

403

# On Her Majesty's Service

WASC 403

WASC 403

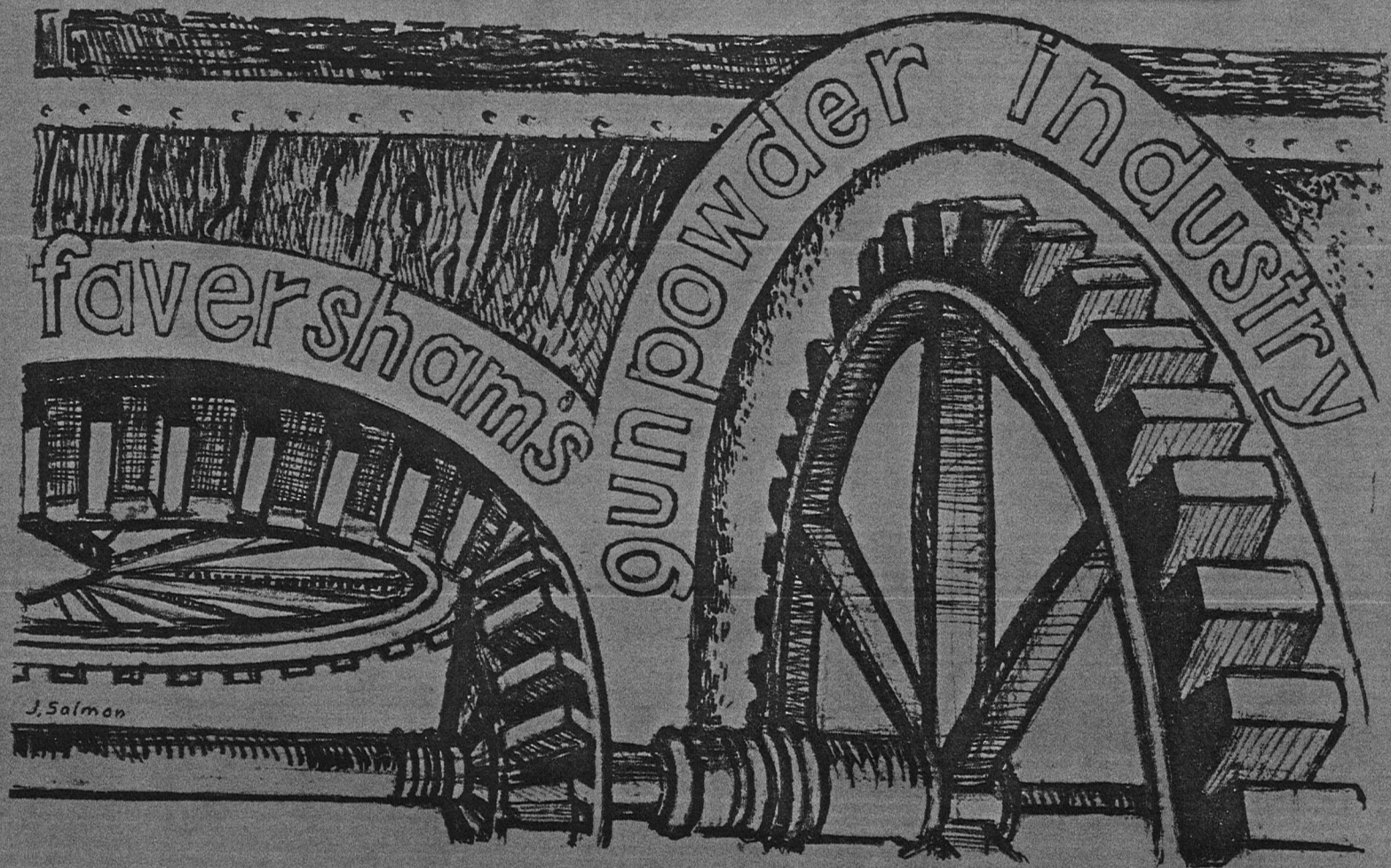
This item has been issued from  
the ERDE Historical Collection.

Please return to  
Head of Library Services, ERDE.

WASC 403

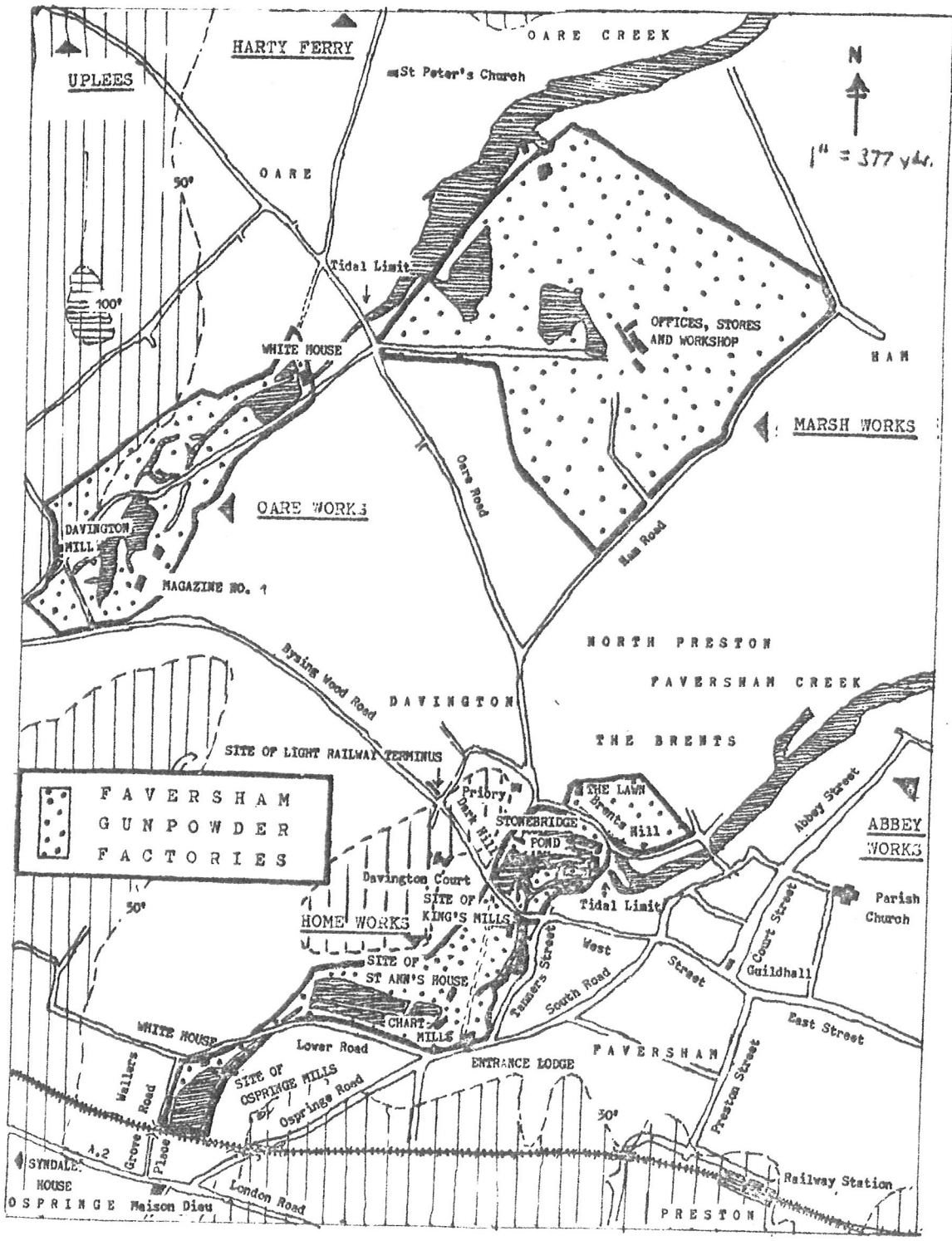
This item has been issued from  
the ERDE Historical Collection.

Please return to  
Head of Library Services, ERDE.



ABOUT FAVERSHAM No 4

WASC 2



F A V E R S H A M P A P E R S

No. 4

1967

THE FAVERSHAM GUNPOWDER INDUSTRY  
and its development

by

ARTHUR PERCIVAL, B.A.

with illustrations by  
JACK SALMON, A.T.D.

Published by  
THE FAVERSHAM SOCIETY  
42 Newton Road: Faversham; Kent

THE AUTHOR

Our towns, our villages and our countryside have been shaped by history. All that is good about them, all that is bad, and all that is merely indifferent, we owe to the past. We cannot understand the present or plan properly for the future without knowing about the past. It is ARTHUR PERCIVAL'S firm conviction that town and country planning and the study of local history should go hand-in-hand - and not at arm's length, as happens all too often. So he welcomed the chance of writing this paper for a Society whose range of interests is broad enough to include both planning and local history.

Born in North Kensington in 1933, Mr Percival lived for a time in Sandwich before settling in Faversham in 1959. He worked in the London County Council Members' Library for six years before taking up his present appointment as Librarian of the Civic Trust. He has been the Hon Secretary of the Faversham Society since its formation in 1962.

THE ARTIST

JACK SALMON, who was born in Faversham and has lived most of his life in the town, teaches art at the Ethelbert Road Secondary Modern Boys' School. Since its earliest days he has been one of the most active members of the Faversham Society. His artistic talents have benefitted the Society on more occasions than can be recorded here. In particular, many readers will be familiar with the Society Christmas Cards he has designed year by year, and with the lively sketches which grace the town brochure sent by the Borough Council to prospective visitors and residents.

C O N T E N T S

1	Origins.....	1
2	An Early Owner: Daniel Judd.....	2
3	Early Development of the Industry.....	4
4	The Home Works acquired by the Government.....	7
5	Expansion of the Royal Factory.....	10
6	The Royal Factory sold to John Hall.....	13
7	The First Guncotton Factory in the World.....	13
8	A Visit to the Faversham Factory in 1897.....	16
9	Expansion at Uplees: The Cotton Powder Company.....	21
10	Two more Factories in the Faversham Area.....	23
11	The Old Factories Close - and a new one opens.....	25
12	What is left.....	26
13	Chronology .....	29
14	Bibliography and Acknowledgements.....	31

---

The stencils were typed by Mrs Dorothy Percival

The sheets were run off by

Mr and Mrs P.D. Hutley-Bull

---

Already published in this series:

- 1 The Mayoralty of Faversham (1964, 2nd edition 1965),  
by Herbert Dane (Fellow of the Institute of Journalists  
and for many years Editor of the "Faversham News") - price  
2/6 (3/6 post free)
- 2 Faversham Abbey and its last Abbot, John Caslock (1965, 2nd  
edition 1966), by Canon W Telfer, MC, MA, DD; with a brief  
report by Brian Philp on the Excavations at Faversham Abbey  
in January-February 1965 - price 2/6 (3/6 post free)
- 3 Inns and Taverns of Faversham (1967), by Francis Bywater -  
price 3/6 (4/6 post free)

Editor's Note

The 'About Faversham' series of 'Faversham Papers' are monographs about aspects of the town's life, past and present.

In the next to be published, "The Story of a Thousand Years", Mr Herbert Dane will give a year-by-year account of the town's development, from the Dark Ages to the present day.

Any reader who would like to contribute to the series is invited to write to the Hon Editor at 42 Newton Road, Faversham, Kent.

---

THE FAVERSHAM SOCIETY

was formed in 1962. Its members (around 400 of them) are people of all kinds who have one thing in common. They are enthusiastic about the town and want to care for it, in the same way that most of us like our own homes and want to look after them. We keep what we like and know is good, we improve what is indifferent, and we do away with what is bad. And this goes for the Faversham Society whose motto is ..

Cherish the past; adorn the present; create for the future

Activities are many and various, and most people can get something from, and give something to, the Society.

It holds monthly meetings; it issues a monthly Newsletter; it clears rubbish from derelict sites; it keeps footpaths open; it arranges exhibitions; it runs the town's museum of local history; it publishes the town's magazine; it plants trees; it presses for the improvement of local services, such as the library, clinics and ambulance service; in co-operation with the Borough Council it publicises the town's attractions; and it has many other interests, from industrial archaeology to local government reform.

In short, it believes that nothing but the best is good enough for the town and its people. Independent of any other organisation, it speaks without fear, favour or prejudice. Its only concern is with the welfare of the town and its surroundings.

It always welcomes new members, who pay a minimum annual subscription of 5s (7s 6d for husband and wife, 2s 6d for those under 18).

The Hon Secretary (Arthur Percival, 42 Newton Road, tel 3261) will always be pleased to give further information or to help anyone, whether a member or not.

## 1 Origins

Faversham may well have been the birthplace of the national gunpowder industry. According to Edward Jacob, whose 'History of the Town and Port of Faversham' was published in 1774, the first gunpowder works in the town was established "in the reign of Queen Elizabeth, if not before her time".

The only other early works were at Long Ditton in Surrey and Rotherhithe. Those at Long Ditton were built by George Evelyn, grandfather of the diarist, perhaps as early as 1561. Those at Rotherhithe, worked by Henry and Thomas Lee (father and son), were already in operation in 1555, and may have been in existence as early as 1536, at which time the site belonged to Bermondsey Abbey. It was from Bermondsey Priory, as it then was, that King Stephen had brought Prior Clarembald and twelve monks to Faversham when he founded the Royal Abbey of the Holy Saviour in 1147; and it is tempting, but probably unwise in the absence of specific evidence to support the hypothesis, to suppose that both in Bermondsey and in Faversham monastic initiative lay behind the introduction of the gunpowder industry. Whether the first works to open was at Rotherhithe or Faversham remains uncertain, but Faversham could certainly claim precedence if, as Jacob seems to suggest, its first factory started work some time before 1558.

It was probably in the 13th century that gunpowder was first made in Europe, and for a long time England relied on foreign source of supply. In time of war this was hardly a satisfactory state of affairs, and the first manufacturers to establish themselves could look forward to a rich return on their investments. Before they could begin, however, they had to find suitable sites. These were dictated by the economics of the industry.

First, there was the consumer demand. To meet the needs of the army and navy, a site in the south of England was needed if transport costs were not to be prohibitive. Within this area a seaboard or riverside site was preferable to one to which there was no access by water.

Then there was the question of raw materials. Gunpowder is a mixture of three substances - saltpetre, charcoal and sulphur - normally in the proportion of 75 parts of saltpetre to 15 of charcoal and 10 of sulphur. Though saltpetre could be made in this country, the process was slow and unsavoury, and much was imported (e.g., from Italy and India). With sulphur there was not even any choice: it had to be imported from Sicily and Italy. (In 1584, however, some effort seems to have been made to reduce this dependence on foreign sources of supply. There was a project, probably fruitless, for refining sulphur from the copperas (iron sulphate) washed up on the shore at Whitstable and on the coast of Sheppey).



Thus two of the ingredients of gunpowder came from overseas, and clearly anyone establishing a factory would do well to find a site near a seaport, or again his production costs would be increased by transport charges. The third ingredient, charcoal, did not have to be imported, as it was derived from coppice wood (usually alder, willow or dogwood), which was charred in open pits. On the other hand it took about 180lb of fresh green wood to make 15 lb of charcoal, so that large quantities of wood were required - nearly two tons of wood, for example, to make enough charcoal for one ton of gunpowder. So a factory also needed to be within easy reach of suitable woodland.

Finally, a reliable water supply was needed to provide power for water-mills, to provide the water that was needed when the ingredients of the powder were incorporated (i.e., mixed under pressure), and to float the punts and other vessels that for reasons of safety were used wherever feasible for moving powder from process to process within the works.

Given these prerequisites, there were few sites as suitable as Faversham. It was a seaport, with a manageable-sized stream feeding its Creek, it was surrounded by woodland, and it was well placed between London and the Channel ports. It is hardly surprising that with this wealth of natural advantages Faversham became one of the leading centres of the national gunpowder industry. However, one of its advantages - its proximity to the Continent - was also a liability, in that it rendered it vulnerable to attack in the event of war. Though this was not to prove a fatal handicap till the present century, there were forebodings of it as early as 1649, when in September the naval Commander in the Downs was ordered to escort vessels with Faversham powder as far as the Hope, as they were liable to attack from "pickeroons lying at the mouth of the river".

## 2 An Early Owner: Daniel Judd

Who had the enterprise to recognise Faversham's advantages and harness them for gunpowder-making we cannot be sure, but for a time in the 17th century the local works were the property of Daniel Judd. Described by Hasted as "a busy committee man and sequestrator of the royalists' estates" during the Commonwealth, Judd rode in on the crest of a wave of prosperity in the national gunpowder industry.

In a Europe that was hostile to England's new republican government, Cromwell's regime could not hope to survive for long unless it held the undisputed mastery of the seas. Within two years (1649-1651) the size of the Navy was doubled, and in 1651 a Navigation Act was passed requiring that cargoes imported from America, Asia and Africa into England, Ireland and the colonies

should be carried in ships that were English-owned and manned by crews more than half English, and that goods imported from Europe should be carried in English ships or in ships of the country from which the goods came. This Act hit Holland particularly hard, for then (as now) the Dutch were a great shipping nation, and many cargoes imported into England came in Dutch vessels. Holland negotiated for concessions, but before agreement could be reached fighting broke out, and in 1652 the English fleet under Robert Blake was defeated off Dungeness.

It was a crucial time, and one that suited a munition-manufacturer like Daniel Judd pretty well. The Admiralty Committee in London constantly pressed him for increased supplies of gunpowder - and he constantly tried to keep pace with the demand. An agent of the Committee visited him at his factory in February 1653 and reported that he was installing an extra mill. This was expected to be in operation by 1 March, and Judd could then guarantee to supply the Government with nearly 100 tons of powder a year. The same representative returned to the factory on 26 March, and Judd was as good as his word. The mills were "going as fast as the water would carry them", and the weekly quota of nearly 2 tons of powder was to be shipped within a few days to the Tower of London (then used, amongst other things, as a national ordnance depot).

The same summer, in a battle off the Suffolk coast, Blake wrought his vengeance on the Dutch fleet, and no doubt powder from Judd's mills played a vital part in this victory, which marked the turning-point of the First Dutch War. A year later, after a blockade, Holland came to terms and agreed to accept the terms of the Navigation Act.

But for Daniel Judd in Faversham all was not plain sailing. He was more than enterprising. He was high-handed. There was no Town and Country Planning Act in 1653, no planning application had to be approved before a change of use took place, but still there were proper courtesies to be observed, and Judd had no time for them. He fell foul of the Borough Council, who complained to the Council of State that he had converted a flour mill into a gunpowder magazine and had tampered with watercourses, and threatened to take "proceedings" against him. However, the Borough Council were told quite firmly that the Government had authorised the use of the flour mill as a gunpowder magazine "to supply the pressing public occasions" and that they should not take action against Judd "till they inform the Council of the cause thereof". Nothing more was heard of this particular storm in a millpond, so presumably the Council acknowledged defeat.

In 1652 Judd built - or began to build - himself a splendid new house just south of the London road outside Ospringe. But his time of glory was soon to end, for the mansion was confiscated from him after the Restoration of Charles II - and hence earned

the name Judd's Folly.

Some time in the 19th century, probably when it was reconstructed by John Hyde, the house was genteelly renamed Syndale House, but tradition dies hard, and we still have Judd Folly Hill. Later in the same century the mansion again became the home of a gunpowder magnate when William Hall, of John Hall and Son, lived here. In recent times the house became a hotel, the 'Mumford Mans', and it was during this phase of its history (in 1961) that it was severely damaged by fire. Most of the original house is now (1967) only a shell.

#### Early Development of the Industry

The original works was established with its centre on what is now known as St Ann's Estate. This takes its name from St Ann's Church, built in 1764 and demolished in April-May 1963, which in turn was called after the medieval St Ann's or St Agnes's Cross, demolished with the other three Rogationtide crosses in the town in 1571. This cross is also recalled by the public house of the same name (in South Road, nearly opposite the entrance to St Ann's Estate) and in St Ann's and Upper St Ann's Roads.

Over the years this first works (later known as the Home Works, to distinguish it from the others that followed) gradually expanded, till in its final form, reached about the end of the 18th century, it stretched alongside the stream from near the north side of Ospringe Street (just west of the Maison Dieu) as far as the head of the Creek, at the foot of Flood Lane. The channels north of Lower Road used till recently as watercress beds and Stonebridge Pond were both part of the Works, and part of the Lion Field council using estate now occupies the site of the Ospringe mill-pond.

To the west of the stream that feeds Faversham Creek, and roughly parallel with it, is a similar stream flowing into Oare Creek. Its potential did not go unnoticed by the gunpowder makers, and some time after the establishment of the Home Works another factory (usually known as Oare Works, but also called Davington Works or Mills) was built alongside it. It stretched from Bysing Wood Road as far as the head of Oare Creek, below Oare Pond and Meadow.

When Jacob wrote in 1774, powder from this Works was being supplied to the East India Company (which then governed part of present-day India and Pakistan) and to wholesalers. The management was early progressive, as it had recently introduced an improved method of drying powder, in which it was laid on a copper frame suspended over a stream of hot water. The earlier and more hazardous method had been to use gloom-stoves, in which hot air from live fire was circulated under the powder.

It is not known when this factory was established, but by 1719

it was being operated, with the Home Works, by one of the Grueber family, which later had an interest in the Hounslow powder mills in Middlesex. Like most other factories before and since, it had its troubles. One of them was the problem of pilfering by staff. In 1728, during the management of Francis Grueber the elder and Francis Grueber the younger, evidence was given that a former employee at the works, John Wilson, had been trying to sell gunpowder of which he was not the rightful owner. James Le Feaver, a mill-wright at the factory, gave testimony that

"one Bull, a soldier in Col Kirk's Regiment, as he was informed by the said Bull on Sunday last, asked the said Wilson to lend him a Razor; and, the said Wilson opening a Chest, the soldier perceived a Bagg or Two of powder therein, said 'You are well stockt with Powder, give me a Charge or Two', which he did; and afterwards this Deponent found in the said Chest a parcell of powder containing about Three pounds and a half, the property as this Deponent verily believes of his master Francis Grueber the Elder. And this Deponent saith that the said powder is worth Two shillings and sixpence."

The story was corroborated by Samuel Bull, the soldier concerned, but whether Wilson was convicted we do not know.

But worse trouble - this time of their own making - was in store for the Gruebers. About ten years later the firm began to take loose gunpowder through the town centre in open carts, and local people naturally became very uneasy about the risk of explosion. It was suggested to them that it would be safer and just as convenient from their point of view for the carts to take an alternative route, but they took no notice. The Borough Council took advice about the possibility of making an appropriate by-law or, if this were impossible, of prosecuting the firm under some general power. It was advised that it could make a by-law, and in April 1742 laid down that:

"If any person or persons shall at any time hereafter Carry or Convey in or through any of the streets or lanes within this Town any Gunpowder in any Waggon Cart or Carriage other than what is close covered with Boards or in any Waggon Cart or Carriage shoed with Iron every such person and persons shall forfeit and pay unto the Mayor Juratts and Commonalty of this Town the sum of forty shillings for every such offence to be recovered by Action of Debt in any of his Majesties Courts of Record by the Mayor Juratts and Commonalty of this Town in which action no Wager of Law shall be allowed."

Additional powers of control of the carriage of gunpowder were later conferred by a general Act of 1771, which among other things extended to the whole country restrictions which had been in force in the London area since 1725. Little more is known about the Grueber management at the Home and Oare factories, but in 1809 Henry Grueber, of Sloane Street, Chelsea - presumably

another member of the family - died leaving bequests to Mendfield's Almshouses and the National Schools in Faversham. At the end of the 18th century the Oare Works were the property of Miles Peter Andrews and Frederick Pigou, who were also the owners of gunpowder mills at Dartford, which they had bought in 1788 from Pike and Edsall, who had opened them in 1732.

Meanwhile expansion and improvements went on at the Home Works. Following the revocation of the Edict of Nantes in 1685 Huguenot refugees settled in Faversham, as in several other towns in East Kent, and some of them found employment in the works. Possibly James Le Feather, the mill-wright who gave evidence against John Wilson, was the son of one of them.

In the period 1650-1750 recorded shipments of gunpowder through the Creek were often well over 40 tons a year, though it seems that additional consignments were smuggled out and evaded the Customs men. In 1673 they complained rather sheepishly that every week large quantities were being exported "without cocquet 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." Bearing in mind that twenty years earlier the capacity of Judd's mills had been increased to nearly 100 tons a year, one feels the Customs men were indeed being well and truly hoodwinked, and quite clearly Faversham's reputation as a hotbed of smuggling was not unearned.



Mixing powder with pestle and mortar.

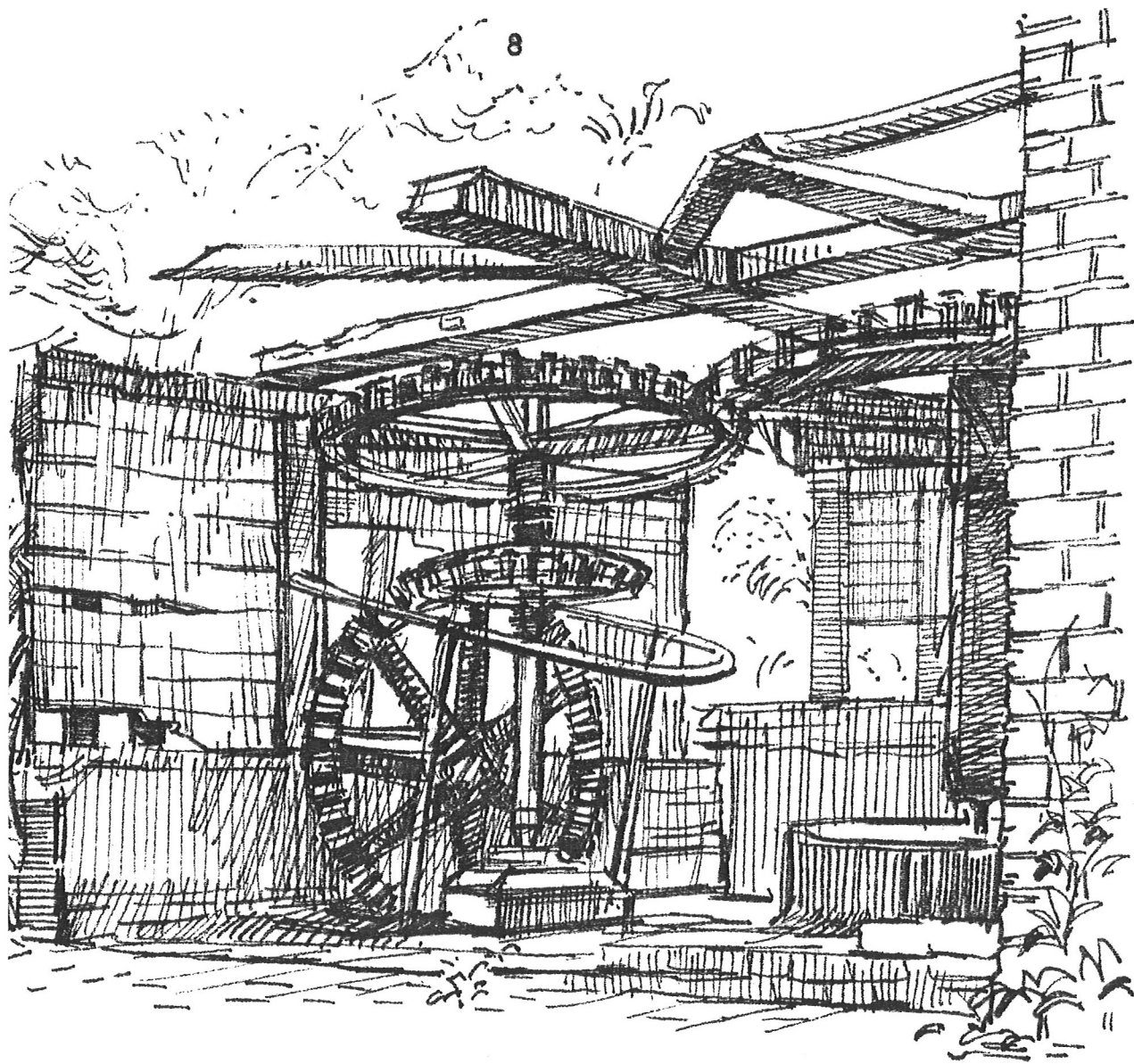
In the very early days of the Faversham industry, the gunpowder may have been mixed by hand with pestle and mortar. Later, manufacture was carried out in what Jacob calls 'pestil-mills', i.e. stamp-mills, in which the powder was pounded by mechanical hammers driven by horse- or water-power. About 1734 these began to be superseded by edge-runner mills, which were all worked by horse- or water-power. In these mills the charge of powder was placed in a trough on top of a circular stone bed, round which rolled one or two very heavy stones, or edge-runners, with their axes horizontal. In water-mills power was transmitted from the water-wheel by a train of gears alongside and over the stone bed, but when steam-power was introduced the gears were beneath the mill. The use of the old-fashioned stamp mills, except for the manufacture of fine sporting powder, was finally prohibited by Act of Parliament in 1772.

#### 4. The Home Works acquired by the Government

All this time gunpowder for the navy and army was being supplied by private firms, but in 1760 the Government decided that it might be more economical to open a factory of its own. To avoid unnecessary expense and delay, it also decided to take over an existing factory rather than build a new one, and the choice fell on the Home Works at Faversham. After being in private hands for many generations (the Waterman family were among the owners) the Works was bought by the Government from Thomas Pearse in 1760, and became the Royal Gunpowder Factory, under the control of the Board of Ordnance.

In the grounds there was already a residence, which had been the property of Sir Roger Twisden, Bt, and had previously been occupied by Francis Grueber (presumably one or other of the two of this name who had been working the Home and Oare Factories in 1728); but in 1764 this was superseded by a new house for the Storekeeper (director) of the Royal Factory. This was St Ann's House, and here in 1799 was born George Finlay, who fought with the Greeks in their War of Independence and subsequently wrote a history of it. He died in 1875.

Immediately after the Government took control a programme of extensions and improvements was put in hand, and by 1774 the Factory's annual output at full capacity had increased to 364 tons per annum. The plant comprised 11 water-mills and 5 horse-worked mills used for mixing and incorporating the powder, as well as others for grinding the individual ingredients and granulating the powder. (After being incorporated, the charge of powder, known as 'mill-cake', was compressed into thin slabs of 'press-cake', which was broken down into grains of the required size in the 'granulating' or 'corning' process.) Each charge of powder was mixed in an incorporating mill for 6 hours, though 3



One of the Chart Mills

hours had been considered sufficient until the Factory was taken over by the Government in 1760.

A visitor to the mills at this time might have begun his tour by turning off Ospringe Street into what is now Grove Place and its continuation Wallers Road. On the right he would see the headwater to the 'Ospringe Mills' and then, just south of Lower Road, the Mills themselves. Walking another 600 yards, to the junction of Lower Road and Ospringe Road, he might just catch a glimpse of the next set of mills, 'Chart Mills' through the young trees on his left. Then, entering the Factory across a bridge over the stream, he would come to St Ann's House and the Offices, with

the crest of Davington Hill overlooking them. Walking through the grounds towards Stonebridge Pond, he would notice 'King's Mills' on the right, just the other side of the stream from 50, 51 and 52 Tanners Street. Crossing West Street into Stonebridge Pond, he would pass a crane and come to the Factory Watchhouse. Above him on his left, as the Pond curved round, would come into view more houses and offices on Brents Hill. Last of all he could watch two more sets of mills at the head of the Creek (Lower Mills and Bennet's Mills) before striding out onto the Government wharf, with its crane at work loading barges with barrels of powder.

Jacob records that in the horse-worked mills the animals were protected from injury in the event of mishap by a continuous leather curtain suspended round the mill mechanism. There was no difficulty in finding labour, as the work was light, the Factory offered secure employment, and workers were sure of proper care in the event of accident. Jacob also describes the construction of the mills :

"The contrivance in the erection of the millhouses, though simple is very proper, the covering being made with fir boards, lightly fastened, so that when by accidents, no way to be accounted for, they blow up, the blast, meeting with little resistance, hath sometimes done no other injury to the buildings, than blowing off the roof; though at other times much greater damage hath ensued."

Other measures were taken with the aim of confining, or at any rate reducing, the effect of blast should a mishap occur. One method was to build tall, thick screen walls in strategic positions. Another method, simpler but not so immediately effective, was to plant trees. Once mature, these could help to absorb and dissipate any blast from an explosion; and at the same time they assimilated the various process-houses into the landscape, virtually camouflaging them, though this was not the intention. So it happens that many disused gunpowder works, such as Home Works and Oare Works, are now particularly beautiful places, well endowed with fine trees in their prime. At the Home Works, for example, there are at least twelve types of tree - ash, beech, copper beech, cedar of Lebanon, elm, Cornish elm, horse chestnut, lime, plane, oak, poplar, sycamore and Scots pine. On a number of these the Borough Council has wisely placed a Tree Preservation Order.

It is worth remembering that we owe this splendid legacy to the gunpowder-makers. It is also a sobering thought that it can be said of so few other industrial developments that they have actually improved their settings: even today, unfortunately, many factories only sully their surroundings, reminding us that the crusade against Blake's "dark satanic mills" is not yet half-won.



But whatever precautions were taken to mitigate the effect of small accidents, there was nothing that could be done to prevent damage over a wide area when a large explosion occurred. The history of the gunpowder industry in Faversham, as elsewhere, is studded with a long series of accidents of this kind. Seven years before Jacob's 'History' was published there had been one which had damaged the monastic buildings of Davington Priory, and in April 1781 there was a far worse one which destroyed many of these buildings and did widespread damage in the west of the town. Over 3 tons of powder exploded, destroying the corning-mill and dusting-house (where dust was removed from the powder after corning). A house in Tanners Street was blown down, many others lost their tiles, and West Street was blocked with debris. The explosion, in which three men were killed, was heard as far away as London; in Canterbury many people thought there had been an earthquake; and the pillar of flame was seen as far away as Thanet. Altogether, the cost of the damage was estimated at nearly £1,500.

### 5 Expansion of the Royal Factory

Following this disaster the future of the Royal Gunpowder Factory was re-assessed. One view was that the Government would do better to abandon the Factory and revert to its original practice of buying powder from private firms, and this argument carried so much weight that by 1783 Pitt, the Prime Minister, was on the point of recommending to Parliament that the Factory should be sold. At the eleventh hour, however, Major (later Lt.-Gen. Sir) William Congreve, the Deputy Comptroller of the Royal Laboratory at Woolwich, produced hard facts and figures to show that the Faversham Factory ran at a profit, and suggested that if this were ploughed back to provide for improvements much better powder could be produced. His advice was taken, and in 1786 work on the more dangerous processes was transferred to a new site well north of the town, between what we know now as Oare Road and Ham Road. These were to become known as the Marsh Works.

Within the Factory there was a tightening-up of safety precautions, and in October 1785 a stringent set of works regulations was issued. These were very soundly formulated, and indeed were to serve as the basis for all later rule books in the industry. They are worth quoting in full:

If any workman belonging to the Royal Mills wears his slippers out of those parts of the Works where they are intended to be used for safety, or wears his own shoes into any of the said works, any such workman is to be chequed a day's pay for the first offence and if they should so far forget the duty they owe their country as a second time to run the risque of blowing the works up, through such negligence they are to be discharged and on no account to be entered again.

(The heels and soles of ordinary shoes were of course secured,

then as now, with iron nails, which could strike dangerous sparks off stones, etc.)

- 2 The respective officers will please to give the strictest orders for having the several works cleaned out whenever they require it, and the cleaning is not to be confined to the floors only but to every part of the machinery and buildings to prevent any accumulation of dust, which in a powder manufactory must be attended with the greatest danger.
- 3 The hinges of all doors and window shutters are to be kept well oiled, also the pulleys over which the window lines go and the grooves in which the sashes slide to be brushed and scraped as often as occasion requires to prevent any dangerous friction. The cogs, axles and other parts of the machinery to be kept well soaped and oiled as has hitherto been the custom.
- 4 The pulleys belonging to the valves of the powder stoves must be carefully examined and if there is a possibility of the ropes rubbing against wood or if the sheaves of the pulleys are made of wood they must be altered, so that the ropes may rub against copper, and the sheaves be made of the same metal.  
(It was in the stoves that the powder was dried).
- 5 Whenever the powder tumbrils are required to come near a building in which powder is contained, brick rubbish must be laid on the ground after it has been very carefully examined that no flint or other stones remain therein.
- 6 Each of the corning houses are to be completed with canvas receivers in the dust troughs and a canvas curtain similar to that ordered for No 1 corning house.
- 7 When barrels of gunpowder are lifted out of boats to be store in the magazines or powder vessels, the strictest attention must be paid to have them brushed all over with a soft brush to prevent any grit hanging to them. The wheelbarrows on which they are to be carried, the hold of the vessel in which it is to be laid to be cleaned in the same manner.
- 8 All the wheelbarrows which are used to carry powder are to be fitted with copper hoops and gudgeons instead of iron.
- 9 The floors of the cooperage must be kept as clean from sand or gravel as the magazine and the coopers must work in their magazine slippers to prevent any grit adhering to the barrels or charge tubs, and before any of the articles are issued from the cooperage they must be well brushed and cleaned.

Even with all the expansion that had taken place, the Faversham Factory soon failed to keep pace with Government demand, and in 1787 the Board of Ordnance acquired another old-established

private works at Waltham Abbey. Here, as at Faversham, a programme of modernisation was found necessary, and workers were sent to the Faversham Factory to study up-to-date methods. That at this period Faversham was well in the lead in gunpowder technology is also clear from the fact that J Stevens, one of the staff, was asked to give expert advice in 1798 when a consortium won a licence for the manufacture of gunpowder at Lowwood, near Haverthwaite, in Furness.

It was in the same year, and possibly even in connection with the same venture, that John Ticking, the Master Worker at the Faversham Factory, drew a series of sketches of the various processes in use. This is the earliest graphic survey of its kind, and though the originals seem to have been lost, they were fortunately reproduced in 1909 in 'The Rise and Progress of the British Explosives Industry', edited by E A Brayley Hodgetts and published by Whitaker & Co. Later, more sophisticated, and quite invaluable to the historian, is the 'Treatise on Gunpowder' written in 1830 for the Board of Ordnance when the future of the Waltham Abbey factory was in the balance. It exists only in manuscript and can be consulted in the Public Record Office (reference Supply 5/672). Though the exquisite scale plans and drawings illustrate plant and equipment at Waltham Abbey, they can also be taken as a pretty accurate illustration of practice at Faversham. Nothing is known about Frederick Drayson, the author of the 'Treatise', but it is just possible that he was a Faversham man, for in the Parish Church there is a monument to Charles Drayson, who died on 31 December 1830.

By the time of the Napoleonic Wars output at Faversham had been stepped up to between 535 and 580 tons per annum. The labour force numbered nearly 400, or just under a quarter of the total male population of the parish of Faversham at the time (1,878). Nearly £250 a week was drawn in salaries and wages, the most highly-paid employees being the Storekeeper (£100 a year) and the Master Worker (£90). The two Carpenters (£62) were better paid than the two Clerks (£54 and £36), and bottom of the scale came the Hoy Master (£31) and his mate (£23). Production was continuous, shift-work being in operation; and, as in most powder factories by this time, an assembly-line technique was in use, whereby the manufacture of the powder was gradually completed as it passed down the stream. Despite all the safety measures, explosions still occasionally occurred, and following one in 1810 it was planned to sink some of the process-houses below ground level. In 1794 the Royal Factory raised its own Company of Volunteers (or Home Guard, as it might have been known in the last war) under the command of the then Storekeeper, William Sumpter. The same year the Royal Powdermill Volunteers, as they were called, paraded before George III at Maidstone. 200 strong, they were armed with four 6lb pieces of artillery. The unit was disbanded in 1810.

## 6 The Royal Factory sold to John Hall

At the end of the Napoleonic Wars the demand for gunpowder dropped a good deal, and the Government leased the Home Works to John Hall, of Dartford. Hall, an engineer who also founded the Dartford engineering firm of J & E Hall Ltd (still in existence today), had become interested in the gunpowder industry, no doubt owing to the success of the Dartford factory, and in 1812 had acquired the still independent Oare Works from the heirs of Stephen Gillow, of Cooksditch in East Street. In 1825 the Government decided that they could afford to dispose of the Home Works for good, and at an auction at the Ship Hotel it was bought by John Hall and Son for £17,935. Seven years later the Marsh Works were let to the same firm, who bought them outright in 1854. Thus the original (Home) Works, the Oare Works and the Marsh Works were now in common ownership.

Production continued, but at first - in peacetime conditions - at a lower level, and in 1835 the Municipal Corporations Commission in its report on the Borough of Faversham found that the value of cottage property in the town had decreased as a result of the withdrawal of the Government interest. More uncertain conditions of employment were probably reflected in the formation in 1830 of the Davington (i.e. Oare) Factory Friendly Society, a workers' benefit society, which in 1882 was still in existence and holding its meetings at the White Horse in West Street.

Not that the employers did nothing for the welfare of their workers. In 1848 one of the Hall family, William Hall, who lived at Syndale, Daniel Judd's old house, established a girls' school in the building now occupied as a bungalow on the edge of Stonebrid Pond (almost opposite the entrance to St Ann's Estate). In 1861 the school moved to new and larger premises in Tanners Street, on land provided by Hall, and it remained in use until the present Ethelbert Road schools opened in 1907. The vacated building became the Empire Picture Hall, Faversham's first cinema, in 1910, and much later it was converted for its present use as the town's Roman Catholic Church. Another local church, the Brents Parish Church, was built by William Hall's wife in his memory in 1881. Mrs Harcourt Rose, as she became after her remarriage, also built the Cottage Hospital in memory of her husband in 1887.

## 7 The First Guncotton Factory in the World

Scientists were constantly seeking explosives more powerful than gunpowder, and in 1846 guncotton was introduced. It consists of purified cotton, steeped in a mixture of equal parts of nitric acid and sulphuric acid, and afterwards dried, retaining the appearance of cotton wool. John Hall and Son were quick to

obtain patent rights and in October 1846 decided to build a guncotton factory - the first in the world - at the Marsh Works. Within a month they were advertising the new product, which they claimed was six times as powerful as ordinary gunpowder.

Production started shortly afterwards, but about six months later, on 14 July 1847, was summarily curtailed by a disastrous explosion, in which some 20 people lost their lives. Two buildings at the western end of the Works blew up in quick succession, and the noise was heard within two miles of Maidstone. An eye-witness account of the scene of the disaster was published in 'The Times' and reprinted in the 'Illustrated London News':

"The roofs of all the buildings within about a quarter of a mile of the explosion are completely stripped of their tiles, and the walls are much shaken. Even in the town of Faversham, fully a mile distant from the scene of the disaster, windows were broken, and the houses otherwise damaged in some instances. On the opposite side of the stream which forms the northern boundary of the Marsh Works is a field of wheat of some extent. The explosion has completely blasted this over a space of about two acres, and the ears, drooping and discoloured, present a scene of desolation in perfect character with the adjoining ruins. The willow-trees which skirt the bank of the stream referred to, and, indeed, all the trees within about 50 yards of the buildings Nos. 3 and 4, are torn up by the roots, and scattered about in all directions. Those more distant are less seriously injured, but the foliage of all within a very large circle is wholly destroyed. One of the most remarkable effects of the explosion is the removal, as it appears almost bodily, of the enormous mound of earth skirting the No. 4 stove. Another instance of its power was shown in the forcible ejection from a deep well of two massive pumps, the leaden pipes of which, nearly 20 feet long, were drawn up and thrown to a very considerable distance."

Following this explosion the guncotton factory was immediately closed, and the new invention was not taken up anywhere else for nearly ten years. Remaining stocks of the explosive were buried in the vicinity.

The manufacture of gunpowder at the Marsh Works continued, however, and indeed the factory expanded to cope with the increased demand which resulted from the Crimean War (1854-1856). With factories belonging to two other firms, it met the bulk of the Government's requirements. Another new explosive - dynamite - made its appearance in the '60's, and the inventor, Alfred Nobel, offered the British patent rights to John Hall and Son for £500. This time, however, they decided that discretion was the better part of valour, and declined the offer. With less fundamental new developments, however, they were not so cautious, and in 1876 began the manufacture in this country of pellets (i.e. gunpowder in the form of compressed cartridges), which enabled the effective strength of blasting charges

to be increased by 25%. Meanwhile, on 28 December 1867, there was a serious explosion at the press-house and corning-house at the Marsh Works, and following this the Works was completely remodelled.

For a long period in the 1870's John Hall and Son had difficulties with Major (later Colonel Sir) V.D. Majendie, RA (KCB), who had been appointed H.M. Inspector of Gunpowder Works in 1870. Evidently an officer of great diligence, Majendie refused to turn a blind eye to any apparent infringement of the gunpowder legislation, be it serious or seemingly insignificant. Clearly he believed - and with every justification, in the light of experience - that even the smallest lapse might have disastrous results. But to John Hall and Son he appeared over-zealous and officious, and at last in 1876, when the effects of the Explosives Act 1875 were beginning to be felt, they took the unusual step of printing extracts from the correspondence they had had with him over the past three years. Beneath the velvet prose the iron determination of either party is ill-concealed, and as models of nasty letters written in a nice way these would be hard to surpass.

Most of them concern technical matters which, though of much interest, are outside the scope of this paper. One exchange, however, is of more general interest and is worth quoting in full:

29th October 1874.

Home Office  
Whitehall  
S.W.

To John Hall & Son, Faversham

Gentlemen,

I have the honour to inform you that a report was recently received by this Department from the Chief Commissioner of the Police of the Metropolis, relative to a van containing 20 barrels of Gunpowder, which had been loaded at Blackwall Stairs for conveyance to Paddington, and which was observed on the 5th inst. by Police-Constable 147 K, Pope, who found that the head of one of the barrels had come out, and that the driver was placing it in again. I caused further inquiry to be made, and it appears that the powder in question was consigned by you to a customer in Birmingham. The carman was John Yeo, No. 35, Nelson Street, Long Lane, Bermondsey. On being questioned, he stated that he placed the barrel on end and another barrel on the top of it, and that the head gave way.

It is my duty to lay the whole case before the Home Secretary, and I am instructed by him to call your immediate and serious attention to the matter, and to point out to you that a barrel which admits of being broached so readily (according to the carman, by the simple placing of another barrel upon it) is not a safe or proper barrel in which to issue powder; and I am further directed to inform you that in the event of a similar occurrence being repeated

the Home Secretary will feel it necessary to institute proceedings against you for sending out Gunpowder in barrels not secured as to prevent the powder being scattered in the passage (see Section 20 of the Gunpowder Act).

I have the honour to be, Gentlemen,  
Your obedient Servant,

(signed) V.D. Majendie, Major, R.A.

H.M.'s Inspector of Gunpowder  
Works.

2nd November 1874.

Faversham

To Major Majendie, R.A.

Sir,

We have had forwarded to us from our London Office your letter of the 29th ultimo, giving us the details of the enquiry you had made as to a broken powder cask which had been observed by the police on the 5th ultimo.

We had heard of the incident in question, and had made it the subject of grave consideration with all concerned, and we have now again assembled all our coopers and headers-up of casks, and in the presence of our Manager and Foreman have read your letter to them and enforced all its points in the most emphatic manner.

We pay the highest wages to coopers, we use only the best oak staves, and we endeavour to retain in our employ as coopers only men who have a sense of responsibility and character, on purpose to ensure the best casks that can be made. We are taking additional measures to ensure still further inspection and supervision in this department, and we can assure you that no expense and no trouble shall stand in the way of our attaining as nearly perfection as possible in this important branch of our business.

We have the honour to be, Sir,  
Your obedient humble Servants,

(signed) John Hall & Son.

8 A Visit to the Faversham Factory in 1897

In 1896, on the retirement of the existing partners in the firm, John Hall and Son was converted into a private limited company. By now there were a large number of gunpowder-manufacturers, big and small, all selling in competition with one another, and the climate was ripe for a measure of rationalisation. The first firm

to make a series of successful take-over bids could expect to reap a rich reward from the economies that would undoubtedly follow. The lead was taken by the firm of Curtis's and Harvey, which had been formed in 1820 to take over the Hounslow mills then owned by Messrs W.G. Harvey and Grueber. From the very start they had pursued an aggressive policy of expansion, acquiring existing businesses in Bedfont, Middlesex; Glenlean, Argyllshire (1844); Tonbridge (1859); Glyn Neath, Breconshire (1864); and Millhouse, Kyles of Bute (1886). The climax to this period of growth came in 1898, when Curtis's and Harvey Ltd was incorporated as a public company. At the same time it took over eight more firms, including both John Hall and Son Ltd of Faversham and Pigou, Wilks and Laurence Ltd of Dartford. The new firm had an issued capital of £458,000 in £1 shares (£600,000 authorized), as well as a similar amount of Mortgage 4 $\frac{1}{4}$ % Debenture Stock, and in all its factories employed a total labour force of about 1,500. The only larger private firm was Nobel's Explosives Company Ltd, which had been originally formed in 1877 to exploit the British patent rights of the innovations introduced by Alfred Nobel, the Swedish inventor (1833-1896) who endowed the famous Nobel Peace Prize and other international awards. Its main factory was at Ardeer in Ayrshire.

Some time between 1896, when the firm became a private limited company, and 1898, when it was taken over by Curtis's and Harvey Ltd, the Faversham works of John Hall and Son Ltd was the subject of an article in the 'British Journal of Commerce'. As 'A Visit to Messrs. John Hall & Son, Limited: Works at Faversham, Kent', this feature was reprinted as a little 32-page illustrated booklet, complete with fetching advertisements of the period, from one of which we learn that

"Lord Walsingham set out last August in order to beat record by killing 1,000 grouse to his own gun or guns, and when one would have thought that smoke would be an item to be reckoned with, he had his cartridges loaded with  $3\frac{1}{8}$ drs. of Hall's FIELD B. POWDER, and his lordship managed to kill 1,070 head of driven grouse."

As a full account of an explosives factory of the period, this booklet is of considerable value, and it is worth quoting several passages from it in full:

"The works, as at present existing, extend to more than 250 acres in area, and encroach on no less than six different parishes. The number of operatives is some three hundred. The business connection is ubiquitous and world-wide, and includes the supply of several governments. The issue of many battles has, doubtless, been largely aided by the innocent-looking black and brown powder from Faversham, whose appeal is generally found to be of more avail than either argument or arbitration."



"It must not be assumed, though, that the dogs of war alone watch over the interests and productions of the firm. The manufacture of sporting and blasting powders is immense. Big game hunters and other sportsmen of all degrees are fully aware of the importance attached to the quality of the powder on whose trustworthiness they stake their reputation, and railway and mining companies, and many other undertakings whose operations require the use of Gunpowder, and who realise how much depends upon its manufacture, have long looked to Faversham for the supply of the most carefully prepared and skilfully blended that can be obtained.....

The main works... are situated at about a mile from the quaint old-world Kentish town of Faversham. The nature of the manufacture of Gunpowder demands the precaution of careful isolation. Some of the mills, known as the home works, are almost in the town itself; the remainder occupy an extended semi-circle to the north and west.

We were met at the station by Mr. J.W. Cook, the works manager, who, after our visit to the home works, forearmed us with a general description and explanation of the various operations of the business. The elements of Gunpowder are, as is generally known, saltpetre, charcoal and brimstone, thoroughly mixed, in the percentage proportions of 75, 15 and 10 respectively. ...

Saltpetre ... is a natural product gathered from the surface of the earth. It is comparatively impure on importation from Bengal, and there are large departments at Faversham where it is freed by steam and filtration from the chlorides and sulphates whose presence is undesirable.

Charcoal, chiefly burnt from the wood of young alder trees, is made by the firm themselves in large cylindrical chambers. This operation demands great care and skill, as the rate of combustion of the charcoal, when incorporated in the Gunpowder, depends on the temperature at which it was originally charred. Charcoal which has been prepared at great heat is, by the expulsion of most of its hydrogen and oxygen, converted into almost pure carbon, and is proportionately dense and incombustible; whilst, if charred at a lower temperature, it is more volatile and burns freely.

Sulphur, the third ingredient of Gunpowder, is used to assist combustion, because of the low temperature at which it ignites. The sulphur is first melted in a copper and run into moulds, from whence it is taken and broken up for further melting in a chamber, whence the fumes, known as flowers of sulphur, pass into a dome, whilst the sublimated and purified portion for use runs out in a consistency somewhat resembling that of treacle.

Sufficient stress cannot be laid on the urgency of the utmost skill in the preparing and purifying of these three elements of Gunpowder ... Charcoal, in particular, plays a most important

part, and the enormous quantity of wood in growth by the firm betokens the value they attach to wide selection.

The three ingredients being thus fitted for use, are mixed in proper proportions in a cylindrical mixing machine, which revolves in reverse direction to interior spindles. The mixture then passes in charges of sixty pounds to the incorporating mills. The firms have no less than fifty pairs of the latter in different clusters.

An incorporating mill consists of a circular stone or iron bed on the floor of a small shed, and the powder is thoroughly mixed by two stone or iron edge runners of about four tons each in weight, which revolve in the bed by means of gearing under the floor. A couple of ploughs throw the mixture continually in the path of the runners. The powder is occasionally moistened by water, and in the ultimate finishing of the Gunpowder a certain percentage of moisture must remain, as the absence of presence thereof has a considerable effect in the variation of quality required. A decimal fraction of moisture above or below regulates proof in powder supplied to the Government would ensure rejection. The presence of moisture in the mills also prevents dust and minimises danger.

The mills, which run day and night, require otherwise little attention. Above each pair of runners is a water tank, which, in the event of an explosion, immediately empties and floods the mill automatically, and each other mill in the cluster would be simultaneously treated likewise.

Every possible precaution against accident is, in fact, rigidly observed throughout the works. The operatives are clothed in fireproof garments, no speck of dust or foreign matter is anywhere visible, and the various mills, magazines, and workshops are all isolated, and protected by traverses and tree clumps.

Fire buckets are everywhere, and, moreover, a waterway system interlaces the whole area in every direction. Most of the conveyance of powder is by water, and it is everywhere present. The remarkable immunity the works have long enjoyed from any serious accident is a testimony to the care taken for the operatives; and one must also comment upon the extremely kindly and cordial relations between employers and employed which are everywhere apparent.

To proceed to the course of manufacture. The Gunpowder, after leaving the mills, where it is ground for a time varying with the quality and description required, passes to the breaking-down sheds; and thence to the sheds, where it is pressed between plates into cakes, by hydraulic rams.

These cakes are then granulated by a machine with gun-metal

teeth, and the powder is subsequently polished with Spanish graphite by revolution in tubs in rows on long axles. The powder is finished by "stoving" or drying on racks heated by steam pipes, and is then ready for flasking, casing and packing. Messrs. HALL have their own coopering and tin-makers' departments, which are always kept busy. There is much ingenious machinery in the tin-making room, and we saw a powder-flask completed in a few minutes from the sheet metal.

The firm employ a large number of women operatives. We visited many sheds where these were making the compressed cartridges for blasting purposes, in which Messrs. HALL do an enormous trade, and of which they were the original makers in Great Britain; and others where cartridge filling, wadding, and shotting were proceeding.

Many also were occupied in cartridge filling with the firm's speciality - the new, but already world-known, "Cannonite" smokeless sporting and rifle powder. This powder is not only smokeless, but is unaffected by heat or damp; and even if immersed in water, it is as sound as ever on drying. The grain is very fine and even, rapid in ignition and almost free from fouling. ...

We entered other sheds where "Field B" and other well-known cartridges of the firm were being loaded, and included in the tour were a number of magazines and glazing sheds. We passed several large woodstacks for charcoal making, and on a creek, connected with the sea, was floating one of the private barges which convey the powder to Messrs. HALL'S large magazine at Tilbury.

Messrs. JOHN HALL & SON, LIMITED, have a very great output of all kinds of powders - military, blasting, and sporting, which are again subdivided into many classes and qualities, each of which has its department of skilled labour. We saw in the offices at Faversham several specimens of the firm's productions, which range in size from enormous cartridges to dust-like powder. ... The house of one of the Managing Directors, Mr C.L. Watson-Smith, stands prettily embowered at the home works. ... (The Factory has) been quoted by an eminent expert as the most model extant. ...

The works themselves, with their almost idyllic setting of winding waterways and leafy glades, are more akin to a beautiful private park than one's idea of an industrial centre."

One of the most notable achievements at the Faversham factory came shortly after the amalgamation with Messrs Curtis's and Harvey when in 1899 it succeeded in devising the only explosive of the gunpowder type which passed the Woolwich test for the 'Permitted List'. This List was issued by the Home Office under the provisions of the Coal Mines Regulation Act 1896, and it was restricted to those charges which could be used for blasting purposes without risk of igniting fire-damp. First produced in the form of "Bulldog"

pellets, and later known as "Bobbinite", it was the only low explosive on the 'Permitted List', and was in great demand from the start.

#### 9 Expansion at Uplees: The Cotton Powder Company

After the Faversham disaster of 1847 improvements were gradually made in the processes used for the manufacture of guncotton, and after a time it began to be made again in this country. One of the earlier firms in the field was the Cotton Powder Company Ltd, registered in 1872, which in the following year established its first factory on the shore of the Swale, about half-a-mile north of the hamlet of Uplees. The site was in the parish of Oare, and for this reason the factory was sometimes referred to as the Oare Works.

The choice of this position had more to do with its flatness and isolation and the availability of skilled and experienced labour than with other considerations, such as the local availability of raw materials. Water-power was no longer a factor, as machinery could be driven by steam-engines, which could, if necessary, be sited well away from it. Transport was no problem, as the new works faced a navigable tideway.

At first the new concern made Punshon's Patent Controllable Cotton Gunpowder or Guncotton, in which sugar was used to 'control' the action of guncotton. Owing to its tendency to absorb moisture however, this compound proved a complete failure, and in 1874 it gave way to "Tonite", an improved version of guncotton, which was patented in the same year by George Trench, the Faversham factory manager, in conjunction with two other explosives experts. (George Trench's home in the '80s was 49 Abbey street).

"Tonite" was an introduction of great and lasting importance which assured the future of the new factory. There were three different varieties, but the one generally used was an intimate mixture, in approximately equal parts, of guncotton and barium nitrate. These ingredients were ground together in an edge-runner mill and the mixture was formed into blocks or slabs of any desired size or shape by means of hydraulic presses.

Commercially, "Tonite" won prompt acceptance in the mining industry, for which it was made in the form of candle-shaped cartridges, fitted at one end with a recess to take a detonator, and covered with paraffined paper. A dense explosive, containing its own oxygen for complete combustion, it was safe in action, and for many years had the advantage over dynamite that the railways would carry it under the same conditions as gunpowder while they would not accept dynamite. To cope with the demand for it another factory was opened by the Company at Melling in

Lancashire in 1880, and it was also produced in San Francisco by the Tonite Powder Company. Large quantities of "Tonite" were used in the construction of the Manchester Ship Canal from 1887 to 1894.

Shortly after the introduction of "Tonite" Trench introduced his rocket distress signal containing the new explosive, and this was adopted exclusively by the Board of Trade. Large quantities were produced at Faversham, and in 1938 the "Tonite" rocket distress signal was still being supplied to the Merchant Navy as the only official signal. The explosive itself also gained official approval, for the Trinity House authorities commenced, and in 1938 were still continuing, to use it for lighthouse sound signals and also for wreck disposal. Devices based on "Tonite" are still being made and marketed today (1967) by Imperial Chemical Industries Ltd, and the trade name is still used.

In 1887 Trench, a prolific innovator, invented a fire-extinguishing compound designed to eliminate flame when "Tonite" cartridges were used in mining operations. Though the composition proved successful, it was another fifty years before attention was given to sheathed explosives of this kind.

But production at Uplees was not limited to "Tonite" and its derivatives. With spare capacity after the Melling factory opened in 1880, the works began to produce a range of ammonium nitrate explosives, one of them known as 'Faversham Powder', though in the end most of it was made at Melling. In 1892 a nitro-glycerine plant was opened at Faversham, and the manufacture begun of gelatinous blasting explosives for quarries and coal-mines. Production of cordite began in 1896, and by 1911 Faversham was also making hand and rifle grenades, fulminate of mercury, detonators and electric detonator fuses.

With all this expansion, the factory grew rapidly. In 1876, within three years of its opening, there were already 33 buildings in the works area, and by 1899 the number had risen to about 150. Employment opportunities gradually increased too: there were over 70 staff in 1882, and 120 in 1889.

Inevitably there were accidents. In 1896 a fire at the factory offices destroyed the firm's books and records. Three years later there was another incident, and the works was visited by H.M. Chief Inspector of Explosives, who described them in the following terms:

"The buildings are for the most part placed at suitable distances apart to provide against the communication of explosion from one to another, some being surrounded by substantial mounds. It would be impracticable to place the buildings of a factory so far apart as to ensure that heavy pieces of wood and parts of machinery could not be expected to be projected by an explosion in one building on to others;

the work could not readily be carried on with buildings at such distances from one another, and the area of a site for a factory for explosives would have to be so extended as to be prohibitive to manufacture with profit. Trees have been largely employed as a protection to the buildings against projected debris. Unfortunately, owing to the saltings on which the Cotton Powder Factory is situated, it has hitherto been found impossible to make either trees or shrubs grow there."

By 1909 the Uplees factory had grown still further. It occupied about 250 acres of land, and comprised about 227 buildings of various kinds. Steam, for driving machinery, boiling chemicals and drying explosives, was raised by seven boilers in three separate boiler-houses, between them capable of developing 1,800 H.P. Owing to the unstable nature of the subsoil chimneys could not be built, and draught was fan-induced. Dispersed about the factory there were 25 smaller steam-engines, rating 400 H.P. in aggregate, and there was a single gas engine.

An electric generator provided current for lighting the plant for the recovery of volatile solvents, but otherwise lighting was by gas, the factory having its own gas works capable of an output of 20,000 cubic feet a day. Water was drawn from three artesian wells by pumps with a combined capacity of about 14,000 gallons an hour.

In almost every way it was a very modern factory for its date. As many services as possible were centralised, and there were for example two compressed air mains (of 80 lb and 40 lb pressure), three hydraulic mains (one high-pressure and two low-pressure), and over three miles of large-bore steam pipes used for drying and boiling purposes. The whole works was served by mains and hydrants from a hydraulic pressure fire installation, and a full head of water could be turned on any building in the course of two minutes.

The Company owned its own fleet of eight barges, together with a dock and slipway where any necessary repairs could be carried out. Within the works there was an extensive system ( $4\frac{1}{2}$  track miles) of narrow-gauge (3ft 3in) tramways, with a suitable range of rolling-stock.

#### 10 Two More Factories in the Faversham Area

In 1904 Messrs Helcke established a factory near Harty Ferry (also in the parish of Oare) for the manufacture of fulminate of mercury, a product used in detonators. This works was taken over four years later by Messrs. Eley Brothers Ltd, an old-established London firm specialising in the production of sporting ammunition. During the 1914-1918 war the Company expanded its range to include gun-cotton, and its premises were

extended.

In 1913 there were also plans by a much larger firm, Nobel's Explosives Company Ltd, to build a huge factory on a 923-acre site on the other side of the Swale, at Harty itself. Its main factory at Ardeer had built up a thriving export trade, and it needed additional capacity, preferably in the south of Britain. The site on Harty, with its easy access to the Thames estuary, seemed ideal, and it was bought and a draft licence obtained from the Home Office. However Nobel's underestimated the strength of the feeling their proposals would arouse, and in July 1914 the Sittingbourne magistrates refused permission for the project.

In the meantime one more explosives firm had been established in the Faversham area. This was the Explosives Loading Company, which in 1912 began building and equipping a factory (next to the premises of the Cotton Powder Company Ltd) for loading TNT into shells and other munitions. Advice was given by experts from the Cotton Powder Company, and the factory went into production towards the end of 1913 under the direction of Capt John Coke, RN.

For a time at the beginning of the 1914-1918 war this was the only private filling factory for high explosives, but in 1915 a similar works opened at Pembrey, Carmarthenshire, where Nobel's Explosives Company Ltd had had to build the TNT factory they had wanted to build at Harty. The worst disaster in the history of the Faversham explosives industry occurred on 2 April 1916, when over 100 employees lost their lives in a TNT explosion. Like many serious accidents, it was triggered off by one small incident. Some empty bags outside a TNT store caught fire and then set fire to the store itself, which contained 80 tons of TNT as well as a quantity of ammonium nitrate. Even at this stage it was possible that disaster could be averted, and attempts were made to put the blaze out, while a large number of workers looked on. These efforts failed, and after about an hour the TNT blew up, doing vast damage to the factory and to the adjacent works of the Cotton Powder Company. About 70 of the victims were buried in the mass grave that is so dignified and notable feature of the Borough Cemetery. The factory was afterwards rebuilt and remained in operation till the end of the war, after which it only executed small orders. The damage was also made good at the premises of the Cotton Powder Company, where production of cordite during the war was second only to that of the Nobel factory at Ardeer.

With the expansion of the three factories in the Uplees- Harty Ferry area during the war there was a large increase in the labour force required. Passenger transport for workers in the factories was provided by a light railway built from a station just west of the top of Dark Hill (Davington). The remains of this station, and of a few earthworks along the line, are still visible, though the track was lifted many years ago. There was no link with the South Eastern

and Chatham Railway's main line from Dover and Thanet through Faversham to London.

The patriotic spirit that pervaded workers in the Faversham factories during the 1914-1918 war is well summed up in these verses, issued broadside-fashion on a postcard by the printers F. Austin & Son in 1916:

THE GIRLS WITH YELLOW HANDS

The guns out there are roaring fast; the bullets fly like rain  
The aeroplanes are curvetting, they go and come again;  
The bombs talk loud; the mines crash out; no trench their  
might withstands.

Who helped them all to do their job? The girls with yellow  
hands.

The boys out there have hands of red; it's German blood,  
and warm.

The Germans know what's coming when the English swarm -  
Canadians and British, and the men from Southern lands.  
Who helped them all to do their job? The girls with yellow  
hands.

The boys are smiling though they rush against a barbed trench;  
The girls are smiling though destruction hovers o'er their  
bench;

And when the soldiers sweep along through lines of shattered  
strands,

Who helped them all to do their job? The girls with yellow  
hands.

If one or two of these lines now seem repugnant in their virulence, it must be remembered that at the time Faversham men were dying at the front, Faversham workers being bombed at the explosives factories, and Faversham people were tending war casualties at the hospital improvised at The Mount. The yellow hands of the girls in the verse above were caused by the nitric oxide present during the manufacture of TNT. The girls' hands were protected, but if the protective clothing became loosened the yellowing of the skin occurred.

11 The Old Factories Close - and a New One Opens

While manufacturers were hard put to it to keep pace with the growing demand for explosives during the war, they realised well before the Armistice that a period of retrenchment was inevitable after the war. After negotiations between the various firms, a holding company, Explosives Trades Ltd, was formed in November 1918 with an authorised capital of £18,000,000. Thus most of the major businesses in the industry amalgamated, the Faversham firms involved being Curtis's and Harvey Ltd, Eley



Brothers Ltd, the Cotton Powder Company Ltd, and the Explosives Loading Company Ltd. The merger was carried through by Sir Harry (later Lord) McGowan, managing director of the largest firm involved, Nobel's Explosives Company Ltd, who became the first chairman and managing director of the new holding company. In two of the Faversham firms Nobel's had already obtained holdings - the Cotton Powder Company Ltd (in 1911) and the Explosives Loading Company Ltd (at its formation in 1912). Not long after the 1918 merger, in 1920, Explosives Trades Ltd was renamed Nobel Industries Ltd, but all this time, as it was only a holding company, the individual concerns retained their own names.

Following the merger there was a rapid process of rationalisation. All the factories in the Uplees-Harty Ferry area were closed within a few years, the cordite factories ceasing production about 1919 and Eley Brothers Ltd's fulminate of mercury works closing in the same year. The oldest group of factories, still trading under the name of Curtis's and Harvey Ltd, were retained, and indeed in 1926 were modernised. In the same year there was another merger in the chemical industry, when Nobel Industries Ltd was amalgamated with other interests controlled by Sir Alfred Mond (later Lord Melchett) to form Imperial Chemical Industries Ltd. Eight years later, in 1934, ICI closed the three remaining factories (the Home Works, Oare Works and Marsh Works) and transferred production to Ardeer.

The town's proximity to the Continent, which had once been an advantage for explosives manufacturers, was now a critical handicap, as it rendered it very vulnerable in the event of bombing or invasion. But till the end Faversham's particular natural advantages still stood it in good stead: two of the three basic raw materials - sulphur and saltpetre - were still being brought in by the Creek, and much of the third - charcoal - was being made from wood grown, charred and ground within the factory areas.

However one factory in the town remains as a link with the explosives industry. This is owned by Heaters Ltd, and was established in 1931 in premises opened in 1924 by the Mexco Mining Explosives Company Ltd. Known as the Abbey Works, the buildings stand on the east bank of the Creek, north of the railway sidings. The firm makes the heater, or chemical energiser, used in a carbon dioxide blasting cartridge which is employed in the mining industry.

## 12 What is Left

What survives today of an industry that was for so long such an intimate feature of the town's economy? Of the more recent factories in the Uplees area there is now very little trace, and the casual visitor might very well suppose they had never even

existed. Most of the marshland in this isolated and attractive spot is now given over to grazing, and has resumed the pastoral appearance it always had before the first factory was built in 1873.

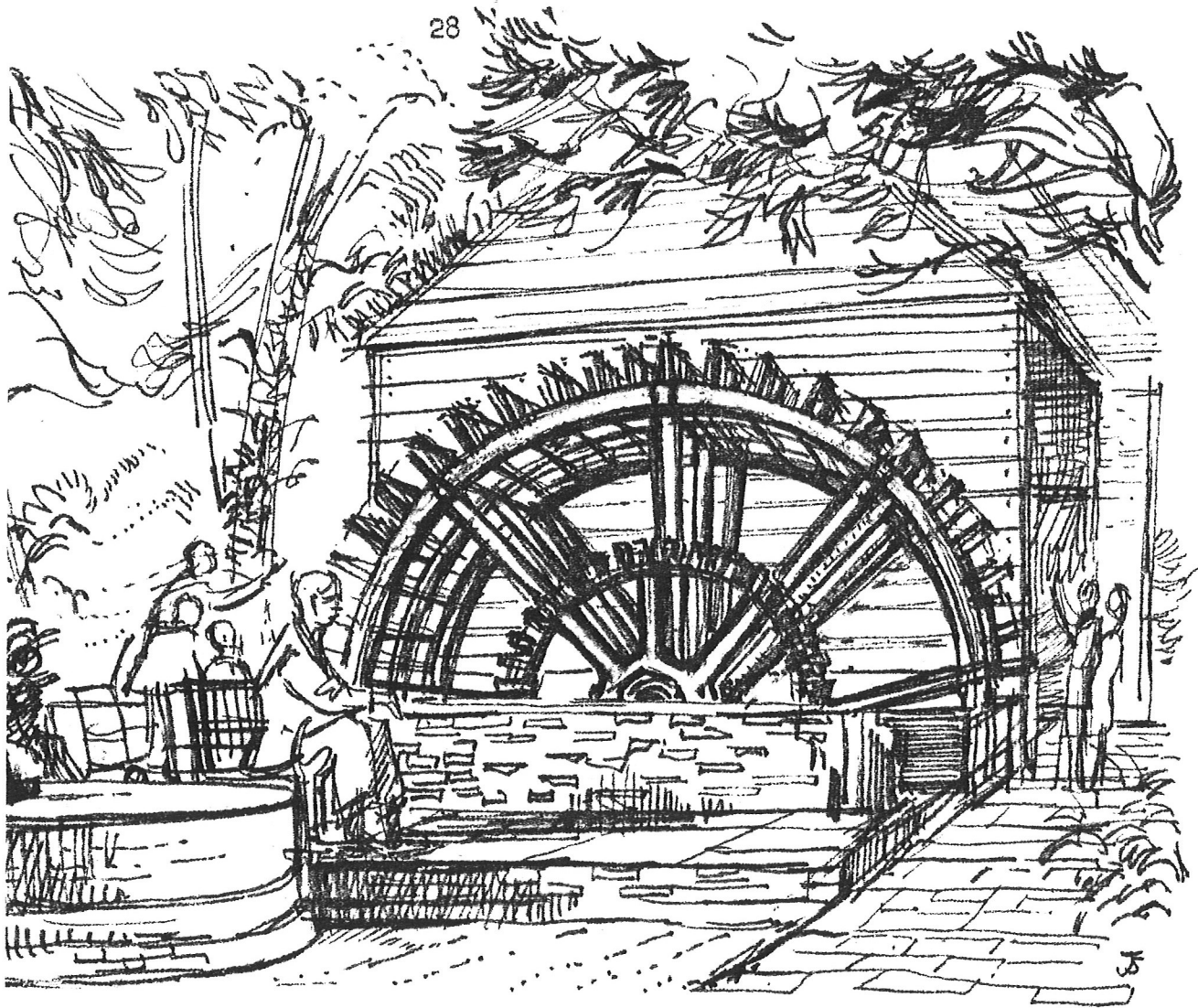
Rather more survives of the older-established factories. The latest of the three, the Marsh Works (established in 1786), has been largely given over to gravel-working, and many of the factory structures were demolished in Spring 1958. Ironically, they were so solidly constructed that they had to be blown up with gelignite. However, a few of the buildings still remain. Near the grading-plant are workshops, offices and stores, still used as such by the present occupiers, the Ace Sand and Gravel Company Ltd. From here a path can be followed along an old tram-track beside a miniature canal to a spot where an artesian well still feebly bubbles in the shadow of immense concrete screen walls. Though so close to Faversham, it is a secluded place, and the remains still impress.

The Oare Works has had longer to mature, and is more typical of a disused gunpowder factory, with its mainstream following an erratic course beneath old trees. The only word for it, as for parts of the Home Works, is bosky. Here, too, gravel-working nearby has resulted in the gradual disappearance of the buildings, though some still survive. There is the old Foreman's House, literally embowered in trees, and now known as Davington Mill. The Victorian single-storey offices and foreman's stores still exist, too, while not far away, but jealously guarded by tall trees, are the sunken remains of Magazine No 1.

Following the track towards Oare, one comes upon the handsome 'White House'. This was occupied by a foreman, too, and beside it was a watermill, the outline of whose wheel can still be seen. A little further on, rising above Oare Pond and Meadow, is another attractive Georgian house, with its front of well-hung mathematical tiles looking for all the world like the real bricks that most people probably believe them to be. This, too, was part of the Oare Works, and it is good to see that it has recently been restored.

But, appropriately enough, most of all survives of the first works to open, the Home Works, now being developed as a private housing estate by Messrs F Parham Ltd, of 173 Pier Road, Gillingham. Most people will know the stone-built entrance lodge, looking rather like a level-crossing keeper's house, in South Road, not to mention the terrace of three red-brick Georgian houses in Tanners Street (nos 50, 51 and 52) that face the site of King's Mills on the other side of the stream.

And everyone knows Stonebridge Pond, with its various streams and miniature inlets, though perhaps not everyone realises that it was once part of a gunpowder works, and that it owes its form to this fact. Some people, it is fair to say, know Stonebridge Pond better than others, and if you are ever lucky enough to be



Part of Chart Mills as they will be after restoration.

allowed on to it you will see a great deal of Faversham that you have never seen before. There are few better places to be on a sunny day, and somehow the Pond seems much bigger than it really is. The cottages on Brents Hill, with their gardens running down to the Pond, not to mention 'The Lawn', the attractive Georgian house opposite, were all part of the Home Works. Down Lower Road, a good half-mile away, pause and look at the 'White House', an even older dwelling, which also belonged to the Works.

Between here and Davington was the heart of the old Royal Factory, and here too is the most important of what survives in the town. Tightly girt with trees so that they are quite invisible from South Road and Lower Road, both only fifty yards away, are the remains of Chart Mills. This group of incorporating mills is the

only one of its kind to have survived in Faversham - or anywhere else in the United Kingdom for that matter. Of three of the mills there survive the stone beds and other remains, and the fourth is virtually complete, looking much as it did two centuries ago, though it has not been used for very many years. With its big water-wheel and massive machinery, it is an impressive irreplaceable link with the past. It is history brought to life. The setting, too, is superb, with its clear rippling stream flashing back sparks of sunlight through the trees and the ever-precise murmuring of the water, with its reassuring hint of repose.

There is to be a streamside walk from Stonebridge Pond, and what better climax to a stroll through an old gunpowder factory than a visit to some of the actual mills? The Faversham Society plans to restore the whole group, and part of the site has already been generously promised to the Borough Council by F Parham Ltd so that the work can be carried out. The Government and the Borough Council respectively have promised contributions of £1,000 and £250 if the Society can raise the other £2,500 that is needed. The aim is to recreate the mills authentically in their setting, giving the impression not of a lifeless museum-piece, but of active machinery which has just been stopped for an inspection. And if funds permit, seating will be provided for visitors who wish to enjoy the peace of this place for a few moments before leaving it.

The Society has published this booklet as one small means of raising money for the project. Its Committee hope that you have enjoyed reading it and will support the Society as generously as you can in its effort to preserve Chart Mills.

### 13 Chronology

As this is the first study of the Faversham explosives industry, it may be helpful to sum up the developments in chronological form.

- 1558-1601 First Faversham gunpowder mills began work during this period, or earlier
- 1653 Home Works being operated by Daniel Judd
- 1673 Much gunpowder being smuggled out of Faversham
- c 1685 Huguenot refugees find employment in gunpowder works
- by 1719 Oare Works in operation
- 1734 Watermills introduced for incorporating process
- 1760 Home Works acquired by Government and becomes Royal Gunpowder Factory
- 1764 St Ann's House built
- 1767 Explosion at Home Works damages part of Davington Priory

- 1774 Annual capacity of Home Works 364 tons
- 1781 Serious explosion at Home Works destroys part of Davington Priory
- 1786 Marsh Works opened by Government as extension to Royal Gunpowder Factory
- 1794 Royal Powdermill Volunteers raised
- by 1798 Oare Works in ownership of Miles Peter Andrews and Frederick Pigou
- 1799 George Finlay born at St Ann's House
  
- 1810 Royal Powdermills Volunteers disbanded
- 1812 Oare Works acquired by John Hall of Dartford
- c 1815 Home Works let to John Hall
- 1825 Home Works sold to John Hall & Son
- 1830 Davington Factory Friendly Society formed
- 1832 Marsh Works let to John Hall & Son
- 1846 First guncotton factory in the world opened at Marsh Works
- 1847 Serious explosion closes Marsh Works guncotton factory
- 1854 Marsh Works sold to John Hall & Son
- 1854-1856 Marsh Works extended
- 1867 Marsh Works remodelled
- 1872 Cotton Powder Co Ltd registered
- 1873 Cotton Powder Co Ltd opens factory at Uplees
- 1874 "Tonite" invented by George Trench, manager of Cotton Powder Co Ltd factory
- c 1880 'Faversham Powder' introduced by Cotton Powder Co Ltd
- 1892 Nitro-glycerine plant opened at Cotton Powder Co Ltd
- 1896 Cotton Powder Co Ltd began to produce cordite  
Fire at Cotton Powder Co Ltd offices  
John Hall & Son become a private limited company
- 1898 John Hall & Son Ltd absorbed by Curtis's and Harvey Ltd
- 1899 "Bobbinite" introduced by Curtis's & Harvey Ltd
  
- 1904 Messrs Helcke open fulminate of mercury factory at Harty Ferry
- 1908 Eley Brothers Ltd take over factory of Messrs Helcke
- 1911 Nobel's Explosives Ltd acquires interest in Cotton Powder Co Ltd
- 1912 Nobel's Explosives Ltd acquires interest in Explosives Loading Co Ltd
- 1913 Explosives Loading Co Ltd opens factory at Uplees
- 1914 Unsuccessful bid by Nobel's Explosives Ltd to build large factory at Harty
- 1916 Disastrous explosion at Explosives Loading Co Ltd factory
  
- 1918 Explosives Trades Ltd takes over all Faversham explosives firms

- 1919 (or shortly after) All factories in Uplees/Harty Ferry area closed
- 1920 Explosives Trades Ltd renamed Nobel Industries Ltd
- 1924 Mexco Mining Explosives Co Ltd open Abbey Works
- 1926 Oare Works, Marsh Works and Home Works remodelled  
Nobel Industries Ltd merges with other concerns to form Imperial Chemical Industries Ltd
- 1931 Abbey Works taken over by Heaters Ltd
- 1934 Oare Works, Marsh Works and Home Works closed
- 1963 St Ann's House demolished

#### 14 Bibliography and Acknowledgements

This booklet is little more than a hasty compilation of facts from a number of different quarters. It is hoped however that at least for the time being it will meet the need for a concise history of the Faversham explosives industry. A revised and enlarged edition is envisaged, and the author will be glad to hear of any errors or omissions. The work is based on the following sources:

- Calendar of State Papers (Domestic), 1649-50 and 1652-53
- Records of the Borough of Faversham deposited in the County Record Office, refs. Fa/JQR 21 (1728), LB1 (1741) and AC5 (1742)
- Edward Jacob, History of the Town and Port of Faversham, London, 1774.
- E Hasted, History of Kent (2nd edition), Canterbury, Bristow, 1798 (Vol VI)
- The Beauties of the Isle of Thanet and the Cinque Ports, London, W Marshall, 1830 (first issued c. 1817)
- Illustrated London News, 17 and 24 July 1847
- MS plan of the Home, Oare and Marsh Works in the possession of Mr Sidney Hogben, of Oare
- Post Office Directory of Kent, London, Kelly & Co, 1874
- Gunpowder Legislation: Copy of correspondence with the Home Secretary and Major Majendie, 1873-1876; Faversham, John Hall & Son (private circulation) 1876
- F F Giraud and C E Donne, A visitor's Guide to Faversham, Faversham, Higham, 1876
- F F Giraud, Extracts from Wills and other Documents relating to the Faversham District National Schools, Faversham, Higham, n.d.
- Directory of Canterbury and Neighbourhood, London, George Stevens, 1882
- Directory of Canterbury and Neighbourhood, London, Stevens, 1889
- Edward Crow, MS notes on the history of Faversham, Faversham Institute Journal, 1889 and 1899
- Haydn's Dictionary of Dates, 21st edition, London, Ward, Lock and Bowden, 1895

- Gunpowder and its Manufacture, Faversham, John Hall & Son Ltd,  
c. 1897
- Report (18 May 1899) by H M Chief Inspector of Explosives on an  
explosion at the Factory of the Cotton Powder Company on 5 May  
1899, London, HMSO, 1899 (ref. C.-9351)
- and E A Brayley Hodgetts, The Rise and Progress of the British  
Explosives Industry, London, Whitaker & Co, 1909
- Faversham & District Directory, London, Vickery, Kyrle & Co, 1921
- Imperial Chemical Industries Ltd and its Founding Companies, Vol  
1, London, Imperial Chemical Industries Ltd, 1938
- Archaeologia Cantiana LVII (1944), p 65
- P D Stebbing, The Old Royal Faversham Gunpowder Mills and its  
Storekeeper, Archaeologia Cantiana LX (1947), pp 65-67
- Catalogue of the Industrial Exhibition held during the Borough  
of Faversham Charter Celebrations 1952
- Dane, A Hundred Years of Faversham History 1854-1954, Faversham,  
Faversham Historical Society, 1954
- H Andrews, The Trade of the Port of Faversham 1650-1750,  
Archaeologia Cantiana LXIX (1955), pp 125-131
- Wilson, Faversham - The King's Port, Faversham, Carmelite  
Press, 1963
- H Simmons, A Short History of the Royal Gunpowder Factory at  
Waltham Abbey, London, Controllerate of Royal Ordnance Factories  
(private circulation), 1963
- F G Hogg, The History of the Royal Arsenal, Oxford, Oxford  
University Press, 1963
- Paul N Wilson, The Gunpowder Mills of Westmorland and Furness,  
Trans. Newcomen Society XXXVI (1963-4), pp 47-65
- Faversham Society Newsletters Nos 5, 8, 9 and 12 (1963-4)
- Johnson, Faversham and Gunpowder - Some Personal Recollections,  
Faversham Magazine, July 1965, Faversham, Faversham Society
- Faversham News, 21 March 1958 and 31 March 1967

For information, assistance and advice the author wishes to thank  
: Elliott C Blee, of Westcliff; Dr F Hull (Kent County Archivist);  
: E Brent-Jones, of Billingshurst; Miss M Reeve, Miss J Wood and  
: D G Justham, of Imperial Chemical Industries Ltd; and Mr & Mrs  
: Johnson, Messrs Peter Hutley-Bull, Geoffrey King, Jack Salmon and  
Andrew Osborne of Faversham

2 April 1967