WEALDEN IRON RESEARCH GROUP

NEWSLETTER

Spring 1992 Number 15

Gloucester Furnace Bressumer Found

After a lecture given by myself, on the Wealden Iron Industry, for the Lamberhurst Historical Society, a member of the audience said that she had a beam, probably cast-iron, above her fireplace, with the following inscription :-

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+--------------------+
       B
     W   D   1696
+--------------------+
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On following this up the next Sunday, it became apparent that this was the cast-iron beam, or bressumer, from the famous Gloucester Furnace of Lamberhurst.

A "bressumer" is defined as "a beam across a broad opening, sustaining the superstructure", whilst the modern spelling is "breastsummer". Its use would have been to support the furnace superstructure above the casting arch.

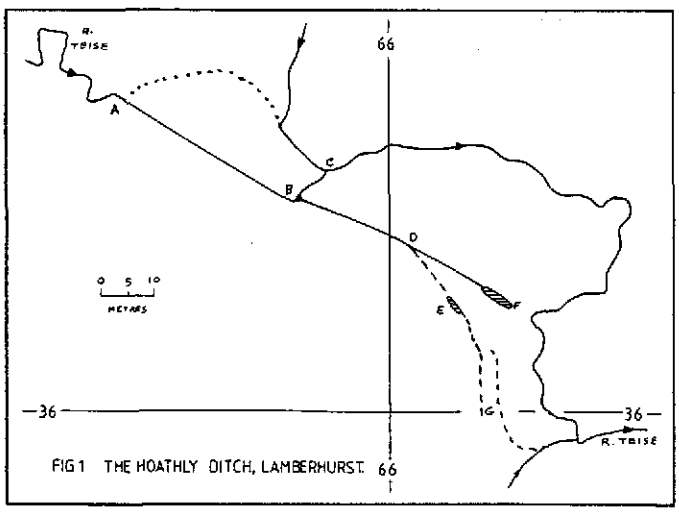


FIG 1 THE HOATHLY DITCH, LAMBERHURST

The Gloucester Furnace was the first furnace on this site, originally a conversion forge. The furnace was initially built and operated by William Benge; the usual date for building is given as 1695. This documentary evidence covers two of the initials and the date; the remaining initial may be Beng's wife's, a sister-in-law of John Barham, another local ironmaster.

It will be remembered that this is the furnace where some, if not all, the cast-iron railings for St. Pauls were cast.

The associated drawing shows the dimensions of the bressumer, fig.2, although guess-work is involved where the two ends are partially hidden within the wall. The total weight has been calculated at 11cwt, 0st, 3lbs, assuming a density of 0.261bs/cubic inch. It will be seen that both ends of the bressumer are of rectangular section, being, suitable for resting on the sand-stonework either side of the casting arch. The centre, triangular section, takes the form of a cast-iron pig, and would have supported the stonework above the casting arch.

The last date for the operation of a furnace at Lamberhurst is 1787, and is assumed to be the actual Gloucester Furnace structure, although it must have been repaired several times during the 90 years of intermittent operation.

The bressumer is now located at Hoathly Farm, Hoathly, Kent. The earliest part of the house is 15th. century, although it was extended towards the end of the 18th. century, perhaps when the

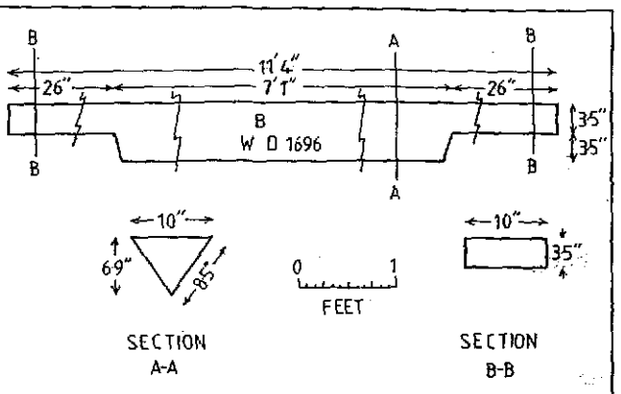


FIG 2 BRESSUMER FROM GLOUCESTER FURNACE, LAMBERHURST.

Gloucester Furnace ceased blowing. An estate map of 1795 shows the Lamberhurst forge and furnace sites, but does not show the furnace. It does, however, show the position of the "coalhouse", which would have been adjacent to the furnace.

A further discovery at Lamberhurst, made by the foray group, has been the actual site of the earlier conversion forge of 1548; it is this site that made it necessary to cut the "Hothley Ditch". This find is unbelievable considering the number of visits made by WIRG, myself included.

The Hoathley Ditch has always been assumed to finish as a small pond, close to the house known as "Furnace Mill". This is now known not to be so; some 30m before this pond (where the hopping shed now stands) the Ditch originally continued on a straight course into woodland, ending in a much larger pond closer to the river Teise.

There are the usual "forge bottoms" to pin-point the actual forge site, although the bank at the end of the pond has been removed at some time in the past, probably destroying much of the working area.

The complete site, Ditch, forge and furnace site, will be surveyed by WIRG in the near future and will be fully reported in the WIRG Bulletin, probably 1993.

The map reference for Lamberhurst Forge is TQ66193620.

Once again WIRG would like to thank the three landowners for permission to walk freely over their property.

Brian Herbert.

Winter Meeting Lewes-1st Feb 1992

It may be that "Early Iron Making in Sri Lanka and South India" was a subject which many felt to be too remote from the iron industry in the Weald, and that may have accounted for the slightly smaller than usual audience at what turned out to be an extremely interesting and highly relevant talk by Dr Paul Craddock, of the British Museum Research Laboratory. Disarmingly modest in his understanding of ferrous metallurgy, Dr Craddock described, with the aid of some admirable slides, a number of examples of the bloomery process, some of which were quite recent. For a period in the 12th and 13th centuries, Indian iron had a high reputation in the Middle East, being exported in large quantities to the fuel-starved Gulf states. The quality of the metal was demonstrated in the wrought ironwork of the famous iron pillar in Delhi, the best known of a number of similar columns found all over India.

In Sri Lanka, bloomery smelting was carried out in living memory, and the excavated remains of the furnaces, with their unusual, triangular upper shafts, had many parallels with Wealden examples. Other features may help in our interpretation of remains we might find in the Weald; such as the need for a cover over the furnace, not to protect it from rain during a smelt, but before, while the clay shaft was in preparation. Then there were the blooms with their characteristic V-shaped incision, found in other parts of the world also, caused by a blow from an axe, made to establish the quality of the metal.

Photographs of a large number of very curious iron working sites in another part of Sri Lanka caused considerable speculation and no authoritative explanation. Always sited on the west-facing sides of hill tops, they consisted of an oval area, backed by a sofa-shaped, low clay wall. They had little depth and no recognisable superstructure, yet all around was tap slag and the mysterious re-use of old tuyeres as some form of containment for slag. More easy to comprehend were the remains of crucible steel manufacture, albeit at an almost domestic level. Once a widely renowned product of the Mysore region, it was again the living memory of this process and of the, sometimes, surprising ingredients used - leaves, for example - which enlivened Dr Craddock's narrative.

A well-informed discussion followed the talk, before tea and a chance to meet old friends.

Clues to the Past

This is the first of a short series of notes which it is hoped may be helpful to members who come on forays or simply keep their eyes open for clues to past ironmaking.

Materials:

Iron ore, charcoal, clay, stone, water were used throughout the ages.

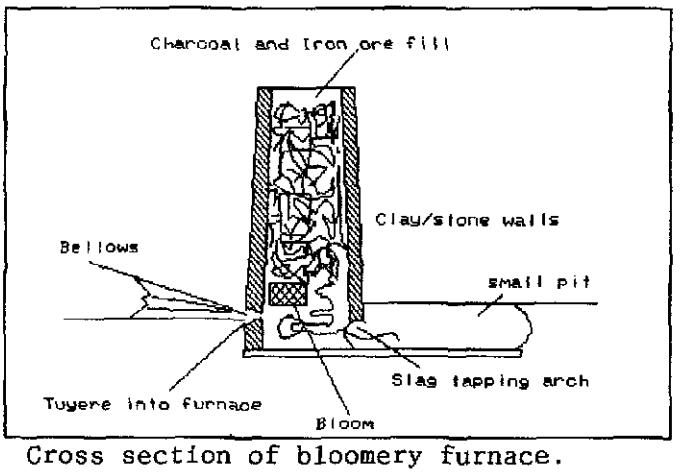
Types of furnace:

1. bloomery : Iron age to end 15th century. The product was wrought iron.

2. blast furnace : end 15th cent. to beginning 19th cent. The product was pig iron. This process also included a finery and chafery for the conversion of pig into wrought iron.

Method : 1 Bloomery furnaces were probably about 4 ft high with varying widths of 12 ins +, often built into side of small pit, although some of the Roman shaft furnaces could be free-standing. Furnaces of the Roman period were the most numerous and have been more often excavated, however, present knowledge suggests that Iron Age, Saxon and early medieval furnaces were built on a roughly similar pattern and used a similar technology for the production of wrought iron. Pig iron was not produced.

Construction was of clay and stone, with a clay lining sometimes made on 'coil-pot' principle; before use, a furnace would be dried and hardened with fire. When ready, charcoal was ignited inside the furnace and charcoal and ore were gradually added from the top. The fire was blown with bellows to reach smelting temperature, about 1200C, well below the melting point of iron (about 1528C) The iron was not liquified but separated into crystals which formed a porous, spongy mass just above the point where the bellows' tuyere entered the furnace. The furnace was periodically topped up with charcoal and ore. Slag (unwanted material from iron ore) melted at a lower temperature than iron and was tapped off from an opening at the bottom of the furnace.



Cross section of bloomery furnace. An imaginary reconstruction based on excavation and experimental work.

Output was small, a few pounds per day. Smelting was not continuous. The iron 'bloom', a spongy-looking mass of pure iron and remnants of slag, was taken from the furnace via a slag-tapping opening, which

necessitated damage and therefore subsequent repair to the furnace. Furnaces would be relined with clay and re-used several times.

The iron bloom had to be consolidated and the remaining slag removed from it by heating and hammering on an anvil.

Product : wrought iron (almost pure iron), capable of being heated and hammered into whatever shape was required but rather soft. Various techniques were developed to make the iron more steely but steel itself could be made in only very small quantities so that tools that needed to be sharp would have steel tips or edges bonded into the softer iron.

What you may find on a bloomery site

Waste material: 1. Tap slag: black, heavy, 'treacly', occasionally shiny on Roman sites, may be fairly tabular in form or twisted. 2. Cinder: rough and not homogenous, may include bits of charcoal and burnt clay; some large, heavy pieces from near the bottom of the furnace are known as 'furnace bottoms'. 3. Furnace sandstone, often reddened, sometimes with glazing formed by melting of silica content. 4. Furnace lining, reddened, may be hard if it has been near the source of heat, or soft (burnt clay). Sometimes glazed as above.

Charcoal, usually in very small pieces or simply occurring as powder making the soil very black - a very characteristic sign of a bloomery site so long as slag is present. On its own, charcoal staining may simply indicate a charcoal-burning site.

Iron ore, may be raw or roasted. In its raw state iron ore is very common and does not necessarily indicate an iron-smelting site. 'Raw' iron ore is likely to be sandy or grey in colour and may have a sandy 'skin' caused by oxidation when exposed to air. Iron ore was usually roasted before smelting. Roasted ore will be dark red in colour and softer than the raw. Small pieces often occur on bloomery sites.

Pottery, an exciting find, may suggest a date for the bloomery.

Other finds have included a bronze brooch and part of a Roman leather sandal, so keep your eyes open, you may have a lucky find!

Ore pits may be found very near to a bloomery site, particularly the early ones. They may consist of anything from a small quarry in the side of a stream-bank to large open-cast pits. Rows of small depressions indicate the sites of filled-in shaft pits of medieval and post-medieval origin.

Later bloomery furnaces were water-powered but few definite locations are known in the Weald, owing probably to post-medieval re-use of the sites as blast furnaces or conversion forges. There have been no excavations of water-powered bloomeries in the Weald. Happy hunting! c Dot Meades 1992

Congratulations

....to our President, Dr. Henry Cleere, on being made an O.B.E. in the New Year's Honours, for his work for the Council for British Archaeology, from which he retired last year.

An Appeal from Cumbria

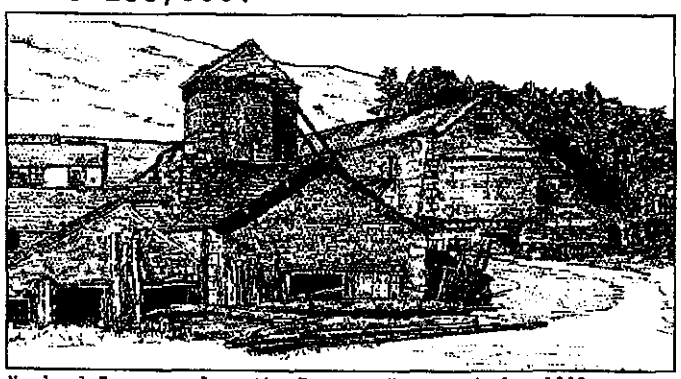
Dr. John Marshall and some colleagues of the Cumbrian Industrial History Society are endeavouring to restore the furnace at Newland Hamlet. Here he writes about the project and appeals for funds.

The historic charcoal iron furnace at Newland Hamlet, one mile NE of the town of Ulvaston (near the A590 highway) was one of a group of such furnaces built in the first half of the eighteenth century by a flourishing iron industry. The furnace was

originally erected by Richard Ford & Co. about 1746, but the present stack dates from about 1770. The Newland Enterprise lasted longer than any other of its kind in Furness (with the exception of Backbarrow), and, after enjoying much prosperity it eventually closed in 1891. The present furnace stack and associated industrial hamlet is one of the most significant monuments to regional rural industry and society in the north-west, with the whole comprising a blacking mill and former forge, a full range of buildings associated with the furnace and an historic corn mill. The whole site was recently (1991) designated a Conservation Area.

In 1752 the Newland partners, in search of cheaper charcoal, established an iron furnace and colony at Bonawe, Argyllshire, and this is today a Scottish national monument, visited by thousands of tourists.

The fate of the Newland furnace has so far been a much less happy one. After its partial demolition in 1903, it was neglected and the west wall of the stack, which contained the blowing chamber arch, eventually partially collapsed through the rotting of the heavy oak beam which strengthened the arch itself. This collapse in turn had repercussions on the firebrick lining of the furnace walls and boshes, and the structure has, in the past twenty-five years, become steadily more dangerous. In 1983 and official DoE survey estimated that the restoration of the furnace and surrounding buildings would cost some £38,000.



Newland Furnace, from the Furness Year Book for 1898.

On the other hand, Newland is a living settlement, with all the other buildings occupied, and our concern is solely with the restoration of the collapsed area of the furnace, which, for the purposes of the present appeal, can be done for less than £3000.

The work of restoration is being undertaken by a volunteer work party supervised by the County Archaeologist for Cumbria, and by the area officers of English Heritage. It is organised by the Industrial Archaeology Sub-committee of the Cumberland and Westmorland Antiquarian & Archaeological Society, by the Cumbria Amenity Trust Mining History Society, and by the Cumbria Industrial History Society, whose Chairman is acting as treasurer for the appeal. Although the project has been helped by Messrs. Glaxochem and has already received small grants from various other bodies we need more money yet to bring the rescue operation to a safe conclusion. Money from governmental sources is strictly controlled and any such help that may be offered can be many years in arriving, by which time the west wall of the furnace could have collapsed totally. WE INVITE DONATIONS (50p to £50) to be sent to Dr. A.G. Keates, Ellenboro, Low Newton, Grange over Sands, Cumbria. Cheques should be made payable to "Newland Furnace Project."

Slaggy Dog Tails from the West of the Weald

In which Carla Barnes reveals the secret of her success.

Field trips were often accompanied by my black and tan terrier, Mac. She was a well behaved dog in all matters, except those that included water, mud or pheasants! I lost her once on the South Downs, but she was happily awaiting me in a dew pond a mile from where we parted company. She always checked Hammer and Furnace ponds for depth and water quality, and tail races could be leapt with the assurance of a four paw drive. Holes were dug quicker than with a

Hy-Mac.

When the team of archaeologists arrived at Northpark in the Summer of 1989 no-one could be sure where anything on the site was buried. Whilst humans stood about pondering and measuring, Mac entertained herself with the water and decided to dry off by digging after a vole on the bank above the tail-race, but a large cut stone got in her way. The hole was quickly confiscated and the furnace gradually uncovered, but this was to be the end of Mac's interest in archaeology, though not in Northpark. One afternoon the group was taking its customary tea-break around a camp fire when they were almost mown down by a low-flying pheasant hotly pursued by a high-flying dog. Moments later Mac returned triumphant and delivered the bird generously to the feet of one of the arhcaes, but not, of course, to the one who had stolen her hole!

The pheasant trick was repeated some weeks later when a group of some 70 well-behaved middle school children arrived from Camberley to view the site. I was speaking about the history of the site when a child's voice piped up with some urgency: 'Miss, Miss'
'Just a moment while I finish please'
'But Miss, your dog's got a pheasant in its mouth.'
Thank goodness the keeper wasn't about. Mac at 13 was older than the children and ought to have known better! Sadly she died in March 1990.

We adopted a year old border collie with fewer manners than Mac but with a greater turn of speed, and a pronounced deafness when her name was being called. Obviously a long distance dog, and on a lead for the foreseeable future. A planned walk of some 8 miles on Good Friday seemed an excellent opportunity to wear her out a little.

Our leader, the Rev. A.H. Way had a theory about the Domesday entry for Trotton, part of which is now in the modern parish of Milland. As we reached Milland Place he remarked to me what an ideal site it was for a mill. He had meant a Saxon cornmill, but I thought of an iron mill. Whilst allowing Jess to cool her feet an tongue in the ford I laughingly said I would find some slag - which I did almost instantly.

The furnace is now official and I am researching its history. Jess 'got it wrong' at Churt, at least there ought to be a hammer but we must take more walks there to be sure - after all, she hasn't got Mac's experience. It was Mac who explored with me around Sicklemill when I worked on my Sturt Hammer theory, but Jess who was here to see it through to the proof of its also being Wheeler's Hammer. But more of that anon. There are some interesting ponds and watercourses on the local map -'Walkies Jess?'

Recent Publications

Edmund B.Teesdale, Gunfounding in the Weald in the sixteenth century, Royal Armouries Monograph 2 (London 1991); 142 pages, maps, tables; no index; £6.00 to WIRG members.

This is a lightly modified version of Dr Teesdale's D.Phil thesis which was reviewed in WIRG Newsletter 9 (1988). The principal modifications are in the chapter on the early development of gunfounding, where advantage is taken of the passage of time, since the original thesis was submitted, to bring up to date the historiography of gunpowder and early ordnance.

The strength of this study lies in the fact that it is the most detailed examination of the late-16th century gunfounding industry to appear, and shows what can be pieced together from a wide range of both local and national sources. Of considerable importance to the industry at this time, as it was to remain until the demise of Wealden gunfounding in the 1770s, was the role and influence of the State. The

records of government purchases of ordnances, together with the various lists compiled at the time, provide a useful source of information about the extent of the iron industry in the Weald as a whole. Less easy to assess, however, is the extent of the merchant trade in guns and, as appears to have been the case in later periods, a number of furnaces may have operated solely in this market. Such may have been the case of the furnace at Batsford, and this writer was surprised that it had been omitted from the lists of furnaces which Dr Teesdale had prepared. The existence of its guncasting pit, revealed only by excavation, points to the possibility of a larger number of gunfounding furnaces in the Weald at that time.

There are rather too many printer's errors in the text and the lack of an index is to be regretted. Original surveys of this sort are valuable both for the new perspective they give the student on their particular subject, but also for the accumulation of references and the incidental information derived from them. For this, latter, reason an index is essential. The book is attractively presented and the maps and tables are, with one slight exception, clear.

Also on the plus side, it is a matter of some satisfaction that the present writer's earlier exhortation that this thesis should be made available to a wider readership has been taken up. It must be hoped also that the attractive presentation and the modest price of this book are a sufficient indication that, with modern desk-top publication methods, the reproduction of longer studies with a limited interest market is now a viable proposition.

The Romans have been to Heaven!

The field group has made this important discovery during a bloomery site dating dig. Two trial trenches were dug into a slag bank at Heaven farm, Dane Hill, Sussex, in January. It was only when the trenches were being back filled that a small piece of pottery was found. Later examination by experts has proved it to be of Romano-British origin. Once again we must thank Hugh Sawyer for this find, (his eyes must be attuned to Roman Pottery), which would otherwise have meant a "wasted" days digging. By "wasted" we mean unfruitful; everyone in the field group always enjoys forays, whether successful or not.

Finings

A COMMENT ON THE MINSTER GUN (see Newsletter 14)

There is no evidence to support the oft-repeated suggestion that H is the mark of Harrison of Robertsbridge. Firstly Harrison's link with Jukes at Robertsbridge did not extend beyond the first lease. William Harrison was a London-based merchant and ironmonger rather than a hands-on founder. With various partners he built up a large network of furnaces which, in the second quarter of the 18th century became the largest supplier of iron guns to the British government and the merchants. Where evidence can be found to identify a trunnion mark, it usually follows the pattern: single letter represents a furnace e.g. A for Ashburnham or C for Conster; double letter for Founder's name e.g. JF for John Fuller. Using this we should look for a furnace beginning with letter H. The likeliest candidate is Hamsell Furnace. In the seventeenth century under the Baker family it was an important furnace for the production of ordnance but in the eighteenth century it dwindled in importance. It was part of Harrison's works.

It appears in the 1740s to have been used for casting smaller guns and merchants' guns; John Fuller did not include it in his list of furnaces capable of casting the largest guns. In Nov 1745 an air furnace was built there.

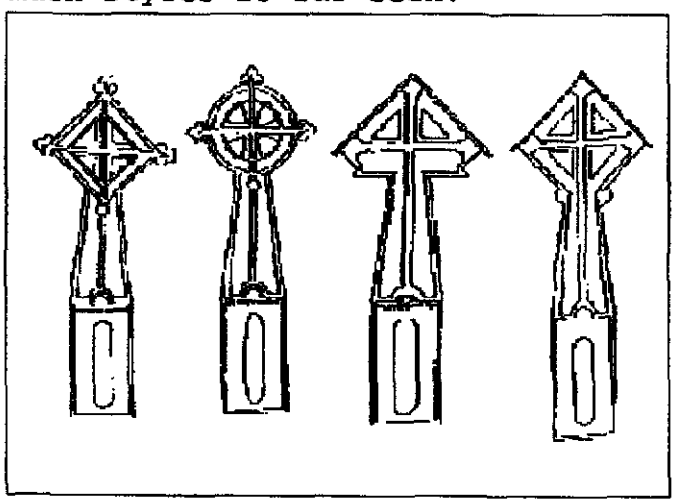
This length of 9 pounder was first mentioned in payments for the Board of Ordnance in 1740 and continued in manufacture till the end of the Wealden period; when the Board stopped buying guns from the Wealden founders, they continued to manufacture them for merchants and the East India Company.

H is a less common British trunnion mark. It is often confused with guns marked H from the great Swedish furnace of Huseby. These can usually be distinguished by the date in two or four numbers cast onto the opposite trunnion.

Ruth Brown

CAST IRON HEADSTONES

Tony Yoward, Slipper Mill, Emsworth, Hants P010 8BS, is researching into late 19th century cast iron headstones. He knows of 60 at various locations in Surrey, but would like to hear from anyone who comes across such an object in their travels. The diagram below gives an indication of the four main styles so far seen.



NEWS FROM THE PAYS DE BRAY

Apart from the 1451 date for the Le Becquet forge in the Picard part of the Pays de Bray no firm dates for the building of its ironworks have previously been available. Indirect evidence had suggested that the works in the Norman part of the Pays de Bray were set up from the mid-1470s onwards. Now a registre de tabellionage (notaries' register) of the viscounty of Beaubec for the period 1476 to 1501 (ADSM, 2 E 83/412) has been found, which gives a date for the Rouge Moulin (the 'forge d'Acher' and the 'fonderie de Frenchy', see Bulletin, 2nd series, No. 19, 1990, pp. 29-30). It appears that the ironmaster, Anthoine de Quenel, chevalier, took possession of the watercourses at Rouge Moulin by an act dated 14 August 1481. The transfer itself does not survive, but is alluded to in an act of 1485, which makes it clear that the transfer related to the watercourses, corn mill, fisheries and 'other things conveyed', without affecting the tenure of the remainder of the manor. A date of late 1481 or of 1482 for the building of the works at Rouge Moulin fits in admirably with what had been previously been inferred.
B. G. A.

DE LA CHAMBRE ARMS

Thank you to all those who wrote in on the subject of the 'de la Chambre' arms, raised in the last issue. There appears to be no connection between the family and the gun founding industry, and the general concensus is that the family's armorial bearing is simply an example of canting arms.

Obituary

We bring to your notice the death of Professor W.G. Hoskins, CBE, on January 11th., at the age of 83. He pioneered a completely new type of study of the English landscape, showing that it is not a random arrangement but has been shaped

and reshaped by Man over the years. He wrote many books on the subject, the best known being "The Making of the English Landscape" 1955.

It was between 1976 and 1978 that Professor Hoskins became known to a wider audience when he presented a series for BBC2 called "Landscapes of England". WIRG made a small contribution to the programme "Kent: Landscapes of War and Peace". At one point, Mr Hoskins, wearing shoes, stands in the stream at Upper Stonehurst Farm Bloomery, discussing the technicalities of building and operating a bloomery furnace. Once again he showed his ability to communicate his enthusiasm for the landscape to others; this time to the man in the street.

An associated book was published by the BBC as "One Man's England".

The following has been quoted :-

"The dullness of much local history is because it is written by people who only study documents and never look at the fields and farms and streets and lanes, with which the documents are concerned."

An outlook with which we in WIRG wholeheartedly agree, and which, it is hoped, shows in our Bulletin.

B.K. Herbert

For Sale

WIRG's old and trusty resistivity meter is up for sale. Any offer over £19.99 secures!.

P.S.

My thanks to all members who have shown an interest in the news letter, and particular thanks to those who have gone to a deal of trouble in actually writing things for me. Please keep them coming! Granville Davies 0892.541629.

W.I.R.G Summer Meeting July 25th