Newsletter 81 Spring 2025

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Metalled Road Surface, Ickelsham

Newly Discovered Roman Road at Icklesham, East Sussex

Exciting news from a corner of East Sussex for those with an interest in the Roman province of Britannia.

LIDAR images of the fields between Icklesham and Winchelsea indicated possible trackways or geological features. Geophysical surveys of the fields by David Staveley in autumn 2024 provided the basis for an exploratory excavation in November led by archaeologist Cameron Ross. (The figure on p2. shows some of the geophysics results.) To investigate, a 10m by 3m trench was opened near to Icklesham. It revealed, at a depth of about 50cm, a road about 8m wide between two well-defined ditches. The road was metalled with iron slag except for one patch where it appears that it had been removed by robbers. A piece of glass found in the north ditch has been confirmed as Roman from the third century AD. Two iron ox shoes were also found. The photo shows the excavated portion of the road.

Based on this first excavation it seems that the Roman provincial network extended to Winchelsea. If this is confirmed by further work, it will be the first major Roman road discovered in east Sussex since the 1940s.

The confirmed Roman road nearest to Icklesham runs from Sedlescombe northwards to Bodiam, where it crosses the river Rother, and to Rochester.

There it joins Watling Street, the road between London and Canterbury. A Roman road between Sedlescombe and Westfield was proposed by Margary in 1947, in an article in the Sussex Archaeological Collections, but its route has not been confirmed by recent archaeology. Winchelsea to Westfield is about 9km and Westfield to Sedlescombe is about 4km. The newly discovered road is at least 9km in length and could extend to 13km.

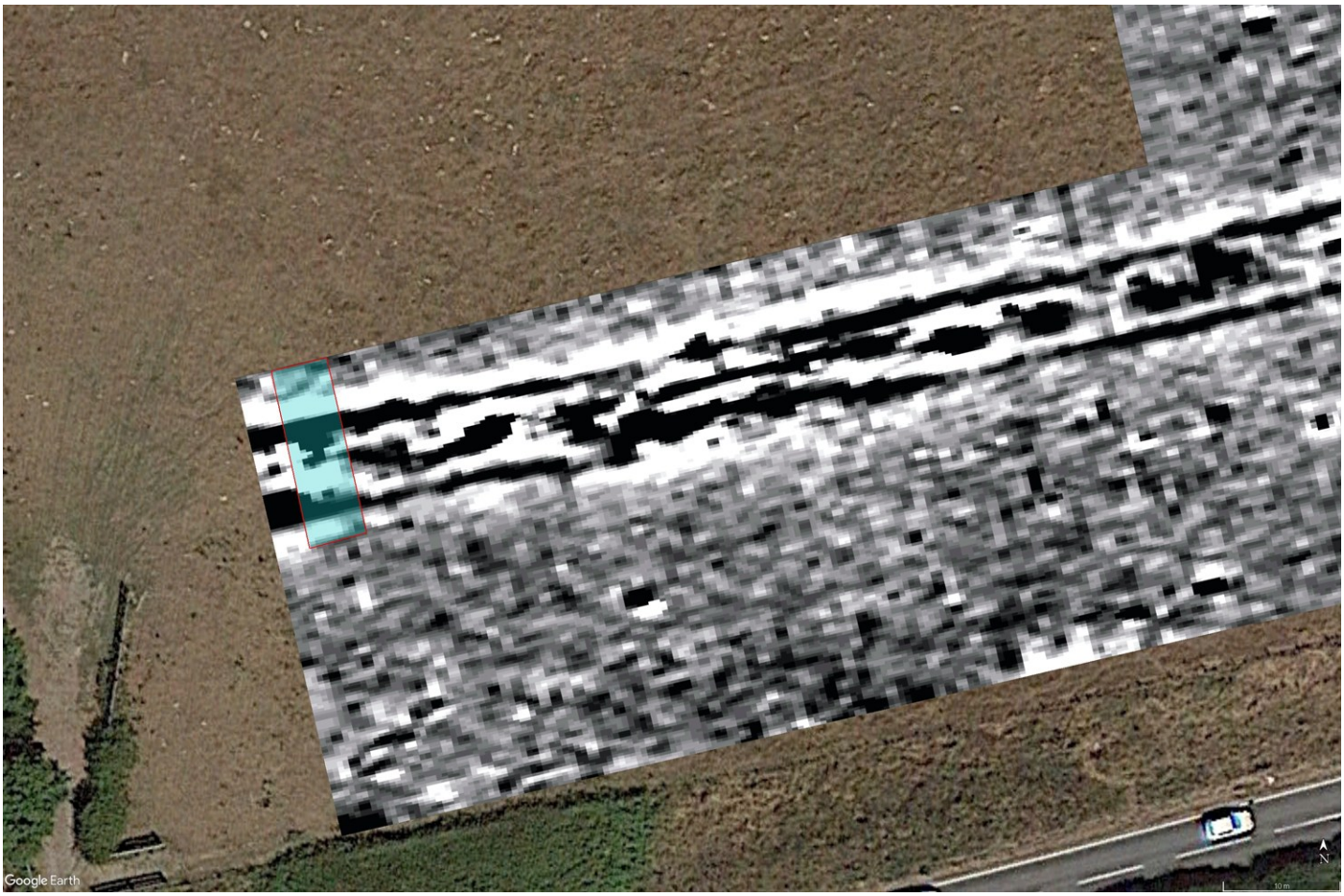
For the Wealden iron industry, the new road raises several issues. If it is metalled with iron slag along its entire length, it requires an assessment of the scale of iron smelting in and near Icklesham.(Iron slag was not transported far for road-metalling by Roman road builders.) The Sites Database on the WIRG website for Icklesham records a confirmed bloomery and several slag scatters which may indicate other bloomeries. More information on the length of the road, its average width and the depth of the metalling, is needed before estimates can be made of total iron production in and around Icklesham.

Elsewhere in Britain major Roman roads leading to the coast terminate at ports, and it is likely that there was a Roman-era port at Winchelsea. To what extent was it used to export iron from the major sites in the eastern Weald? Did a port at Winchelsea replace Bodiam on the Rother or Sedlescombe on the Brede? Further excavations of the road and its ditches may provide dating evidence which would help to address such questions.

If Winchelsea were a Roman port, it is likely to have had a military garrison. The locations of the port and fort will be the subject of future work.

During the winter of 2024/25 there have been extensive geophysical surveys around Icklesham and to the

Below: view of area described with magnetometry results superimposed. Car, bottom right, provides a good idea of the size of the roman road.



west of the village. Similar surveys are planned on National Trust land near to Winchelsea. This year and beyond further sections of the road will be excavated, and resources permitting, features revealed by the geophysics, including suspected bloomeries, will be examined.

To facilitate the programme of work relating to the newly discovered road, Winchelsea Archaeological Society has been renamed as the Winchelsea Area Archaeological and History Society and has established an Executive Committee. WIRG has a seat on this Committee.

Volunteers to participate in all aspects of forthcoming research will be most welcome. A programme of work extending over several years is anticipated.

The Events section of the WIRG website will provide up-to-date details of activities, dates, times and places.

Bob Turgoose

The defence of Hastings and origins of some of the names for guns

In his book *Historic Hastings* (1986), Manwaring-Baines records the earliest description of the town's defences when, in 1587, invasion by the Spaniards was imminent. This description is taken from a survey made by Sir Thomas Palmere and Mr. Walter Coverte, the Deputy Lieutenants for Sussex, for all access points to the county coastline from the sea. The description is taken by Manwaring Baines from *A survey of the coast of Sussex made in 1587* edited by M. A. Lower in 1870.

> "At Hastinge town within the vPortes they are furnished with these peces following, viz iij Portugall Bases of brasse, with iiij chambers of brasse to eche of them. One culveringe of yron vmounted, ij sacres, ij mynions and one Robinet mounted, iij quatre slinges stocked, and Poudre and Shotte sufficient. The town strongly seated and easily to be fortified."

Manwaring Baines goes on to explain that Elizabethan artillery was named after animals, especially birds. However, etymology is a minefield to be trodden with care. Whilst we find that "culverin" is probably cognate with (French) *couleuvre,* a common snake and "saker" with (OF) *sacre,* probably a sparrowhawk, *robinet* has no connection with robins. Cannon, bombards, minions and bases have no obvious faunal links. The Drake was a duckless gun: the name is cognate with *dragon*.

Falcons are fairly securely bird-linked.

Geraldine Crawshaw

Wealden Iron Research Group

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Notice of Summer meeting & AGM 2025

To be held on **Saturday 19 July** 2025 from 10.30am at St Mary's Barn (Church Hall), The Causeway, Horsham, W Sussex RH12 1HE https://maps.app.goo.gl/VBzouHVP2Bj7sFry5

(Please note there is no car park at the hall. The nearest long term Parking is at Dukes Square car park, Denne Road RH12 1JF entrance on left after Drill Hall Pay & Display 4 hr £5-60, 5 hr £7.00. This is the second car park travelling south down Denne road – **do not use** the first car park on the right as this is limited to three hours parking Alternatively use Park and Ride at Hop Oast off A 24 at round-about onto Worthing Road RH13 0AR - entrance opposite Management Waste & Cleaning & entrance to recycling centre. Bus 98 every 20mins Bus 23 every hour to Horsham Bus Station – 10 min journey – Pay on bus – concession cards free. Then walk east up West St to Market Square, turn right down South Street which leads to the Causeway and Museum (on left) & St Mary's Hall (on right – red brick building with moon shaped windows. Entrance through private car park.

Non-members of WIRG are welcome to the Summer Meeting and site visit but cannot vote at the AGM.

Agenda for the day

10-30am Coffee / tea
12.00pm Annual General Meeting of the Wealden Iron Research Group.
12-45 Visit to Horsham Museum (50m along the Causeway on right towards the Town Centre)
1.30pm Lunch break – lunch is not provided; please bring your own – you can picnic in the Museum courtyard & garden (toilets available) alternatively, there are plenty of food outlets around the Market Square.

2.30pm Depart for site visit to Shipley Forge, on the Knepp rewilding estate. Park in Shipley Village, School Lane RH13 8PL. A 3 mile return walk to the site via Shipley's 12C church to see the tomb of Thomas Caryll ironmasters of Knepp Furnace (operated 1568 to 1622).

ANNUAL GENERAL MEETING 2025 (Only WIRG Members may vote)

Apologies for absence
Approval of the minutes of the 2024 AGM
Matters arising
Chairman's Report
Treasurer's Report and Adoption of the Accounts
Appointment of Accounts Examiner
Election of Officers and Committee
Any other business

Nominations for new members of the committee are most welcome. You must be a member of WIRG and be Nominated and Seconded by a current member of WIRG.

Continued on next page.

If you are interested in serving on the Committee but need a nominator and seconder please contact the Hon Sec, Tim Smith at the address at the head on this announcement by 15 July latest.

Location

An event worth looking at!

Festival of Metals

24 and 25 May 2025

Butser Ancient Farm, Hampshire PO8 0BG (close to Portsmouth, UK)

Join the Historical Metallurgy Society for a weekend of all things metal !

Renowned researchers and craftspeople will share their skills and knowledge at Butser Ancient Farm on the weekend of 24 and 25 May 2025. Demonstrations of various metalworkers will take place while national and international researchers are presenting big-picture overviews of their findings. In-depth talks on the history of metal objects next to the creation of 'metal art'.

There will be a raffle and an auction for replica historical metal objects. All made by our demonstrators. Auction on Sunday 25 May at 3pm.

You can book your tickets via Eventbrite https://festivalofmetals.eventbrite.co.uk . **You will need to scroll down the ticket list if you want to add on the Saturday evening meal (one person per group needs to be a HMS Member)**

See below for list of talks, demonstrations and people involved.

Day	Time	Speaker	Title
Saturday 24 May	**11 am**	Simon Timberlake	**Prehistoric metal mining in Britain**
	12 am	Russell Wanhill Omid Oudbashi	**Case Histories of Fracture in Ancient Metals**
	1pm	Justine Bayley	**Non-ferrous metal working in the first millennium – Roman to Vikings**
	2pm	Tim Young	**Bloomery ironmaking in southern Britain, resources and technology, from the early Iron Age to the late Medieval period**
	3pm	Jeremy Hodgkinson	**Iron-making in the Weald, 1490-1828: Sows, Cannon and Iron Backs**
Sunday 25 May	**11 am**	Andrea Dolfini	**Sword tales: Understanding Bronze Age combat styles**
	12 am	Adi Eliyahu	**From Bronze to Iron: the Metal Revolution in the Iron Age in the Southern Levant**
	1pm	Vincent Serneels	**Medieval mass production of iron in Western Africa**
	2pm	Paul Mortimer	**Gold, Bronze and Sword of Iron: Engineering Metals at Sutton Hoo - an exploration of elite metal work from the late sixth and early seventh centuries**
	3pm	**Auction of objects made during the weekend**	

Festival of metals continued. Programme of practical demos.

All demonstrations take place on Saturday and Sunday

Arrowsmithing Through The Ages

Will Sherman

A look at arrowheads from the Viking to the Tudor periods, how they changed to compete with ever increasing armour, and how their construction evolved from simple iron hunting heads to complex multi-part weapons of war.

Bloomery iron smelting

Charles Torres and Simon Pellequer

Charles and Simon are among the most experienced iron smelters in France. They will be smelting iron ore in a clay furnace they are bring over from across the Channel!

Bronze Age bronze casting

James Clift

Jim and team will be casting replicas of Bronze Age bronze objects including a Wilburton type sword which will be part of the auction on Sunday afternoon.

Bronze Age inspired furnaces

Katie Surridge

Katie will be making cast bronze in two furnaces inspired by Bronze Age pit furnaces, but with a slight artistic twist. She will also be displaying some of her own art works cast in bronze for visitors to see.

Caring for Iron (in the early medieval period)

Joe Robert (Angle-Seax Forge)

An exploration into known and possible ways that iron tools and weaponry were cared for in Anglo Saxon Britain

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Iron Age metalworking at Hengistbury Head.

Hayden Scott-Pratt

To book your tickets go to Eventbrite https://festivalofmetals.eventbrite.co.uk

An analysis of examples of Wealden cast iron firebacks

By Tim Smith

The literature on Wealden iron is sadly lacking in chemical analysis and metallographic images of iron artifacts.

A retired metallurgist, Richard Williams, is attempting to rectify this by determining the analysis of identifiable Wealden irons using modern X-Ray fluorescence techniques. So far he has been sent an iron find from Ashburnham furnace, a sample cut from a cast 'chuck' believed to be from a gun boring wheel and a sample of agglomerated nails.

Jeremy has pointed us to literature providing the analysis of a number of firebacks, some in the Hastings Museum store, and reported by Schubert in his book 'History of the British Iron and Steel Industry'. At least five of these are identified by Jeremy as cast on the Weald. Images of polished and etched samples at x45 magnification, indicate the irons to be grey irons in which free graphite is present as flakes. Schubert reports small regions of 'mottled' iron in some of the castings in which some of the carbon is present as free carbide, which is characteristic of the much harder and more brittle white iron.

The lower the carbon content, the more likely is the iron to solidify as a white iron – a desirable feature for iron destined for refining at the forge, but undesirable for iron intended for castings as too brittle. Si and P have the same effect as increasing the carbon content – known as the Carbon Equivalent – raising the value by one third of their sum ie Ceq = (%Si + % P)/3 and thus help to enable the iron to solidify grey. A second factor, a slow cooling rate, also encourages grey iron to form, such as achieved by a thick casting in a sand mould. The mass of a casting will also slow its cooling rate and the weight of these firebacks is calculated to range from 12 to 7.6kg. Conversely, a fast cooling rate provided by a thin section or chill mould – such as an iron mould, is likely to form a white iron. Schubert states that mottled iron – an intermediate between grey and white iron - is found at the edges of some of the castings, the result of a faster cooling rate here.

The micrographs are typical of grey irons with random flakes of graphite showing black. The matrix surrounding these is mainly pearlite (so called from its lustrous appearance under the microscope like mother-of-pearl in an oyster shell) which is a lamellae structure of alternate layers of ferritic iron and iron carbide. There is also some free ferrite with the exception of the bottom right micrograph (sample LA

Analysis of some Wealden Firebacks in Hasting Museum

Sample	Total C %	C Equivalent	Si %	Mn %	S %	P %	Date
LA 231	3.58	3.97	0.56	0.86	0.074	0.61	1683
760	3.55	3.97	0.65	0.63	0.070	0.62	16th C
763	2.97	3.75	0.93	1.64	0.170	1.43	Royal Oak
794	3.99	4.36	0.65	0.82	0.048	0.47	1707
806	3.64	3.97	0.52	0.42	0.086	0.56	1586+

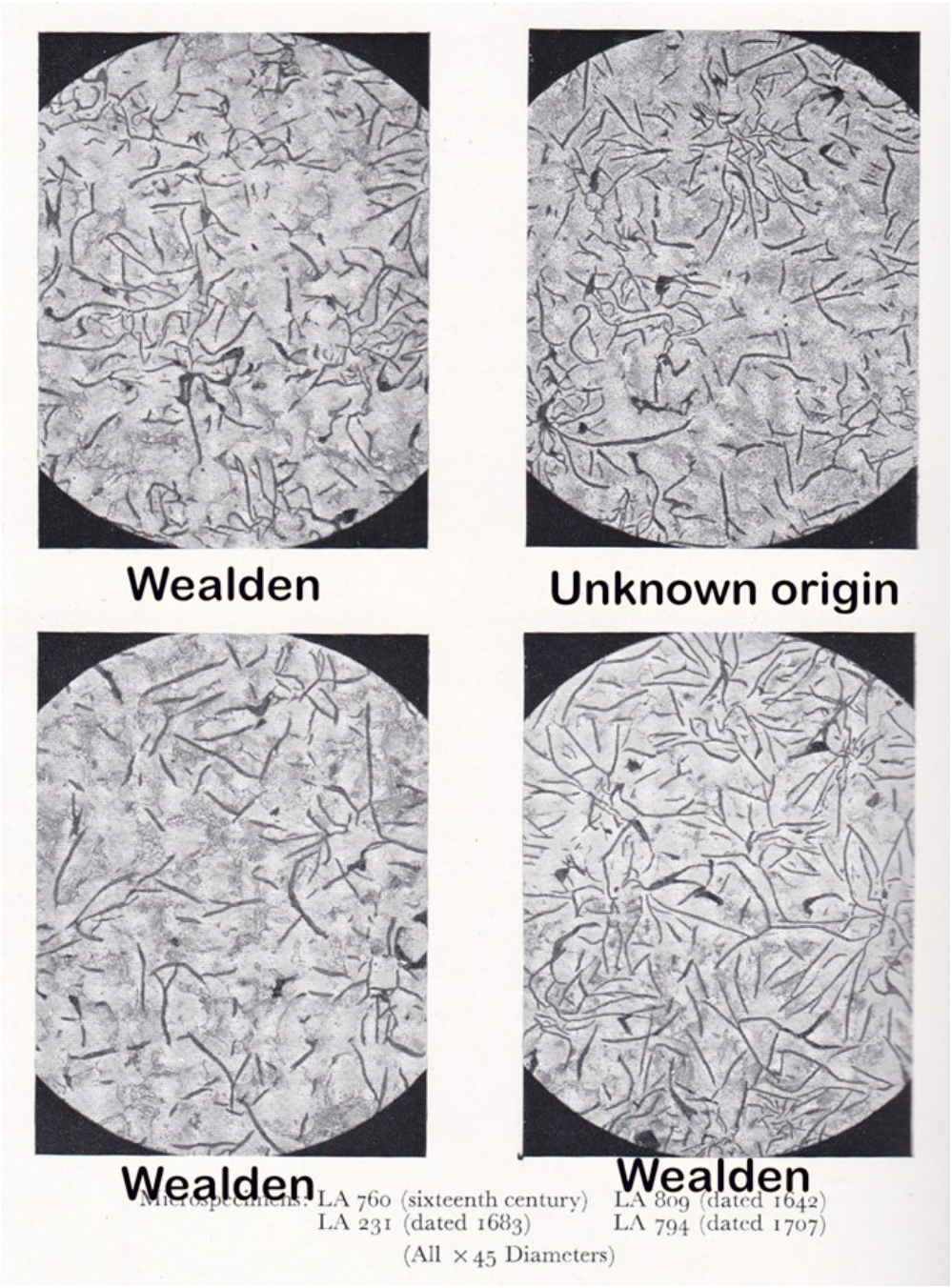
Source: Schubert's History of the British Iron and Steel Industry (1957), p.398

794) which shows some excess iron carbide instead of ferrite, a result of the carbon equivalent of this fireback (4.36%) being just above that at the lowest melting point of the iron (the eutectic temperature – a fixed value - which occurs at 1135°C and 4.3% carbon composition). The result of this excess iron carbide over that in the pearlite is to produce areas of mottled iron. In each sample, there are small areas of

Text continued on next page

Micrographs of three Wealden and one unknown fireback. Graphite flakes show black in a matrix of pearlite and a small amount of ferrite. Sample LA 794 (bottom right) has a higher carbon equivalent exhibiting free iron carbide instead of ferrite. X45

Micrograph of mottled cast iron – intermediate between grey iron and white iron. The near-white areas are free iron carbide Fe_3C, the black rosettes and flakes graphite and the remaining matrix pearlite.



phosphide eutectic (lowest melting point for FeP) present due to the phosphorus in the irons, which incidentally, would be a problem in any refined iron causing cold shortness unless removed in the fining slag.

The low silicon in these irons would cause a white iron to form in a thin-walled casting such as a cooking pot which would render it brittle and prone to easily breaking under mechanical or thermal shock. In contrast, the famous 'bellied' cooking pots produced in iron by Abraham Darby at Coalbrookdale had more than 3% Si and over 1% P present – partly through the use of coke rather than charcoal in the blast furnace - which not only resulted in a grey iron forming but also produced a fluid iron able to easily flow to completely fill the mould. Such pots were cast in sand moulds which would encourage slow cooling.

Firebacks were cast in sand beds as shallow mouldings about 20-30mm thick by pressing a wooden pattern into the levelled sand, removing the pattern to leave an indentation, building up a sand wall around the edges to the thickness required for the fireback, and ladling molten metal from the furnace into the mould – ideally via a side gate to prevent erosion of the sand by the running metal. Thus the back of the fireback was open to the air. For these relatively thin castings, analytically, a Si content of 2% would be necessary to ensure a grey iron formed – and yet the maximum Si content shown in the analysis is 0.9% with others as low as 0.5%. It was thus necessary to slow down the cooling rate to ensure a grey iron was formed which could be achieved by throwing sand on the back of the casting as soon as a solid skin had formed. Remarkably, a video of the casting of replica firebacks was recorded by one of our members, Tony Meades, at Rother ironworks , Rye, in the 1980s and, indeed, workers are seen throwing sand onto the backs of the castings to slow the cooling rate. The 7minute video is well worth viewing on You Tube at: https://hodgers.com/firebacks/fireback-casting-using-traditional-open-moulds

Guns cast on the Weald required grey iron to avoid shattering on firing. Analysis of some pre-1760 guns show 1.5 to 0.7% Si, sufficient to produce a grey iron in the relatively thick-walled casting of a hollow gun barrel, cast vertically in a loam mould contained in a pit, surrounded by sand or earth to counter the weight of the metal in the mould. Dimensions of a 42 pounder Culverine gun cast by John Brown in 1673 had a cast in bore of 183mm (7.2") and an external diameter of 345mm (13.6") at its narrowest part giving a barrel thickness here of 81mm (3.1"). Weighing in at 3075kg plus approximately 60kg for the gun head, this mass of metal would take days to cool in the casting pit ensuring a grey iron throughout.

It is possible to improve the ductility of grey cast irons by prolonged heat treatment over a matter of weeks to spheroidise the graphite flakes. This was termed 'nealed' (annealed) and was accompanied by removing a thin surface layer of the gun by turning it on a lathe. The improved strength enabled a thinner walled barrel and breach to be cast, thus saving weight – an important consideration when arming a ship – but the additional cost – rising from £16 to £60 per ton - of this treatment meant that few guns were treated this way. Today, spheroidised graphite is made by adding small quantities of caesium and magnesium to the melt.

If you do have any samples of Wealden iron and would like them to be analysed, please contact secretary@wealdeniron.org.uk

WILLIAM BENGE

The rise and fall of an ironmaster

William Benge is a figure who bridged the gap between two major iron-working consortia: the Brownes, who dominated gun-founding for most of the 17th century; and John Legas and his partners, who held sway during the first part of the 18th.

The Browne family's fingers were irrevocably burnt when they over-produced the 'neiled and turned' guns, the expensive white elephant adopted by the Office of Ordnance during the 1670s and 80s, and described so fascinatingly by the late Sarah Barter Bailey in her book, *Prince Rupert's Patent Guns*. When John Browne III's widow, Mary, the daughter of her husband's partner and step-father, Alexander Courthope, was forced to sell her stock of those guns to cover the family's debts their gun-founding days at Horsmonden Furnace were over. An opening appeared for someone to take over the business.

Probably the son of William, a Mayfield yeoman, William Benge's mother Anne was from the Saunders family, members of which operated several ironworks in the Wadhurst area. They had married at Frant in 1648. She died in October 1653, the day after the baptism of her daughter Anne and was commemorated on an iron graveslab in Wadhurst church. Her age given on the slab, but partially illegible, has been interpreted as 17, making her 12 at the time of her marriage, but this seems improbable. Presumably William Benge, her son, was born between 1648 and 1652.

Iron graveslab of Lucy Benge, 1689; All Saints' church, Laughton.

The trail goes cold until 1681 when William married Dinah Chauntler at Laughton. They lived at Wadhurst where, the next year, their unnamed son was buried, but a daughter Ann was born in 1683 and christened at Laughton. A second daughter, Lucy, followed in 1685 only to die two years later; her iron graveslab is now against the wall of Laughton church.

Earlier that same year William Benge was contracted to supply 530 granado shells to the Office of Ordnance, granado shells being hollow shot with a fuse and fired from a mortar. At this stage there is no indication as to where he was to be casting them. However, a year later Benge's 'founderies' were being visited by the Master Gunner of the Ordnance 'to give directions to casting ordnance and mortars'. Evidently Benge was using the Brownes' old furnace at Horsmonden for, in 1690, he was being paid for over £13,000 worth of brass and iron guns, as well as shells and round shot, and delivering 'neiled and turned' guns to the Ordnance at the Tower of London. Whether the latter were part of the Brownes' old stock or newly cast by Benge is not apparent. At no other furnace than Horsmonden, however, were there foundries for casting in brass (i.e. bronze) at that time. Benge was clearly making a lot of money and in 1692 he was able to purchase Faircrouch, a substantial house to the north of Wadhurst. Also in November of that year he was appointed Brass and Iron Gunfounder to the King, a position that had been held by generations of the Brownes since 1596.

England and the Dutch were at war with France at this time and there was a huge demand for munitions, especially shot and shells. With Horsmonden devoted to gun production and, with this new responsibility, Benge had to find the means of furnishing their supply. He set about paying for casting time at several furnaces across the Weald: Beckley, Beech, Coushopley, Cowden, Hamsell, Hawkhurst and Waldron were all pressed into service. He needed more casting capacity. Where was he going to find it?

The solution came in the form of Hoathly Forge at Lamberhurst, which had been built by Alexander Collins in 1548, and which was well supplied with water via a leat from the River Teise. It had been sold by

Alexander's son Stephen in 1584 to Robert Filmer, whose descendants continued to let it to forgemasters. William Benge bought the forge from a later Robert Filmer in 1694 and with a grant from the Office of Ordnance of £2,000 proceeded to demolish the forge and build a new iron furnace nearby that used the same water supply. It was completed in 1696, the iron bressummer over either the casting or the blowing arch bearing the initials of Benge and his wife. The king's sister-in-law, Princess Anne and her

Casting or blowing arch bressummer from Lamberhurst Furnace 1696, with the initials of William and Dinah Benge; Hoathly Farm, Lamberhurst.

young son, the Duke of Gloucester, who were sojourning at Tunbridge Wells, visited and it was named the Gloucester Furnace in his honour.

Princess Anne and the Duke of Gloucester 1694, by God-

Benge was also attempting to purchase another furnace. Darwell Furnace at Mountfield was in his sights but it was mortgaged and a case brought before the Court of Chancery appears to have scuppered that enterprise. Chancery cases figure more and more in the story of William Benge. To operate Horsmonden and Lamberhurst, as well as providing sufficient charcoal for his shot and shell casting he needed to acquire rights to woodland for charcoal production, which entailed mortgaging some of the properties he had acquired. In 1701 he purchased Horsmonden Furnace from the Browne's descendants, but he had overstretched himself financially and the following year he was declared bankrupt. Attempts to satisfy his creditors by selling property were increasingly stymied by the mortgages on them that he had entered into. More Chancery cases followed. He was rescued to some extent by Peter Gott who took him into partnership and agreed to buy the furnace at Lamberhurst.

Gott was already in the iron trade in succession to his father Samuel and through his mother Joan, one of the eleven daughters and co-heirs of Peter Farnden, the Sedlescombe ironmaster. Also he had married Martha, the daughter of Thomas Western, known as The Great Ironmonger, and one of the richest men in England. Benge also tried to sell Horsmonden Furnace to Gott but the sale was similarly held up because Benge had mortgaged it, together with Sprivers, the house formerly owned by the Brownes. One after another the Chancery cases mounted up over the next six years, all for the same basic reason: Benge was relying on Peter Gott's payment for the furnaces to redeem the mortgages.

In 1712, disaster struck. Peter Gott died, allegedly by his own hand. Not only was Benge bankrupt but insolvent. He was committed to the Fleet Prison in London, incapable of resolving the various claims brought against him in Chancery. He was probably in his early 60s and not of an age to ride out incarceration in the unhealthy conditions of the 'common side' of the Fleet, which is where he died in April of 1714, to be buried on the 19th of that month in St Saviour's church in Southwark.

Jeremy Hodgkinson