterparts do out of reports of air disasters and the like. The public taste changes little.

At the end of the Napoleonic Wars the Home and Marsh Works were sold to a Dartford engineer, John Hall, who also acquired the Oare Works. In 1846 the first of the modern generation of explosives was introduced — guncotton — and John's son William promptly opened plant to make it at the Marsh Works. Its properties were not fully understood, however, and a disastrous explosion the next year resulted in closure of the new installation. From then on the three old works in the town — Home, Oare and Marsh — concentrated on simple, old-fashioned gunpowder. But in 1873 another firm, the Cotton Powder Company, started making guncotton at a new factory on the Swale at Uplees. This time there were no problems and other new explosives were added to the ranre — nitroglycerine in 1892 and cordite (a mixture of guncotton, nitroglycerine and vaseline) four years later.

Other firms opened factories alongside the Swale and by the outbreak of World War I in 1914 the once pastoral marshes were teeming with activity. A special railway — the Davington Light Railway — had to be built to ferry

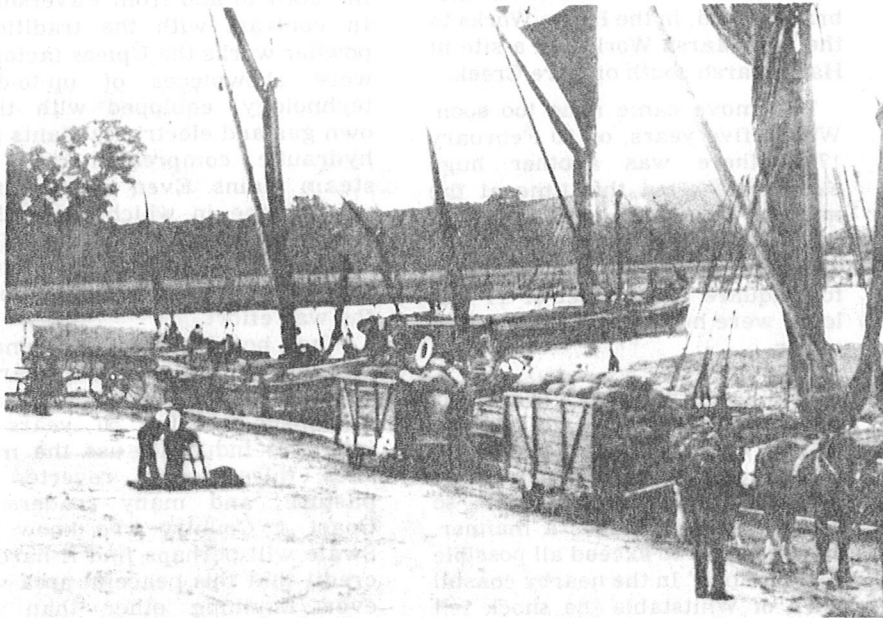
the staff to and from Faversham. In contrast with the traditional powder works the Uplees factories were showpieces of up-to-date technology, equipped with their own gas and electricity plants and hydraulic, compressed air and steam mains. Even after a 1911 catastrophe in which more than 100 people lost their lives in a TNT explosion, the factories continued making a major contribution to the war effort.

When hostilities ended, demand plummeted and within a year or two the factories were closed and demolished. After 50 years of intensive industrial use the marshes miraculously reverted to pasture, and many readers of Coast & Country who know the Swale will perhaps find it hard to credit that this peaceful area was ever anything other than the remote, unspoilt length of coast line that it is. Only if you take a closer look will you notice one or two small, but massive, magazines which defied demolition in 1919.

There was still a market for ordinary gunpowder — used mostly for sporting purposes and for fireworks — and the three original works remained in operation. The first to open were the last to close — in 1934. Even then they closed not because of any fall in demand or because they were obsolete (not much more than good old-fashioned intermediate technology is needed to make powder) but because ICI, who now owned them, saw the clouds of World War II gathering and felt it would be safer to move powder-making to a less vulnerable location. So it came about that many Faversham folk made the long journey to Ardeer in Ayrshire, where ICI already had an explosives plant.

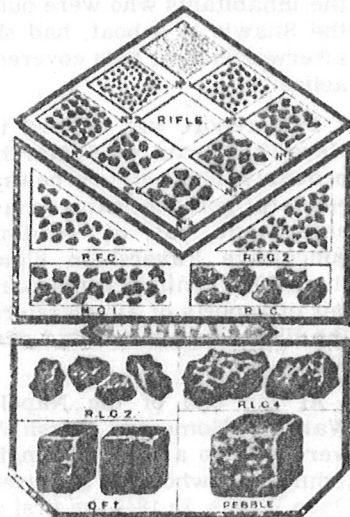
In Faversham buildings were dismantled, moved elsewhere for new uses, or simply left to decay; but one incorporating mill was left standing and in full working order the one with the auxiliary drive to pump water to the manager's house in the Home Works in the 1760s.

One of the group known as Chart Mills, only 400 yards from the town centre, was kept in occasional use. Soon, however, it was not needed, even for pumping water, and it too fell into decay. Then, in 1967, it was re-discovered, overgrown in a bamboo thicket of sub-tropical luxuriance. The town's local amenity society, the Faversham Society, recognized it as an unusual industrial monument and raised money to restore it. No one



Above: Oare Creek dock of the Marsh Works about 1925. Raw materials being discharged (right) and finished powder being loaded (left) into barges, which carried a red flag to indicate their dangerous cargo.  
(Courtesy of the Faversham Society)

Right: Different sizes of grain were required for different applications – small ones for rifle cartridges, big ones for shells.  
(Courtesy of the Faversham Society)



Below: Davington Station, the Faversham terminus of the Davington Light Railway in August, 1917. All the passengers are women – because separate trains were run for men and for women!  
(Courtesy of the Faversham Society)



had tackled anything like this before, there were no plans (or so it seemed) and the job was a tough one. But then following a television story a viewer in Southend told the Society about some plans in the Public Record Office. They happened to be of some mills at Waltham Abbey, but these had obviously been modelled on the Chart Mills and the drawings (in 1830) were by a Faversham man, so they were just what was needed. It was only later that the Society discovered how important its work was, for it established by a process of international elimination that the surviving mill is the oldest gunpowder mill in the world.

It dates from about 1760, when the Government was modernizing the Home Works, while the runner-up (in Denmark) was built about 80 years later. This is why opposite Stonebridge Pond you'll see a direction sign reading "Chart Gunpowder Mills – Ancient Monument."

Some work still has to be done on the Chart Mills but it is hoped they will soon turn again. The green charge won't be gunpowder, of course; it will be a compound (guaranteed non-explosive) made for the Faversham Society to a secret formula in the Government Ordnance Factory at Bishopton. If Chart Mills whets your appetite, then explore the rest of the Faversham and Oare areas to see what other relics of the gunpowder industry you can find. No clues, except that one of the works is very overgrown, and that it's full of surprises, including the remains of a miniature canal network for powder-punts and an old-corning house which is so secluded that the air seems uncannily still. Good hunting! ●

Note: Chart Mills lie on a public right of way and the exterior is therefore on view at all times. The interior is usually shown when a society or other organization makes arrangements with the Faversham Society for one of its conducted tours of this historic town. The interior is also on view during the Society's annual Open House event – when residents and visitors have a chance of seeing over historic buildings not normally open to the public. This event usually takes place on two successive Saturdays in July. Further information is available from the Society at the Fleur de Lis Heritage Centre, Preston Street, Faversham. Telephone: 4542.