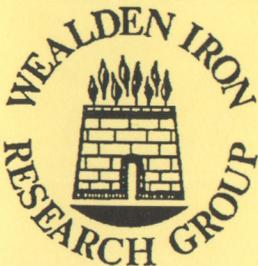


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FIELD NOTES**compiled by J. S. HODGKINSON****A bloomery in Battle, East Sussex**

A heavy concentration of bloomery tap slag and furnace cinder, centred on TQ 7606 1702, has been found covering the north-eastern part of a field, the adjoining stream bank and the western part of the next field, on the southern edge of Petley Wood. The slag covers an approximate area of 1500m², but has probably been dispersed by ploughing. An example of a cylindrical 'plug' of slag has been found. Roman pottery, in association with evidence of ore digging, was discovered in Petley Wood in the 1950s, although smelting activity has not been reported hitherto.¹

We are grateful to Liz Phillips for notifying us of her discovery.

A bloomery in Rotherfield, East Sussex

A small concentration of bloomery slag has been found in the bank of a stream in woodland called Pocket Birches, about 100 metres upstream of where the public footpath from Orznash Farm to Boarshead crosses it. Pieces of bloomery slag have been found in the stream below the site which is located at TQ 528334.

Two bloomeries in Heathfield, East Sussex

Two further bloomery furnace sites have been discovered in the search area that has now moved from N. Heathfield to the S. Mayfield area. These were found in a gill flowing N.E., situated to the S. of Bungehurst Farm at TQ 5992 2425. Many potential iron ore pits exist to either side of the ridge road between TQ 595240 and TQ 594231

At TQ 5972 2409, some pieces of bloomery slag were found beside a small side-stream coming in on the right bank. Although

very little slag was easily visible, it is unlikely to have been dumped there.

The other bloomery site, at TQ 5979 2420, was found in the field to the N. of the gill, covering an area about 25m x 25m, but probably only about 300mm deep. Although on gently sloping ground, it is unusually distant from the stream and may be associated with the farm.

Both sites lie on Ashdown Sand, close to an east-west fault where Lower Tunbridge Wells Sand outcrops.

Five charcoal platforms were seen in the gill, but with two blast furnaces, a forge and the recently found Roman bloomery site at Little Furnace Wood, this is not surprising. However, two of the platforms were much smaller than usual - less than 3m diameter - and the charcoal fines less black, perhaps indicating that they had been there a long time.

Brian Herbert

Bloomery slag in Netherfield, Battle, East Sussex

A layer of bloomery slag, with some lumps of significant size, has been discovered in a stream at TQ 7158 1779, upstream from the newly identified, Netherfield Furnace. No evidence of a working area nearby has been found.

Two bloomeries in Ticehurst, East Sussex

A concentration of bloomery tap slag has been discovered in the bank of a ditch and in the adjacent part of a field on the edge of Hoadley Wood, at TQ 6604 2850. Because the field was under grass, it was not possible to make an estimate of the area covered by the slag.

A further concentration of bloomery slag has been found beneath the roots of a tree, also in Hoadley Wood, at TQ6591 2839.

Both sites lie on Wadhurst Clay, and are located within 100m of a slag-metalled track linked to the Roman ironworking site at Bardown.²

An Iron Age bloomery in Forest Row, East Sussex

In 1999, part of a small bloomery smelting furnace was discovered during the mechanical excavation of a pond on Tablehurst Farm, at about TQ 4298 3559. The remains, which consisted of the base of the hearth, together with a layer of charcoal fines and a few fragments of furnace wall, were about 1m below the modern ground surface. The surviving base measured only about 400mm across, which is relatively small compared with other excavated furnaces in the Weald.³

A sample of charcoal from the furnace was sent for C14 analysis to the Centrum voor IsotopenOnderzoek, Rijksuniversiteit Groningen, in the Netherlands. A radiocarbon determination of 2110 ± 70 BP was received, which when calibrated provides a date range of 210BC – 40BC at 68.2% probability, and 360BC – AD30 at 95.4% probability. An additional peak in the calibration curve of 350BC – 320BC at 5.8% probability can probably be dismissed.⁴

The small apparent size of the furnace may be accounted for by its early date, but the lack of corroborative dating evidence must raise doubts. The depth of the remains below the surface, upon which there is other evidence of ironworking in the bloomery period, adds credence to an Iron Age date. Nevertheless, the limited scope for excavation and the paucity of the remains, and of the samples for dating, make this an unsatisfactory conclusion.

A Romano-British domed bloomery furnace in Mayfield, East Sussex

The discovery of a bloomery site in Little Furnace Wood, Mayfield has already been reported.⁵ Trial trenching in September 2003 led to the discovery of three sherds of East Sussex ware, which suggested a late-Iron Age or Romano-British date for the site. However, trenching also revealed the top of a furnace structure. Initial examination led to the conclusion that the remains

might be quite well preserved, and the decision was taken to excavate more fully. Chris Butler, of the Mid-Sussex Field Archaeology Team is directing the excavation, which commenced in October 2003, and which has revealed a substantial, and fairly well-preserved domed smelting furnace set into an elongated pit in a bank at the top of the valley side. The size of the furnace, at about 1m wide and over 1m high – both internal measurements – is rather larger than similar furnaces that have been excavated in the Weald. Comparisons can be drawn with furnaces seen at Cow Park, Pippingford, and in Rocks Wood, Withyham, as well as outside the Weald, at Laxton, Northamptonshire and at Clérimois, France.⁶

A radiocarbon date of charcoal found in the furnace has indicated a date in the second century AD. Excavations will continue and a full report published in due course.

Notes and References

¹ C. H. Lemmon, 'Fieldwork during the season 1952', *Transactions of the Battle & District Historical Society* (1951-2), 27-9.

² H. Cleere, 'Some operating parameters for Roman ironworks', *Bulletin of the Institute of Archaeology*, **13** (1976), 236.

³ *Wealden Iron*, 2nd ser., **20** (2000), 8.

⁴ Rijksuniversiteit Groningen, GrN-25465, Domesday Ferrara 1. The error margin of ± 70 can be accounted for by the small size of the charcoal sample

⁵ *Wealden Iron*, 2nd ser., **23** (2003), 2.

⁶ C. F. Tebbutt, 'The excavation of three Roman bloomery furnaces at Hartfield, Sussex', *Sussex Archaeol. Collect.*, **117** (1979), 47-56; H. F. Cleere, 'The Iron-smelting Furnace', in 'Excavations in Rocks Woods, Withyham, 1982', A.F.Harding, and J. Ostója-Zogorski, *Sussex Archaeol. Collect.*, **125** (1987), 11-32; P. Crew, 'Laxton revisited: a first report on the 1998 excavations', *Historical Metallurgy* **32/2** (1998), 49-53; C. Dunikowski & S. Cabboi (eds.), *La sidérurgie chez les Sénons: les ateliers celtiques et gallo-romains des Clérimois (Yonne)*, Documents d'Archéologie française. **51**, (Editions de la Maison des Sciences de l'Homme, Paris, 1995); 120-131.

IRONWORKS IN LATE-16TH CENTURY KENT**J. S. HODGKINSON**

In an oft-quoted paper, published in 1981, Charles Cattell drew attention to the lists of ironworks in Kent drawn up in and after 1588, of which the corresponding lists for Sussex and Surrey seem not to have survived.¹ The lists provide considerably more information than those of 1574, upon which they were initially based, but Cattell transcribed relatively little detail and, being deposited in the Staffordshire archives, in Stafford and at some distance from the Weald, the lists are reproduced here in full.

In addition to the basic facts about the owners and occupiers of ironworks, the lists include a certain amount of incidental detail about the individuals named, their employees, the output of their furnaces, numbers of guns cast at certain furnaces, and the names of merchants on Tower Hill, in London, with whom they dealt or, in one instance, were contracted to. The names of the merchants correspond closely with those named in surviving bonds of the same period, obliging merchants to dispose of ordnance according to Privy Council orders.²

Staffordshire Record Office, D593/5/4/28/4

8 and 9 of August 1589

The names of those persons as did make and cast iron ordnance in the pishes following

Thoms Jhonson of Shornden

Jhon Phillips of Barden

Jhon Phillips of Asherst

Jhon Swaysland of Cowden

Jhon Knight or ffrancis Jhonson of the same pische

Thoms Willoghbie of Chedingstone Thoms Browne of Chedingstone

Staffordshire Record Office, D593/5/4/28/3 (part 1)

An exacte vewe and inventorie aswell of the numbers of yron workes called ffurnaces in ye countie of Kente w^t the names of th'owneres and occupiers of everie of them, as also of the numbers and severell kinde of peecees of cast yron ordnance y^t are in any of them now readie made taken by Robt Binge and Will Clarke as herafter followeth

viii November a^o 1588

Sir Rycherd Baker knighte hath in his owne hande w^t in the pishe of Cranebrooke one yron worke called a fordge or hammer w^t in one mile of his dwelling howse in Cranbrooke aforesaid called Sussingherst but hath noe fornace thear

The same Sir Rychard hath in his owne hande w^t in the parishe of Hawkherst about iiii miles distant from his said dwelling howse one yron worke called a furnace wherin was never any peece of ordnance cast as it is saide but onlie sowes of yron

John Webbe being over sees of all Sir Rychard Bakers thinges and his onlie doer in his absence being his founder at the said fornace, and Richerd Willie clerke of his workes stande bounden for the due pformance of th'orders sette down by the Quenes ma^{ties} moste honorable previe councell in yt be halfe by cawse the saide Sir Rychard is nowe remaining at London wth his howsholde

viii November a^o 1588

Sir Alexander Colepeper knight hath in his owne hande in Cranebrook aforesaid w^t in half a mile of his dwelling howse in Gowtherst called Bedgberie one furnace now in the order and government of Anthonie Colepeper esquire sonne and heire apparnt of the said Sir Alexander in the absence of the same Sir Alexander his father where in there was not any one peec of ordnance caste by the space of seven yeares now last paste (as it is said) but onlie sowes or yron

The said Anthonie Colepeper and Peter Lewis founder at the said furnace stande bounden for the dew performance of y^c said order

Chingley Henry Darell gent hath in Chingley w^t in ye pish of Gowtherst only a fordge or hamer now in the occupacon of Rycherd Ballard but the ffurnace y^t was thear is fallen downe and utterlie decayed

Shorneden
in
Horsmonden Thomas Brattle hath in the pish of Horsmonden a furnace called Shorsmonden furnace, w^t he hath letten for yeares to Willm Ashborneham gent who hath letten the same over to Thoms Johnsonne of Hartefeild in the Countie of Sussex gunfounder who now occupyeth the same but hath no workemen thear at this time, in w^t furnace they caist no sowes of iron but peeces or ordnance at this psent remaining, but wear latlie caried from thence to ye water side at Maidstone to be convayed to Tower wharfe in London of w^c peeces some are remaying at this psent at Yalding and some at Maydstone, the totall numb^r and severall kindes whearof ar as followeth

Mynyons lxviii

ffawcons xlvi

The said Thoms Johnsonne & Lewes Hughes clerke of the said ffurnace stand bownden for the dew pformance of ye said order

Thms Dikes hath in his owne hande at Durnedall wth in the pish of Pevenberie one fordge or hammer but no furnace

fforde mill
fornace in
Tunbridge

Sir Thoms ffane knight hath wth in the pish of
Tunbridge a fforname nere unto South Frythe called
Bornemill fornace now in the occupacon of Edmund
Willard, and Abraham Willard of Tunbridge gent in
w^{ch} fornace thear ar caste only sowes of yron and not
any one peec of ordnance, as it is said
Robt Turner founder at the said fornace standeth
only bounden for the due pformance of the said
order by cause the saide Sir Thomas ffane is now
remaining at London and ye saide Edmund and
Abraham are rydden from home, and not to be had

Barden
fornace in
Tunbridge

Thoms Smithe of London Customer hath in
Tunbridge aforesaid at Barden a furnace called
Barden fornace in lease for years unto the said
Edmund Willard and Abraham Willard the chief
workmen wherof is one John Phillippes of London
gunfounder, in w^c fornace are seldome caste any
sowes of yron, but most comonlie peeces of
ordnance, wher thear are remaining at this psent of
theis severall kinde following

Sakers vi

Mynnions xxix

ffawcons xii

And at Gage Green in Hadlow to be careyed to the
water side at Milhale and from thenc to Tower
Wharfe at London

Mynnions vi

ffawcons vi

The said John Phillips standeth onlie bounden for the
dew performance of the said order bycause the said
Edmund and Abraham wear not to be had as before

xvi November a^o 1588

Asherst Sir Walter Waller knight hath w^t in the pish of Asherst a fornace called Asherst fornace now in th'occupacon of the said John Phillips of London gunfounder, at w^{ch} fornace thear are most comonlie peecees of ordnance caste whear thear are remaining at this psent of

Sakers ix
Minnions xl
ffawcons xxx

Cowden John Swaysland of Cowden yeoman hath in the pish of Cowden a fornace whear in are peeceis of ordnance most comonlie caste the founder wherof is ffranceis Johnson of Cowden gunfounder, wch John standeth bounden to Luckantius Roper and Giles ffleming of London March: boath of them dwelling in St Thoms street to deliver unto them lv tuns of mettlee yearlie for the space of foure years, and the same Luckantius and Giles have the said ffrancis Johnson bound also to caste the same mettall into peeceis of ordnance for them at w^c fornace theris remaining at this present of

Sakers xiiii
Minions xxiiii
ffawcons xx

The said John Swaysland and ffrancis Johnson stand bounden for the dew pformance of the said order. But it is as needful y^t the said Lackantius & Giles ffleming should be bound likewise bycause the said John Swaysland standeth bounden to deliver unto them yearlie lx tunns of mettall as afore, and they ar at libertie to make the same into gunnes or what they lyke

xvi November a^o 1588

Cowden
 John Knight of Cowden yeoman hath in the said
 pische of Cowden a fornace wherin he doth ususllie
 caste sowes of yron but doth not at any time caste
 any peeces of ordnance thear as he sayeth. never
 theless he the said John Knight standeth bounden for
 the due pformance of ye said order

xvii November a^o 1588

Thomas Willoughbie esquire hath in Chedingstone a
 forge and also a fornace, wch fornace he hath letten
 for yeares to Thomas Browne of Chedingstone
 yeoman whose founder is Ephraim Arnole of
 Chedingstone gunfounder in w^c fornace peeces of
 ordnance are most comonlie caste, wher thear are
 remaining at this psent of

Sakers vi
 Minions viii
 ffawcons xii

The said Ephraim standeth onlie bounden for the
 dew pformance of the said order bycause the said
 Thomas Browne was not at home, wch Thomas
 afterwards came to Wrootham and entred into bonds
 And at Sundewiche to be conveyed to the tower of
 London

Sakers x
 Minions x
 ffawcons xii

Staffordshire Record Office, D593/5/4/28/17

The names of the ironmasters who were bound 1590
 A^o regin Eliz xxxii
 Dicessimo octavo die Octobris

1. John Dunnednoll of Lambrest in the
countye of Sussex yeom, Occupier of the
ffurnace at Bedgberye in the countie of
Kent, bound in 2000^{ls}
John Polhill of Shorrham
in Kent, gent in 200^{ls}
Suertyes { Willm Tilghman of
Eastmallinge, in Kent,
yeom in 200^{ls}

2. John Swayselande of Cowedene in Kent
yeom, Occupier of the ffurnace at
Cowedene bound in 2000^{ls}
Thoms Burre of Cowden
aforesaid yeoman in 200^{ls}
Suertyes { Abraham Wyllard of
Tunbridge in Kent in 200^{ls}

3. Thoms Burre of Cowdene aforesaid
yeoman Occupier of the upper furnace in
the saide parishe of Cowdene bound in 2000^{ls}
Edmund Wyllard of
Tunbridge aforesaid gent
Suertyes { in 200^{ls}
John Swayesland
aforesayde in 200^{ls}

4. Abraham Willarde aforesayde Occupier
of the ffurnace at Bardeene in Kent,
bound in 2000^{ls}
Edmund Willard
aforesaid in 200^{ls}
Suertyes { John Swayselande
aforesaid in 200^{ls}

5. Edmund Wyllarde aforesayde Occupier
of the ffurnace at Bardenne aforesayde
bound in 2000^{ls}

		Abraham Willarde	200 ^{ls}
		aforesayde in	
Suertyes	{	Thomas Burre aforesaid	200 ^{ls}
		in	

Primo die Novembris 1590

6. John Phillips of London gonnefounder
Occupier of the ffurnace at Ashurst in
the countie of Kent bound in 2000^{ls}
Thomas Johnson of
Hartfeilde in the countie
of Sussex in 200^{ls}
Suertyes { ffrancis Johnson of
Hartfeilde aforesayde
yeom 200^{ls}
7. Thoms Johnson aforesayde yeom
Occupier of the ffurnace at Horsmonden
in Kent called Sherndene bound in 2000^{ls}
John Phillips aforesayde 200^{ls}
in
Suertyes { ffrancis Johnson 200^{ls}
aforedayde in
8. ffrancis Johnson aforesayde Occupier of
the furnace called Scarlets at Cowdene
aforesayde bound in 2000^{ls}
John Phillips aforesayde 200^{ls}
in
Suertyes { Thoms Johnson 200^{ls}
aforesayde in
9. Sir Richard Baker knyght Occupier of
the furnace at Hernden in Kent bound in 2000^{ls}
John Baker of Lymseilde
Suertyes { Surrey in 200^{ls}
Thoms Baker in 200^{ls}

10. Thoms Browne of Chiddingstone in
Kent gunnefounder Occupier of the
furnace at Chiddingstone bound in 2000^{ls}
George Rustell of
Chiddingstone in 200^{ls}
Suertyes { Edward Willoughbie
Lincolnes Inn in com
Middlesex, gent in 200^{ls}

Staffordshire Record Office, D593/5/4/28/3 (part 2)

Mr Byngs certificat of the [...] of the yron works in the weald of
Kent

Chedingstone	Sakers	0
	Minions	0
	ffawcons	0
	ffawconets	0
	Robinets	0

A perfecte note of all the peces of yron ordnance latelie caste at
the ffurnaces of Shorneden, Barden, Asherst and Cowden taken in
Kent the viii & ixth of August in the xxxist yeare of the reigne of
our most gracious sovereigne lady queen Elizabeth &c. by Robt.
Bing & Willm Clerke esquires

viii August an^o 1589

Shorneden	Sakers	0
	Minions	xvii
	ffawcons	xi
	ffawconets	0
	Robinets	0

Sent to East	Sakers	iii
ffarleigh & so to		
Maidstone		

Minions	xi
ffawcons	iii

ix August an^o 1589

Barden	Sakers	viii
	Minions	xv
	ffawcons	xi
	ffawconets	0
	Robinets	0

Commoⁿ buyers of peeces of yron ordnance

Oliver Stiner of Themis street

Lackantius Roper ibm.

Henry Porder of east S^mythfeild

John Chapman ibm.

Giles ffleming of Themis street

Symoⁿ Starley in St nicho: lane

Edmund Harney of Themis street

Rycherd Marshall ibm.

ix Augusti

Asherst	Sakers	iii
	Minions	xi
	ffawcons	iiii
	ffawconets	0
	Robinets	0

Minions	ii	Sent to
ffawcons	ii	Milhale

ix Augusti

Cowden	John Swaysland	
	Sakers	0
	Minions	0

ffawcons	0
ffawconets	0
Robinets	0

Demi Culveringes for her ma ^{tie}	ii
Thear hath been made of late for Sir John Hawkins peeeces, Culveringes and Demie Culveringes	xii

Cowden Mr John Knight none theis viii weekes

Notes and References

¹. C. S. Cattell, 'An evaluation of the Loseley list of ironworks within the Weald in the year 1588', *Archaeologia Cantiana*, **86** (1971), 85-92. The lists form part of a larger collection of correspondence and other papers, part of the Sutherland-Leveson-Gower archive, concerning the role of Lord Cobham as Deputy-Lieutenant of Kent.

². S. Barter Bailey, 'Early attempts to control the export of cast-iron guns and the market on Tower Hill', *Ordnance Journal*, **15** (2003), 55-6.



THE ORDNANCE RECORDS: THOMAS BROWNE

RUTH RHYNAS BROWN

Part I

1598-1603- The Queen's Founder

Following the death of Thomas Johnson, Thomas Browne was given the post of Queen's Founder of Iron Ordnance and Shot. The earliest reference to Thomas Browne in the Ordnance Debenture books is in 25 January 1597/8:

“Receaved of Richarde Polhill deputy unto Thomas Browne her Ma’te founder of cast Iron shott thes severall sortts of rounde and crosbarde shotte hereafter mentioned by him p’vided and broughte into her highnes store w’thin Thoffice of Thordynce for the better supply therof Amountinge to the some of One Hundreth Twenty poundes Twelve pence.”

After this are details of the round and cross-barred shot for culverin down to saker (WO 49/22, 4v). The next debenture to “Thomas Browne her Ma’te founder of caste yron ordynnce and shotte” for £35 5s 1d is on the following page and is dated 3 February 1597/8. This is also for round shot, from culverin to falcon, weighing in all 3 tons, 15 cwt 2 qr 15 lb (WO 49/22, 5r). This is a third payment for ammunition worth £51 15s 10d on 17th February 1597/8 (WO 49/22, 6r).

These are the first in a number of payments for ammunition (e.g. WO 49/21, 17r; 44r; 53r; 57r; 82r; 83r). One unusual debenture is of robinet shot, for the lightest of the guns in service, on 12 Apr 1598:

“There is due unto Thom’s Browne her Ma’tie Founder of Iron shotte rabonett shotte halfe a tonne by him made, provided and broughte into her Ma’tie Stoare towardses the furnyshinge of a proportion for supply of the Realme of Irelande Amountinge to the some of X lib” [WO 49/21, 44r].

The first payment for an iron gun is on 18 Aug 1598:

“Receaved of Thomas Browne her Ma’te Founder of Iron shotte One fawcon of caste yron wayinge One Thousande Two Quarters weightte being by him provided and brought into her Ma’te Store towardses the furnishing of a proportion for Loughfoyle in Ireland which at x s the cth wgt Amounteth to the some of Fyve poundes five shillings” (WO 49/22, 66v).

Loughfoyle was the future site of Derry/Londonderry; the falcon is another light gun, a little heavier than the robinet.

In 1599 there are four payments for parcels of round and cross-barred shot, two for Thomas and 2 for his deputy, Richard Polhill (WO 49/23, 39v; 64r; 65r; 78r). Polhill is probably a member of well-known Kentish family, based near Tonbridge. However in the following year, a new deputy appears. There are four debentures for parcels between 26 June and 9 November 1600 “unto George Collings of London Salter deputie to Thomas Browne”. At least three of these are signed “George Collings”- the fourth is damaged (WO 49/25, 61v; 66v; 87r; 122r).

There are two remaining debentures from Queen Elizabeth’s reign, both in Thomas Browne’s name. The first, dated 30 Sept 1601, is for round and burr shot, worth £20 11s 3d and is signed “by me Thomas Browne”, as is the debenture of 2 December 1602 for round and cross-barred shot for £63 3s 10d (WO 49/26, 141v and 49/28, 216r).

Round shot is the basic solid ball of iron, weighing in set weights e.g. shot for the culverin weighed 18 lb and the demi-culverin 9 lb. Payments for the cross-barred shot are more complicated to work out. This consisted of a rod of wrought iron with an iron ball cast round it. The payments for these specify an agreed weight for the wrought iron bar and the cast-iron component- e.g. the rod for a culverin shot weighed 6 lb and the cast iron 16 lb, while the rod for a demi-culverin weighed 6 lb and the cast iron 7lb. Burr shot was made of fragments of iron and was bought in bulk. It was used to fill case shot as anti-personnel devices.

Part 2: The King’s Gunfounder 1603-1615

The accession of King James brought an end to the long war with Spain and in the early years of his reign there was a reduction in many categories of the Office of Ordnance’s expenditure. Only one payment is recorded over the next few years which may refer to Browne, a debenture dated 23 September 1606 for George Collings for delivering cast-iron guns for the forts on the Thames:

“A Debentur made unto George Collinges of London, Iremonger for these sev’ all sortes of yron ordenance by him cast and made and brought into his Ma’tie Store for the furnishinge of the Fortes of Gravesende & West Tilburie as perticulerlie followeth.”

[There are listed the weights of the cannon, one culverin, four demi-culverins, three sakers and a falcon]

“By me John Wallis for George Collings” (WO 49/32, 121).

A reference in the East India Court Minutes includes negotiations with George Browne, John Wallis and George Collins for guns and shot, suggesting there is still some sort of connection with the Brownes (British Library, EICo B/3, 135r).

From 1608 there are signs of increasing government activity. Between July 1608 and March 1609, Thomas Browne was given debentures for three parcels of round and burr shot delivered into stores. These included ammunition for the largest guns, the cannons of 8 and 7 and demi-cannon (WO 49/33, 68r; 79v; WO 49/34, 16).

Browne and another colleague, the London merchant John Davis, obtained a renewal of a warrant “of their agreement made 30 Jan 42 Eliz [1600] to receive out of the store in the office of the Ordnance all short and unserviceable pieces of iron ordnance, and within one year to deliver again into the store, weight for weight, bore for bore, and length for length, such ordnance as the Master of the Ordnance for the time being or his lieutenant should think fit to accept” (Cal. Marquis of Salisbury, Part XX, 1968, 221-22). In 1604 John Davis had already delivered into the Ordnance stores 60 iron guns, both in his own name and through Sir Thomas Waller and Sir Thomas Willoughby. Whether Thomas Browne was involved, is impossible to determine. (WO 49/30, 88r; 132r).

In response to this, two Ordnance employees, William Bull, the Master Gunner of England, and William Scott, a clerk, travelled to the forts at West Tilbury, Gravesend, Upnor Castle, Chatham wharf and the surrounding sconces “to take a viewe of all such short and unserviceable yron ordenance to be delivered unto

Thomas Browne” in 1608 (WO 49/33, 90r). Robert Bevis and William Forster went down to Chatham “to deliver broken Iron Ordnance to Thomas Browne out of Upnor Castle and Warham Skonce”, travelling by boat and horse (WO 49/34, 21v). The list of the iron guns returned from the forts details 10 guns in size from culverin to minion, as well as two broken fragments (WO 49/34, 17r). Later in March 1610 William Scott, Tristram Slader, Robert Bevis, and Wm Forster, all Ordnance officials, went from the Tower to Chatham “about the deliv’ing of sundry peeces of iron ordynnce unto Thomas Browne” (WO 49 36/22v).

These are records of several deliveries of short and unserviceable iron guns to Browne from out of the stores of the Ordnance. On 17 Nov 1609, 4 demi-culverins, 8 sakers and 3 minions were sent “in liewe wherof he the saide Browne is to redely deliyver into his highnes said store w’tthin the space of one yere ensuinge the like quantety of new and serviceable Ordynnce weight for weight of such natures Boore and lengthe as he shalbe required to make...”(WO 49/36, 95r).

On 29 Mar 1610 3 old iron guns, a saker, minion and falcon from Gravesend fort and blockhouse were delivered into the Ordnance stores to be sent on to Browne (WO 49/35, 34r). Further deliveries of guns are recorded in the Ordnance Deliveries for 1610 and 1611 (e.g. WO 49/36, 103r; 106v; WO 49/38, 113r; 130r; 143r).

Browne had to replace these unserviceable guns. In August 1610 William Bull, Master gunner of England, was paid for stores spent in proofing 24 demi-culverins, 24 sakers and 6 minions “caste by Thomas Browne and made of the mynes of Brenchley and Horsmenden in the countie of Kent” brought into the store in lieu of pieces given to Browne (WO 49/36, 127v). The following year, in August 1611, another batch of guns were received in lieu of unserviceable old ordnance, this time 10 culverins and 2 demi-culverins (WO 49/37, 58). As late as 3 Nov 1614 Browne was still sending in replacement guns, in this case, two cast-iron culverins (WO 49/42, 76).

In addition to these guns being disposed of by the Ordnance, Browne also replaced other guns loaned out to Sir Thomas Smith in the summer of 1609:

“More there hath beene received into the Store from the said Thomas Browne for and in the behalfe of Sr Thomas Smith knight v demi-culveringes and twoe Sakers of caste Iron formerly delivered out and lent unto him by warr’t from the right hono’ble the Lo’s of his Ma’tes privie Counsell wh peeces doe containe in weight over and above those peeces so lent unto him.” [WO 49/34, 51v]. Their actual delivery is probably recorded in a receipt of 10 August 1609 [WO 49/34, 53r].

Smith was involved in a number of colonial and trading ventures, including to Virginia and Bermuda, as well as the East India Company and it is not clear exactly, which of these the guns had been intended for.

Browne was still delivering guns on normal conditions and shot into stores. This began in March 1608 when William Bull and William Hammond went to Milhall in Kent, where they proofed iron ordnance which were to be sent up to the Tower for the King’s service (WO 49/34, 19v). In December one of the Ordnance labourers was paid for a journey of seven days into Kent:

“for his travell and charges being sent by Sr Roger Dalison knight Lieuten’nt of his Ma’tte Ordenance into Kent unto Thomas Browne his Ma’tte Founder of yron ordnance about his Ma’tte Service for the dispatch and makinge ready of yron ordnance to be sent up to the Tower for the service of Irelande” [WO 49/33,120r].

In June 1609 a number of guns were delivered by Browne “towardses the furnishinge of dyvers of his high’s castles and fortes and for other his high’s services”: first three culverins, four demi-culverins and five sakers, followed shortly by five culverins, three demi-culverins and a saker (WO 49/34, 36r; 38r). In July he

delivered one demi-culverin and 3 sakers (WO 49/34, 51v). A payment for guns in December 1611, after listing the weights of two culverins and nine demi-culverins, added:

“Poiz of all the said Ordennce is xix tonnes demi vii c’weight, w’ch at the rate of xiii lib vi s viii d the tonne amounteth to the some of cclxiii lib xiii s iiii d whereof there is to be deducted for xiiii tonnes vii c’th and twoe q’ters weight of broken and unserviceable Ordennce formerly deliv’d unto him out of his Ma’te Store at the rate of xl s the tonne ye some of xxviii lib xv s And there remaineth due unto him the said some of ccxxxv lib xviii s iiii d” [WO 49/37, 91r].

The increase in traffic of ordnance is even reflected in the payments for the crane on Tower Wharf dated 7 September 1610, where new rope was needed “for taking up of new Ordynnce made by Thomas Browne his Ma’te (founder) for caste Iron Ordynce and shotte” (WO 49/36, 128r).

During the 1610s Thomas Browne was also casting ammunition; in fact between 1612 and 1616 he supplied only shot and no guns to the Ordnance. Most of these were round and cross-barred shot but there were a number of unusual items, such as the shot for the largest cannon and non-standard basilisks, as well as hollow shells for mortars (WO 49/34, 65r & 77r; WO 49/35, 3r & 103r)

Last Years 1616-?

In 1616 there was another burst of activity relating to gun supply for the Ordnance, beginning with the accessories for the proof, sent out on 20 April:

“Delivered out of his Ma’te store wythin the offyce of the ordinannce the daye and yeare above written unto Wyllyam Hamond mr Gonner of England for the double proving of Three culveringes Tenn demi culveringes Two and Twenty sakers and eight mynions of past Iron ordinance made of the

mynes of Brenchly and Horsmondon cast by Thomas Browne founder of his Ma'te service These quantities of powder shott and matche hereafter mentioned by order and directions from thoffycers of thordinance . That is to saye
 Round Shott of Iron | for culveringe - iiii or
 | for di culverringe - xx ty
 | for sakers - xliiii or
 | for Mynions – xxxii
 Corne powder-----vii cth wgt
 Match -----one skeyne”
 [WO 49/45, 168r].

The guns were received into store in May; the first delivery for two culverins and three demi-culverins dated 3 May 1616 was for guns in lieu of short and unserviceable guns and therefore has no payment (WO 49/44, 36). The second was a debenture for £607 10s, dated 14 May 1616 for one culverin, seven demi-culverins, 22 sakers and eight minions (WO 49/44, 45). The debenture of 7 June 1617 is made out to “John Browne deputie unto Thomas Browne” and is the earliest reference to Thomas’s son in the Ordnance records. It was for 6 culverins, 13 demi-culverins and 10 sakers , priced at £678 (WO 49/46, 70). However the next payment, for round and cross-barred shot for £200, is made out to Thomas Browne again. At the end of the debenture is a memorandum:

“The sayde Thomas Browne did receave full satisfaction for all the shott before mentioned by virtue of the Privye Seale dated the xiiiith of March 1618 upon w’ch privy Seale and (by) virtue of an Order therupon made he the said Thomas Browne dyd receave at the hands of Sr Thomas Watson knight one of the Colle’rs of his Ma’tte Excheq’r the full some of cc lib as by his Acquittance remayning w’th the said Sr Tho Watson may appeare” [WO 49/46, 106].

From 1619, most of the payments are to Thomas’s son, John, who would become the most famous and influential member of the family. The last debenture in Thomas’s name is dated 4 February 1619/20 and is for round shot (WO 49/49, 13).

The exact date of Browne's death is unknown. Traditionally it is said to be 1615, the date John Browne received the title of Gunstone maker, but there are too many debentures post-dating 1615 to make this seem reasonable. No will seems to have survived which can be attributed to him so that at present I cannot give an exact date for his death.

Part 4- Conclusions

The study of the debentures owed by the Ordnance Office to Thomas Browne strongly suggest that in the last years of Elizabeth and the first twenty years of King James were neither good nor profitable years for the Wealden iron industry in so far as state patronage was concerned. The number of iron guns purchased over 25 years was pitifully small; certainly not enough to sustain the burgeoning industry or give it too much encouragement. The largest number (as opposed to weight) of guns Browne supplied in one year was 43 guns in 1616 closely followed by 42 in 1610. However in many years he supplied no new guns at all, such as between 1599 and 1605 or in 1612 and 1613. Between 1598 and 1617 Thomas Browne supplied a total of 181 guns, mainly in the saker and demi-culverin class. In 1625 his son John Browne managed to find over 500 iron guns, mainly for the ships hired to escort the merchants. These relatively small numbers were however very respectable when compared with the purchases of bronze guns in the same period. At this period the great Navy built up by the Tudors was in decline; few ships were built to replace the aging Elizabethan vessels so that when the *Prince Royal* was built in 1610, it was armed with old bronze guns, rather than new ordnance. The iron guns were mainly intended for less prestigious ships and the forts and were usually in the smaller sizes. On the other hand the supply of iron ammunition was a more regular and possibly more lucrative venture; guns had to pass proof, while shot was less scrutinized.

The private markets were more important in the growth of the iron industry than the government patronage, particularly the export

industry. The Wealden gunfounders had long relationships with the Netherlands. There, there were Dutch entrepreneurs who re-exported the ordnance, merchant companies such as the VOC, the East India Company, with a need to arm large merchant ships, cities which needed guns to place on their walls and a government with forces on land and sea committed to their long struggle against Spain. All these were more important to the wealth and status of Thomas Browne than the Ordnance Office's purchases.

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INDEX TO WEALDEN IRON, 2ND SERIES, 24 (2004)**compiled by J. S. HODGKINSON**

- Arnold, Ephraim, 11
 Ashburnham, William, 8
 Ashdown Sand, 3
 Ashurst (Kent), 6
 Ashurst furnace, 10, 13,
 14, 15
- Baker, John, 13
 Baker, Richard, 7, 13
 Baker, Thomas, 13
 Ballard, Richard, 8
 Battle (East Sussex)
 bloomeries, 2, 3
 Netherfield, 3
 Petley Wood, 2
- Bermuda, 21
 Bevis, Robert, 20
 Bidborough (Kent)
 Barden furnace, 6, 9, 12,
 14, 15
- Brattle, Thomas, 8
 Brenchley (Kent), 20, 23
 Horsmonden (Brenchley
 or Shirrenden) furnace,
 8, 13, 14
- Brown, R. R., 16
 Browne, John, 23, 24
 Browne, Thomas, 6, 11, 14,
 16-25
- Bull, William, 19, 20, 21
 Burre, Thomas, 12, 13
 Butler, C., 4
 Byng, Mr., 14
 Byng, Robert, 7, 14
- Cattell, C. S., 6
- Chapman, John, 15
 Chatham (Kent), 19, 20
 Chiddingstone (Kent), 6
 Bough Beech furnace,
 11, 14
- Clarke, William, 7, 14
 Clérimois (Yonne, France), 5
 Collin(g)s, George, 18, 19
 Cowden (Kent), 6, 16
 Cowden furnace, 10, 11,
 14, 15
 Scarlets (Cowden Upper)
 furnace, 12, 13
- Cranbrook (Kent)
 Bedgebury furnace, 7, 12
 Hernden, 13
 Sissinghurst, 7
- Culpeper, Alexander, 7
 Culpeper, Anthony, 7-8
- Dalison, Roger, 21
 Darell, Henry, 8
 Davis, John, 19
 Dunnednoll, John, 12
 Dyke, Thomas, 8
- East Farleigh (Kent), 14
 East India Company, 21
 court minutes, 19
 East India Company, Dutch, 25
 East Malling (Kent), 12
- Fane, Thomas, 9
 Fleming, Giles, 10, 15
 Forest Row (East Sussex)

- bloomerics, 4
 Tablehurst Farm, 4
 Forster, William, 20
- Goudhurst (Kent)
 Bedgebury forge, 7
 Chingley forge, 8
 Chingley furnace, 8
 Gravesend (Kent)
 fort, 19, 20
 gunfounders, 9, 10, 11, 13, 14
 Gunner, Master, of England,
 19, 20, 22
 gunpowder, 23
- Hadlow (Kent)
 Gage Green, 9
 Hammond, William, 21, 22
 Harney, Edmund, 15
 Hartfield (East Sussex)
 Cow Park bloomery, 5
 Hawkhurst (Kent)
 Hawkhurst furnace, 7
 Hawkins, Joh, 16
 Heathfield (East Sussex)
 bloomeries, 2-3
 Herbert, B. K., 3
 Hodgkinson, J. S., 2, 6
 Horsmonden (Kent), 20, 23
 Shirrenden, 6
 Horsmonden furnace – *see*
 Brenchley
 Hughes, Lewes, 8
- Ireland
 military supplies for, 17
 Lough Foyle, 17
 Iron Age ironworking, 4
 iron merchants, 6, 10
 iron sows, 7, 8, 9
- Johnson, Francis, 6, 10, 13
 Johnson, Thomas, 6, 8, 13, 16
- Kent, ironworks in, 6-16
 Knight, John, 6, 11, 16
- Lamberhurst (Kent), 12
 Laxton (Northamptonshire), 5
 Lewis, Peter, 8
- London
 Tower wharf, 8, 9, 22
 Tower Hill, 6
 Lough Foyle (Ireland), 17
- Maidstone (Kent), 8, 14
 Marshall, Richard, 15
 Mayfield (East Sussex)
 bloomeries, 4
 Little Furnace Wood, 4
 Medway, River
 forts, 19, 20
 Mid-Sussex Field Archaeology
 Team, 4
 Millhall (Kent), 9, 15, 21
- Netherlands
 markets for guns in, 25
- ordnance,
 bronze, 24
 iron, 6, 7, 8, 9, 10, 11,
 14, 15, 16 *et seq*
 markets for, 24
 Ordnance, Office of the, 17,
 18, 24
 Ordnance and Shot, King's
 /Queen's Founder of, 16, 18
- Pembury (Kent)

Dundle forge, 8
 Phillips, John, 6, 9, 10, 13
 Polhill, John, 12
 Polhill, Richard, 17, 18
 Porder, Henry, 15
 pottery
 East Sussex ware, 4
Prince Royal, 24
 Privy Council
 warrant, 21

 Queen's Founder of Ordnance
 and Shot, 16

 radiocarbon dating, 4, 5
 Roman ironworking, 3, 4
 Roper, Luckantius, 10, 15
 Rotherfield (East Sussex)
 bloomerics, 2
 Pocket Birches, 2
 round shot – *see* shot
 Rustell, George, 14

 Sandwich (Kent), 11
 Scott, William, 19, 20
 shells,
 mortar, 22
 Shoreham (Kent), 12
 shot,
 burr, 18
 cross-barred, 18, 22, 23
 payments for, 18
 round, 17, 18, 22, 23
 Slader, Tristram, 20
 Smith, Thomas, 9, 21
 Spain,
 war against, 25
 Starley, Simon, 15
 Stiner, Oliver, 15
 Swaysland, John, 6, 10, 12, 15

Thames, River,
 forts, 18, 19
 Ticehurst (East Sussex)
 bloomerics, 3
 Hoadley Wood, 3
 Tilbury, (Essex)
 West Tibury fort, 19
 Tilghman, William, 12
 Tonbridge (Kent)
 Bournemill furnace, 9
 Tunbridge Wells Sand, 3
 Turner, Robert, 9

 Upnor (Kent)
 Upnor Castle, 19, 20

 Virginia, 21

 Wadhurst Clay, 3
 Wadhurst (East Sussex)
 Bardown, 3
 Waller, Thomas, 19
 Waller, Walter, 10
 Wallis, John, 19
 Warham sconce, 20
 Watson, Thomas, 23
 Webbe, John, 7
 Willard, Abraham, 9, 12, 13
 Willard, Edmund, 9, 12
 Willie, Richard, 7
 Willoughby, Edward, 14
 Willoughby, Thomas, 6, 11, 19
 Withyham (East Sussex)
 Rocks Wood bloomery,
 5
 Wrotham (Kent), 11

 Yalding (Kent), 8