ESSEX JOURNAL

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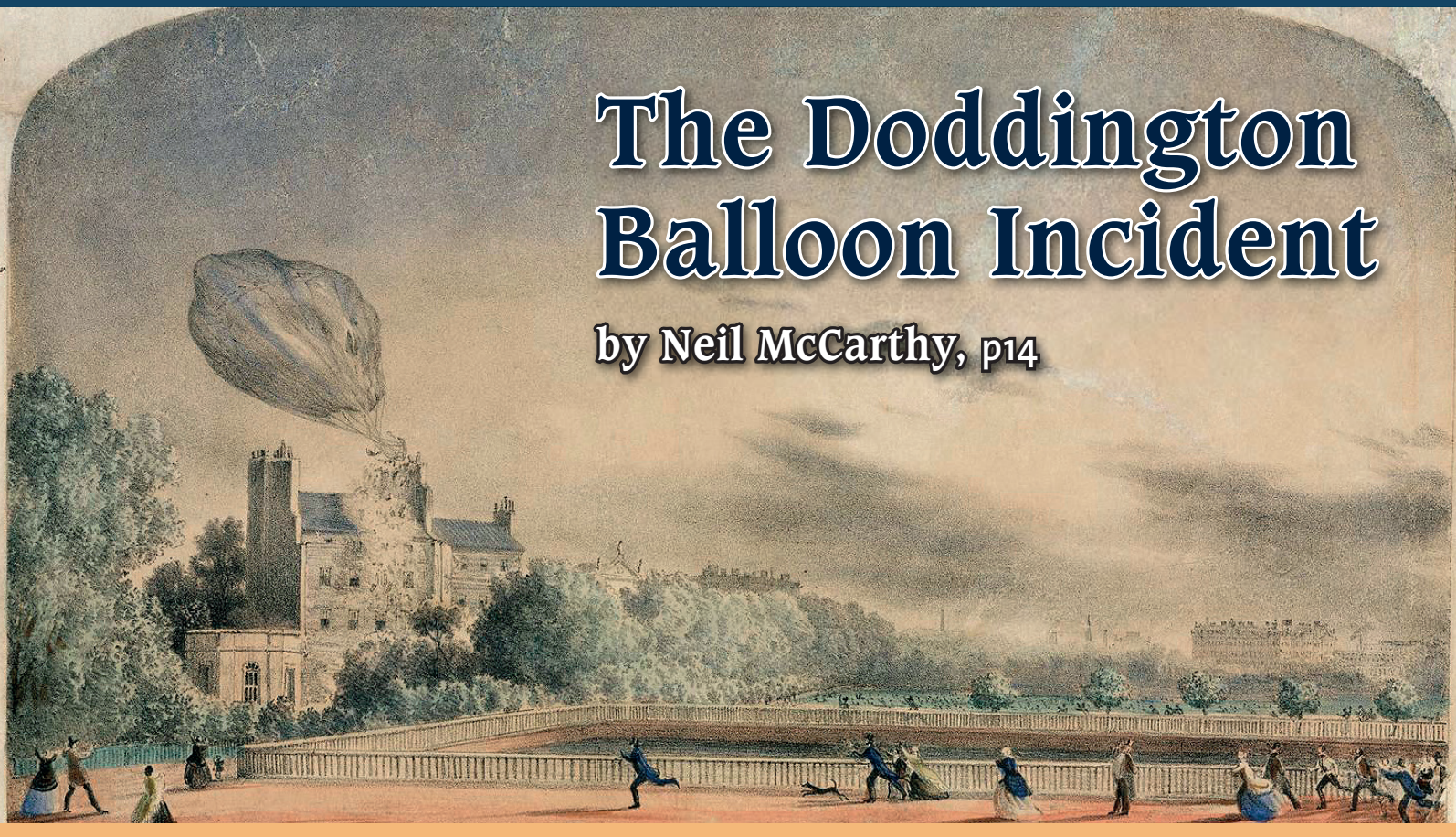

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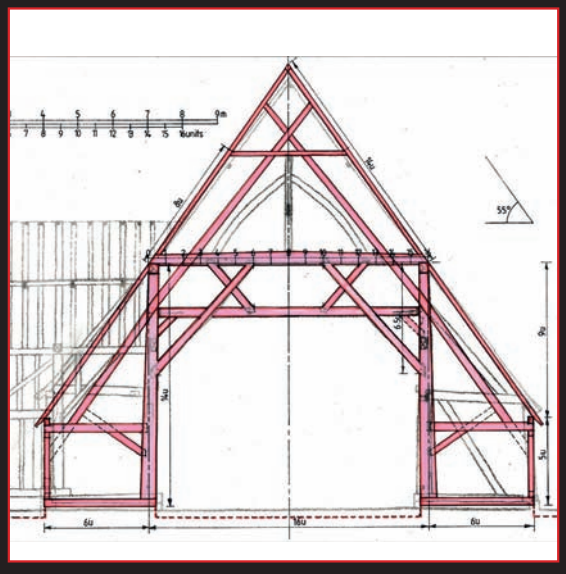

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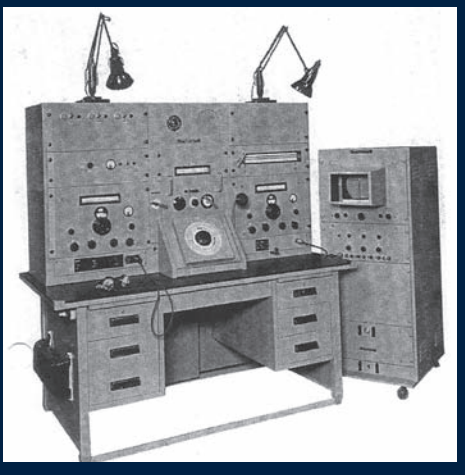

Also in this issue:

- Rediscovering an Essex Marian Martyr
- Coroners, post mortem examinations and exhumations
- Book Reviews

Welcome to the Autumn 2024 issue of the *Essex Journal*

I am very pleased to be able to present a fine array of interesting and engaging articles again. We begin with an original insight into the world of the religious controversies of the mediaeval and Tudor periods, when opinion swung back and forth between polarities, based in little more than the preferences of the person who held the reins of power at any time. There was more at stake than polite disapproval: lives and livelihoods might be lost, heirs disinherited and landholdings forfeited. Into this febrile environment Kevin Bruce leads us in search of the Coker family, whose fortunes at Hazeleigh Hall rose and fell in line with the changing times: members of the same family might experience very different outcomes, if they happened to be in the wrong place at the wrong time. Detailed examination of the present building and of the documentary records provides an idea of the web of connections the Cokers enjoyed.

Post-mortem autopsies are a very modern obsession if the current amount of television drama is any guide: 'Prime Suspect', 'Crime Scene Investigation' and 'Silent Witness' are among the offerings currently available, though doubtless there are others. But how modern is this practice? And what was exhumation supposed to prove in an age before forensic investigation, DNA and microscopy? Michael Leach sets out the details of some early cases from our county, as early as the 17th century. But the office itself is older – already introduced by the 13th century – and the holder of the office could be called in when violent death was suspected in order to "establish when and where the death had occurred, to visit and search the house of any suspect and to obtain the necessary pledges to ensure that he or she did not abscond. If he did so, the coroner could 'levy hue and cry' in pursuit of the escapee. The coroner also had to determine whether the individual had been slain, drowned or strangled by a cord round the neck, or if there was other visible evidence of hurt on any part of the body". Quite a heavy responsibility in an age before any kind of independent police force.

'Quite heavy' might apply to a human body when suspended hundreds of feet in the air without a reliable means of propulsion, but early experiments in heavier-than-air flight were already fashionable in the early 19th century, and pioneering female aeronauts took their place beside their male colleagues. One such was the intrepid Mrs Graham, whose flight over Essex in 1836 ended in a serious (but not fatal) accident. Neil McCarthy guides us through both the bare facts of the event, and also its reporting in the media of the day which led to a kind of celebrity status for Mrs Graham, and a career in the aeronautics industry… well, almost The pilot of the craft was none other than Charles ll, Duke of Brunswick, sometimes styled 'the talk of Europe' for his reputation as a swashbuckler.

Ford End direction-finding (D/F) site was certainly never 'the talk of Europe' in its day, being a hush-hush top-secret establishment which played a vital role in the detection of submarines during World War Two. The system did not rely on a team of expert codebreakers working round the clock or the development of computer technology to crack the secret code: its sole purpose was to identify a signal as likely to emanate from a submarine and to triangulate on the position of the source. No further information was needed. Michael Kirwan discusses the establishment and operation of DF sites and their role in the Battle for the Atlantic.

Technology has a multitude of purposes, of course, and Paul Reed's article discusses the fruit of his original research into the methods used by medieval carpenters to produce buildings by dividing the span of the tie-beam into units to produce a measuring rod to set out the roof and the floor plan with precise accuracy – and all without using geometry or numerical measurements. This is a novel approach, not unlike builders today who often do not need to know the length in measured units of a timber, since they simply cut the wood to fit.

Book reviews continue to be a popular feature (well, I like them) and this time we have Neil Wiffen's thoughts on Adrian Corder-Birch's most recent work: *A Centenary History of the Courtauld Homes of Rest 1923- 2023*. Also hot off the press is Martin Rose's treatment of *The Railway Through Audley End* which sets out to answer some timeless riddles: Why do all fast trains stop at Audley End Station? Whose is the heraldry on the portal to the tunnel at Littlebury? These and other mysteries are explained in detail, and the answers are a little surprising. Also reviewed are *Celebrating the City of Southend*, a recently acquired city to add to Colchester and Chelmsford, and a fine celebration of the life of William Addison who was so important on the Essex historical and arts scene for almost half a century.

Erratum:

There was an oversight in Neil McCarthy's article on the Dengie coast in the 2024 Spring Edition that requires correction. He concluded that a 1930s proposal to build a bombing and firing range for aircraft target training off Bradwell Saltings was never completed. In fact, the range along with ancillary onshore buildings was fully constructed by 1938 and subsequently used for target practice by both RAF and US military aircraft. It was decommissioned in 1962.

References

Mersea Museum/Kevin Bruce Collection – www.merseamuseum.org.uk ID. KBC_DRA

Historic England – www.heritagegateway.org.uk SMR no. 46141

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Notes to contributors

Contributions are welcome and should be sent in a Word format to the Honorary Editor at the email listed above. General correspondence can either be emailed or posted to: Amore, Mill Road, Boxted, Essex CO4 5RW. The Editor is more than happy to discuss any proposed articles as he does not guarantee that unsolicited material will be published. Contributors are requested to limit their articles to 2,500/4,000 words, other than by prior agreement with the Editor. Style notes are available.

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Cover illustration below:

Illustration of the Grahams' crash into a rooftop after a flight over the Great Exhibition

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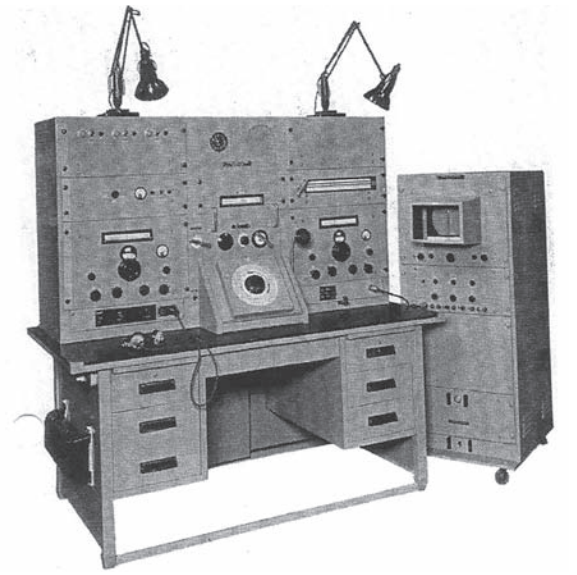
5 Picture DFG 26 desk



In Brief

Excavation work on the route of new supplylines for Abberton Reservoir have produced evidence for an extensive Bronze Age landscape of farms, settlements and a field system dating back around 3000 years, all in the area of Layer de la Haye. A chance find from the dig is a small denarius coin issued by Valentinian I who ruled the Western Empire from 364 to 375 AD. (An alternative interpretation of the find puts it into the reign of Gratian, active from 367 to 383 AD.) In either case, this *denarius* was issued at the tail-end of Roman involvement in Britannia and was among the last Imperial coins circulating in these islands.

The End of an Era: The recent Denarius find. Image courtesy of Oxford Archaeology

A curious early medieval mount was found by a metal detectorist in September this year, in the area of St. Osyth, near Colchester (PAS reference ESS-173741). The bronze fitting is only 50mm (2") long and made in the form of a man with his legs folded and his hands clasped beneath his knees. The head is D-shaped in section with exaggerated eyes while the chest is square, flat and embellished with interlocking panels ready to accept enamel. The fixing point is a rivet behind the mouth.

An unusual mount from the Middle Saxon era: evidence of an Irish connection for Saint Osgyth? (Image: Portable Antiquities Scheme).

It dates to the 8th century and was probably made in Ireland, or in England to an Irish design. Links between the Anglo-Saxon church and the Irish are well known at this time, with missionaries from both traditions undertaking conversion work in Continental Europe. The lady Osgyþ herself (the name which mutated into 'Osyth' after which the village was renamed) died around 700 AD and and is known for her religious connections. Might she have entertained an Irish visitor whose drinking vessel or travelling chest was left behind, and this humble but intriguing fitting then ended up lost in the vicinity of her hall?

Rediscovering an Essex Marian Martyr

Kevin Bruce

Background

Thomas Causton has long been known as a Marian Martyr originating from the Dengie Hundred[1] but a chance discovery has revealed another who has been overlooked since his death. A Chancery Suite[2] relating to a land dispute between the lord of Southminster manor, Thomas Sutton, and Able Clerke the tenant, contained a summary of the land's previous ownership. It was stated that the property, 104 acres in total, had been held by 'William Cooker who was convicted and attained by the laws statute of this realm for heresy and executed for the same', during the second year of Queen Mary's reign.

Not having heard of this martyr, searches on the web first revealed that a William Coker was burnt at Canterbury 23 August 1555 but no information was given as to his residence.[3] The National Archives hold an IPM for a William Coker of Essex at the right date.[4] Further web searches produced a very informative and excellent essay by Dr. Paul Cavill[5] in which William played a significant part.

William Coker resided in Hazeleigh, most probably at Hazeleigh Hall of which he was the tenant at his death. His father John had obtained a sixty year lease of the estate from Giles Leigh in 1532[6].

The Coker and Causton families had been resident in the Dengie Hundred since the early 15th century and were the wealthiest people in their parishes in the 1523 Lay Subsidy[7]. The two families were well known to each other and there are several documents showing that there were financial dealings between them. There was also one inter marriage between the two families.

John Coker was most likely descended from the Cokers of Woodham Mortimer, to the north of Hazeleigh, and were linked to the family of Roger Coker of Mundon. All were substantial yeomen. William's family wealth appears to have been largely amassed during his father's time. Following his acquisition of Hazeleigh's lease in 1532, John acquired 30 acres of pasture in Steeple in 1536[8] and the following year purchased Bramstons alias Newhall, 240 acres in Purleigh and Hazeleigh[9]. Also in 1536 John 'of Hazeleigh, yeoman' acquired Paperelles in Vange from William Harris of Mundon, gent[10]. From Feet of Fines, John appears to have acted as a feefoo with William Harris in 1530 and 1534, the former involving land purchased from Edward Bury[11] and in the second, John was acting with James Osborne[12]. [see later for these two people]

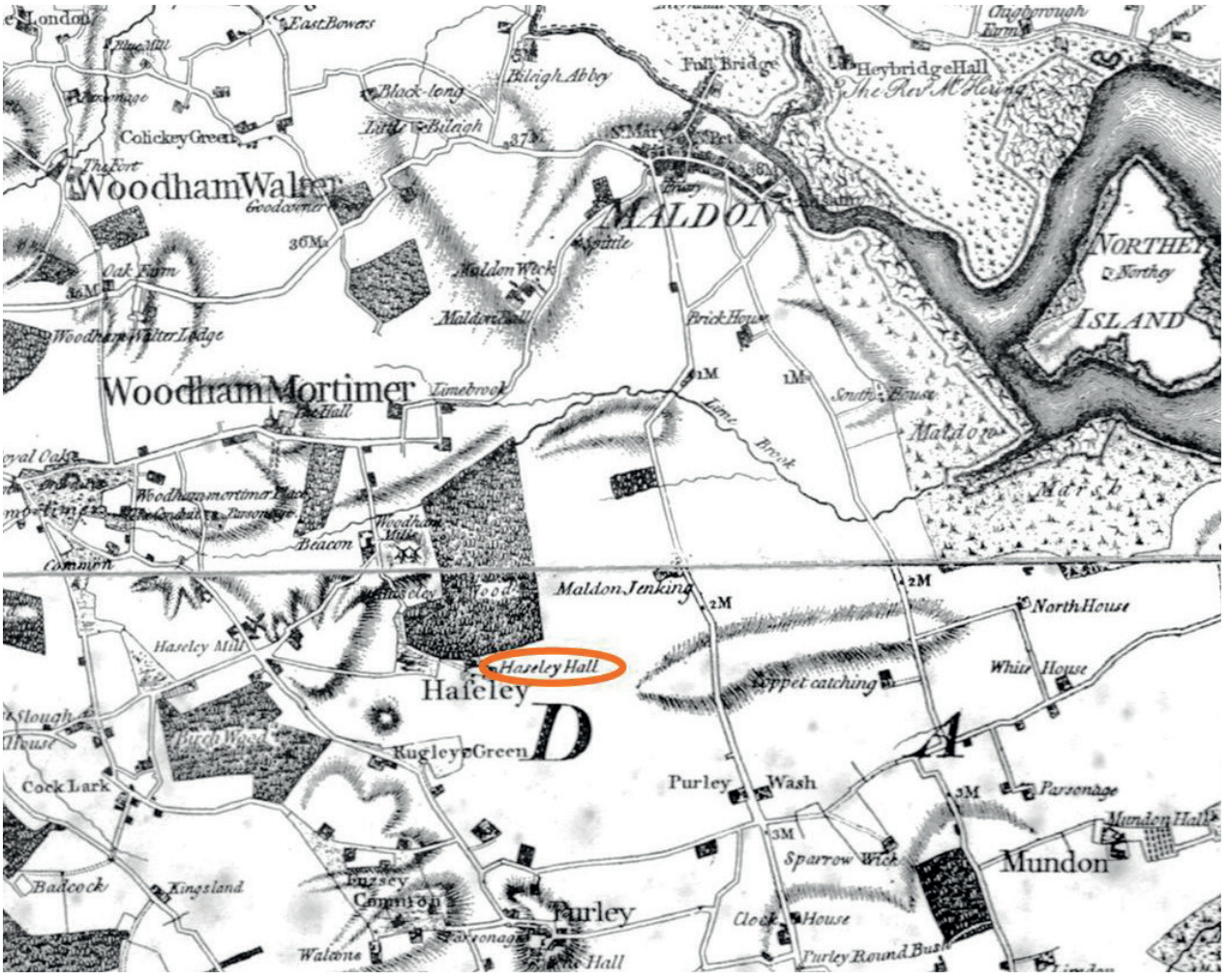
In 1541 with his son Robert he purchased 32 acres in Stock for Robert[13] and in the same year purchased 33 acres in Purleigh for himself[14]. The tenancy of East Newlands, 290 acres, in St. Lawrence, came to him through his father-in-law sometime before 1525[15] and he later purchased the former St John's Monastery farm in 1541 jointly with his son John[16]. The following year he purchased 90 acres in Bradwell and St Lawrence from Robert Andrew and Elizabeth his wife, sister and heir of William Wyatt[17]. In 1544 he purchased 100 acres in Bradwell with Thomas Isaac as his feefoo, a relation of the Wyatt/Wyott family[18]. (see later) In the same year he purchased 80 acres in Purleigh and Maldon from Sir Thomas Darcy[19]. The final purchase as seen in Feet of Fine was of the manor of Wychams, 220 acres, mostly in Woodham Ferrers but also in adjoining parishes[20]. Apparently not recorded in Feet of Fine, John had purchased from Edward Bury the confiscated chantry lands of Rayleigh Church, 70 acres which lay in Woodham Ferrers[21].

John married the daughter of John Denby senior of Colchester, sometime before 1525 when John Denby made his will[22], and they had four sons and a daughter; John, Robert, William, Edward and Mary.

In the IPM for John senior, Robert his heir was described as '24 years and more' in 1552[23]. Robert was a widower with a 4 year old daughter Mary. He had apparently remarried to widow 'Barnard' whose 3 previous daughters are named in Robert's will.

No will has been found for the father who died just months after his son eldest John in 1552, but there is a joint IPM for the two John's which included a fragment of the father's will[24]. The absence of many known Coker properties suggests that he had previously distributed his lands between his sons. John bequeathed East Newlands[25] to his son Robert who was to die the following year. Robert then bequeathed East Newlands to his 4 year old daughter Mary but his main holdings, which had been his father's, Bremstons, went to his brother William[26]. His brother Edward only received a small sum of money while his sister Mary was to have several smaller properties after the decease or quitting of their tenants. John Causton and James Osburne were appointed overseers of Robert's will [see later]. The former chantry lands at Woodham Ferrers were later in the hands of Edward.

Hazeleigh's now demolished church (Photograph courtsey of Kevin Fuller)



Hazeleigh and surrounds from Chapman and Andre's map of 1777

Hazeleigh Hall

There was no mention in Robert's will of the lease of Hazeleigh Hall so this must have been William's portion of his father's estate. The hall was then held by Christopher Alleyn, the son in law of Giles Leigh, and it appears to have been William's residence. The house is described in one of the two IPMs for William in an inventory taken room by room. The document is damaged but it is possible to interpret an open hall with most likely a cross-wing containing two parlours with two chambers above. At the service end were a 'new' kitchen and two butteries, a larder and store cellars plus four unidentified rooms whose contents suggest service rooms. The most interesting contents were three tablets in the great parlor, one of the King's Arms, another of 'ancient work' and one of the story of Adam and Eve. In the little parlor there was a tablet with three gilt fleurs di lise. The household goods were valued at £6 14s 6d. 27

From a detailed survey of the present Grade II Hazeleigh Hall[28], the building mostly dates from the late 16th century with only a small section of the south range of William's home having survived. The present house was most likely constructed for Giles Alleyne, Christopher's son and heir, when it became his home after the termination of William's lease.

The two inquisitions also identified Coker's extensive land holdings. In addition to the properties already mentioned, he had acquired in conjunction with his brother Robert, lands called "Playstowe Fryses" plus other lands lying in Halstead, Stisted, and "Guynescombe"* [Gainscolne in Colne Engaine ?]. It is not known how these lands came to be Coker properties. He also possessed several parcels of land in Purleigh and Hazeleigh. Some of these he had sold to his uncle Roger Coker before his attainment and these escaped confiscation[29].

This was a legal measure that protestants often used to ensure their property, that would otherwise have been confiscated if convicted of heresy, was somehow secured for their families and heirs[30]. William had used these means when he conveyed away land between 12 February and 3 July 1555. On 20 February, he had conveyed much of his estate to two Londoners, the cutler Christopher Curley and the pewterer John Hicks. They had agreed to stand seised to the use of Coker for term of his life and afterwards to the use of family members. Under this arrangement, William had parcelled out the descent of much of his lands between different relatives including his brother and sister. The two Londoners probably acted out of sympathy for a fellow Protestant, for Curley must also be the man who accommodated the radical 'freewillers' Henry Hart and John Kempe in the capital[31].

The rest of the sum of all William's goods, worth £102 19s 10d., was made up with just two items. A debt due to William of £25 and the value of his stock on Bremston's manor which consisted of a bull, 45 cows and 224 ewes, valued at £71 5s 4d. Dr. Cavill thought that this made William Coker one of the most valuable forfeitures in Essex from the martyrs.

William had been unable to protect all his property by these means so he lost the lease of Hazeleigh Hall together with his properties that had not been included in the earlier sales. All his lands were listed in the Escheter John Swallow's returns[32].

William's Protestantism

Little is really known about William's spirituality. The ultimate expression of his faith was of course his willingness to become a martyr rather than recant and save his life. Apart from this sacrifice there are only two letters that relate to his faith. The first is a letter that William received from John Bradford written while Bradford was a prisoner. He had been a chaplain to Edward VI and a popular preacher of the Puritan faith. He had built up a sizable network of contacts of people that he could rely on to communicate with or assist in communication. William was one of these.

How or when they came into contact is not known but William had written to Bradford during his imprisonment and he now replied to William requesting his assistance[33]. He addressed his letter to Coker 'at Hazeleigh by Maldon in Essex', thanking him for 'your love token sent to me, in the tower by my good brother William Punt'. Punt was a close associate of Bradford providing him with assistance in many ways. William's letter was very likely one of support for the imprisoned Bradford. The request was for assistance 'of thys my poore brother and frende John Searchfield, whiche cometh unto you for helpe and comforte, as you can, in this troublesome time.'

Searchfield was described as 'a bookbinder in London, who in Queen Mary's time did wander, to keep a good conscience'… ' help him to some hole to hide himself in, for a little time, if conveniently you may.'

After a long spiritual exhortation commencing 'remember that " he that receiveth one of Christ's little ones receiveth Christ," as he himself in the last day will acknowledge.', he continued. 'I pray you continue, as I trust you do, to keep both soul and body pure in God's service. Strive to "enter in the narrow gate," though you leave your lands and goods behind you. It is not lost, which for Christ's sake we leave, but lent to a great usury. Remember that this time is come but to try us. God make us faithful to the end; God keep us always as his children. Amen.'

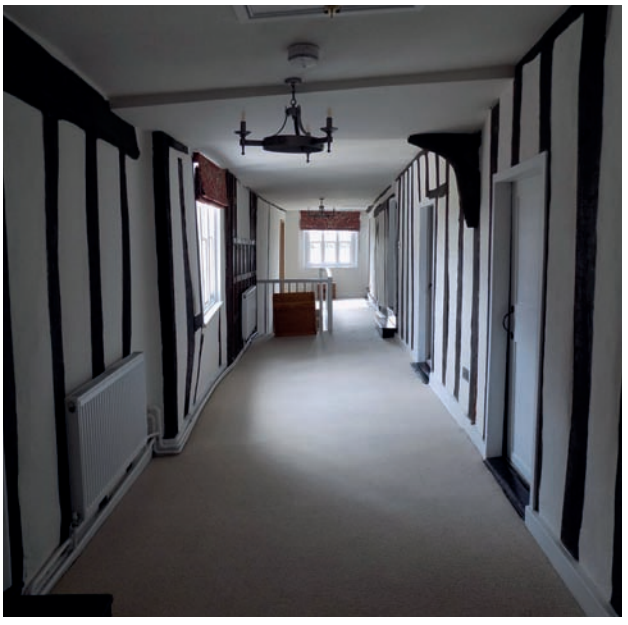
He concludes 'I pray you commend me to Master Osburne, and all our good brethren in the Lord. The peace of Christ be with us all. Amen, Amen. Yours in Christ.'

It is not known who 'Master Osburne' was but a strong candidate might be James Osburne one of the overseers appointed in William's brother Robert Coker's will in the first year of Queen Mary, August 1553 34. His co-overseers James Osburne and John Cawston, were most probably first cousins, once removed, of the martyr Thomas Causton who was burnt 26 March 1555, one of the earliest martyrs. James may well have been of North Fambridge Hall. Another Causton relative, John of Latchingdon, in his will of 1544 makes the firm condition "No procession, dirge or soul mass, except

Hazeleigh Hall early 1900s (Photograph courtesy of Kevin Fuller)

for a sermon at my funeral in praise of God and the abolition of the Romish bishops' power" 35.

Bradford's letter indicates that he was well acquainted with a group of Protestant sympathisers operating in the Purleigh, Hazeleigh area of which the Coker and Causton families could very well have been part. It might well be that Bradford's words to William gave him the strength and conviction to follow him in becoming a martyr. He was to die not quite two months after Bradford. Bradford had spent two years as a prisoner having been arrested immediately after the accession of Mary in July 1553. He was tried for heresy, along with Latimer, Ridley and Archbishop Cranmer with whom, for a brief time, they all shared the same cell together in the Tower of London.



Hazeleigh Hall Long gallery (Photograph: Kevin Bruce)

Arrest and Imprisonment

William was arrested in 1555 and imprisoned at Canterbury along with five others[36]. There is no explanation of why Canterbury but prisoners were often moved around from their habitat. One letter from him during his imprisonment to an unidentified friend, quite possibly from the Hazeleigh area, has been printed which reveals the fervour of his Christian belief.

> *"As your hearty friend in God, and, through the mercy of our Lord Jesus Christ, as pertaining to the faith your brother, I send you greeting and most Christian salutations. For your kindness, in that you wrote so speedily to me again, I commend you, and thank God for it; … I heartily joyed by occasion of your letter; because I understood thereby the state of mine old friends and godly acquaintance, and how you ye all continually labour, as we do, in the Gospel of Christ, which is the word of salvation to as many as believe… though Satan and his rabble of ministers do rage never so much with lying and deceiveable power, yea, though he should appear never so glorious and angel-like in the sight of the world, yet shall his fiery darts be quenched, and he never able to prevail against us. For which testimony of conscience, I give thanks unto God from the bottom of my heart; and pray always unto the Lord, that, as we have begun, even so we may go forwards unto the end, until the time that the darkness be clean put away, and the perfect light shine in our hearts, souls, and bodies, in the eternal kingdom with God; where we shall be sure our enemies shall not prevail against us, but then most victoriously be overcome by that sweet Lamb, the Son of God."*

Hazeleigh Hall Dining Room (Photograph: Kevin Bruce)

William concludes with an exhortation to remain 'stout in his cause, and give us grace to confess the truth before this whorish generation.'… 'Your brother in bonds, for the Lord's cause, William Coker.'[37]

In Foxe's Martyrs concerning William's examination by the bishop of Dover and other clerics, he only reports: 'William Coker said, he would answer no otherwise then he had already answered: and being offered to have longer respite of 6 days after, he refused to take it, and so upon the same, sentence of condemnation, was read against him, the 11 of July.'[38] He was convicted on 2nd August and remained in prison until his death on 23rd August 1555.

Other potential influences on William

Hazeleigh's small church stood just yards from the Hall, John and his family's home. They lie isolated from any through roads and away from prying eyes, possibly an ideal location for a non-conforming congregation? A suitable hideaway for John Searchfield perhaps.

Hazeleigh's Rector was Roger Coker, John's brother and William's uncle. He may even have resided with the others at the Hall. Roger's spiritual alignment is not known but he was ordained following his studies at Cambridge, 1524/5[39]. That may have been very significant. Ridley had studied at Pembroke Hall, obtaining his first degree in 1522, at a time of great interest and discussion about Protestantism at Cambridge. John Rogers, the very first Protestant martyr, was another Pembroke student at this time, and later, John Bradford studied there. The college provided three martyrs, all leading churchmen during Edward's reign. Roger Coker would have been very much part of the religious turmoil of that time but exactly what influence it had on him remains unknown.

He became Rector of East Donyland in 1529 and in 1536 of Hazeleigh[40]. He would have been presented to Hazeleigh by Giles Leigh, four years after his brother had obtained his lease from him.

In 1537 Giles entered an agreement with Henry VIII for the exchange of lands which resulted in Giles obtaining possession of the lands of Hatfield Peveral Priory [41]. Giles had granted his manor estate of Walton upon Thames to Henry to add to his estate of Hampton Court. Giles's wife, two daughters and their husbands, the brothers John and Christopher Alleyne, and their elder brother John Alleyne, a mayor of London and Privy Councillor, were also parties to this exchange agreement. This appears to have been necessary as Giles had already made a partition of his estates between the other parties before the exchange. This exchange did not involve the manor of Hazeleigh as that had been Leigh property since the 15th century. Afterwards Giles made a new partition which gave his son in law Christopher Alleyne the manor of Hazeleigh

among other properties and his other son in law John Alleyne the Hatfield Peveral portion[42]. Giles died in 1538 when Christopher became lord of the manor and patron to the living of Hazeleigh.

Christopher's son and heir Giles Alleyne was married to Mary Skory, the daughter of the bishop of Rochester who was a prominent puritan cleric during Edward's reign. On Mary's succession Skory, who was then bishop of Chichester, was deprived and had to renounce his wife but later he fled to the continent. Returning under Elizabeth, he later became bishop of Hereford[43].

The next generation of Alleynes, both at Hatfield Peveral and Hazeleigh, are known to have had Protestant leanings, so there may have been strong empathy with the Cokers, Roger, John and William from the earlier generations. The return of goods remaining in Hazeleigh church during the reign of Edward VI, 1552, was jointly presented by Roger and Robert Coker. At adjoining Woodham Mortimer, Richard Coker was a churchwarden and Ralph Coker one of the listed parishioners. Richard had been responsible for the sale of some of the church goods[44].

Roger Coker does not appear to have been deprived under Mary. He can be assumed to have been unmarried as he was not listed as one of the 60 Essex ministers deprived because they were married. He must have 'conformed' under Mary and continued as Rector under Elizabeth dying in 1563. His will, idiosyncratically, was in the form of verse but according to Emmison 'it evoked a bland and uncontroversial theology.' It contained no mention of other members of the Coker family[45].

Turning to John Coker's land acquisitions, some had connections with known Protestants. He had purchased former chantry lands in Rayleigh from Edward Bury, active in Henry VIII's reign as a purchaser of former monastic lands and in Edward's reign in the confiscation and subsequent purchasing of chantry property[46]. John's purchase came to light from a chancery case c.1558-1578 involving John's son Edward. He had inherited the 70 acres of land in Woodham Ferrers that had formerly belonged to Rayleigh Church Chantry for the support of a school in Rayleigh. The current churchwardens were then trying to reclaim the property but they failed[47].

Bury had acquired the manor of Rayleigh and later resided at Rayleigh Park. He had to sue out a pardon for his actions under Edward on the accession of Mary and later assisted the sheriff at the execution of martyrs at Colchester. The martyr Thomas Causton also had land dealings with Bury[48].

Another of John Coker's purchases was of land in Bradwell in which he was assisted by Thomas Isaac of Little Baddow, who was a cousin of the vender[49]. His will of 1548[50] contains a bequest to the 'Community of Faith', an early Protestant practice, instead of the usual gift of money to the poor of a parish. Thomas Isaac came from a very Protestant family. His mother Margery had been a Worth before marrying her first husband William Isaac, a prominent Kentish Protestant. Her second husband was Thomas Wyott of Tillingham Hall a relation to Sir Thomas Wyott who led, and was executed for, the Kent Rebellion against Mary. She appointed Archdeacon Edmond Cranmer, brother of Thomas, Cranmer, Archbishop of Canterbury, as overseer of her will[51]. Her son in law William Morris was the brother of Edmund Cranmer's secretary, Ralph Morris.

> *'William Coker said, he would answer no otherwise then he had already answered: and being offered to have longer respite of 6 days after, he refused to take it, and so upon the same, sentence of condemnation, was read against him, the 11 of July.[38] He was convicted on 2nd August and remained in prison until his death on 23 August 1555.'*

Her eldest son Edward Isaac was active in Protestant affairs in his home county of Kent. He accompanied Hugh Latimer, along with his brothers in law William and Ralph Morris, when they had visited a Protestant prisoner before his execution for heresy[52]. Under a warrant for his arrest, Edward fled abroad as one of the Marian Exiles. He also assisted the escape of Edwyn Sandes, vice-chancellor of Cambridge University, who had preached in favour of Lady Jane Grey and was subsequently arrested[53]. In making his escape he is said to have briefly stopped at Edwards Hall in Woodham Ferris, home of his father-in-law, before boarding a ship at Southend for his escape to the continent. Edward Isaac sustained Sandys during their exile[54]. Following his return on Elizabeth's succession, Edwin later became Bishop of London in 1570, after which he came to live at Edwards Hall, later called Edwins Hall. In 1570 it was Edward Isaac who actually purchased the house from the Sandys relatives for Edwyn[55], another favour for Edwyn perhaps?

Woodham Ferrers lies very close to Purleigh and Hazeleigh and if the Sandys family shared their son-in-law's beliefs they may possibly have fostered a favourable environment for Protestants in this part of Essex. Similarly, the Wyott and Isaac influence in the Tillingham area may very well have fostered a similar environment for the Caustons. Thomas Causton must have attended the same parish church as the Wyotts, and as a customary tenant of the manor of Tillingham Hall and owner of the adjacent, former Grange Farm of Stansgate Abbey, had influential and sympathetic neighbours.

The fate of Willam's former properties.

With the accession of Elizabeth I in 1558 many protestants hoped for a reversal of the forfeitures of property but this was to prove difficult for many of the martyrs' decedents. There was to be no immediate return to how things were before Mary. As with the forfeitures during her reign, the rule of law determined what might or might not be lawful regarding property rights. The same respect to law also prevailed under

Elizabeth making it difficult in the courts for many of those claimants to the confiscated properties.[56]

The position with regard to all former William Coker properties following Mary's death is unclear being limited to surviving documents. William's siblings, Edward and Mary were certainly in possession of some of these after Queen Mary's death. They found themselves in several chancery suites in connection with some of the properties and others which might have been owned by William at the time of his death[57]. Mary with her husband John Garrington and Edward Coker also looked after the interests of their niece Mary, the daughter of their deceased brother Robert, in obtaining what her father had bequeathed to her[58].

Feet of Fine show that Mary Garrington, then a widow, was in possession of Bremstons which she quitclaimed to her brother Edward and his heirs in 1572. John Levett and Abel Clerke were also named as plaintiffs. It was then described as 2 messuages, 2 cottages, 2 barns, 2 gardens, 200 acres arable, 40 acres meadow, 60 acres pasture, 10 acres wood & 10s. rent in Purleigh, a substantial holding[59].

In 1589 Wickhams was sold by Mary Pillett, widow, [nee Coker/Garrington] and her son Edward Garrington, with "Warranty against the heirs of John Coker, dec, & of William Coker, dec, father and brother of Mary". Then described as "Manor of Wikkams alias Wychams, 10 messuages, 10 gardens, 60 a arable, 30 a of meadow, 100 a pasture, 30 a wood and a furze & heath & 50s. rent in Woodham Ferrers, Stow Maries, Purleigh, Danbury & Woodham Mortimer."[60]

The wills of Edward Coker[61] and his grandson, Edward Jerham[62], revealed that Edward's niece Mary Coker had married Able Clarke, the very same person who was defendant in the suite that had identified William Coker to have been a martyr. Property that had been confiscated from William had returned into Coker ownership through his niece. Thomas Sutton, the plaintiff, lord of Southminster Manor, had outlined the succession of the decent of the property following its confiscation by the then lord, Lord Thomas Darcy. It passed to Bartholomew Averel, a substantial owner of Southminster and other properties. He sold most of the former Coker lands to John Stephen who bequeathed them to his daughter Sara, then 13. She married Thomas Jarmin whose father John Jarmin was to eventually sell to Abel Clarke[63].

Feet of Fine also show that Robert Coker's daughter Mary had eventually recovered the manor of East Newlands in St Lawrence when she and her husband Abel Clarke sold it in 1579 to Richard Pellett, esquire, possibly second husband of Mary Garrington. They also sold lands in East Hanningfield in the same year, former Coker lands? [64]

Many of the Essex Martyrs have some form of commemorative plaque, such as Thomas Causton in Rayleigh, Stephen Knight in Maldon, William Hunter in Brentwood, Thomas Higbed in Horndon on the Hill. Along with 40 others, William Coker does have his name on a memorial but it is on the Martyrs Memorial in Canterbury as that is where his execution took place. The memorial claims him as one of the Kentish Martyrs. It would be good to have William properly commemorated in his home county.

Acknowledgements

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Coroners, post mortem examinations and exhumations

Michael Leach

A recent re-reading of Richard Gough's *History of Myddle* (compiled between 1700 and 1706) revealed a scantily researched topic. Gough described how Evan and Alice Jones, of the village of Myddle in Shropshire, had one daughter, also named Alice, who had died and been buried (the date, and her age, were not stated). Some malicious gossip had circulated, suggesting that she had been abused and beaten by her father, though most local people gave little credence to these rumours. Nevertheless the coroner was summoned, and what followed next is best related in Gough's own words:

> *'When the coroner came, he summoned a jury, according to the custom in such cases, and caused the clerk to open the grave. When the corpse was uncovered, the coroner required the clerk to draw the winding sheet a little aside, that they might see the face; which being done, the coroner said, he had seen enough, but if the jury would see further they might; but they would not. Then those witnesses were sworn and examined, but nothing material was proved, and Evan was acquitted.'* (Gough1979, 90)

This poses the question of how common was exhumation at this period and what was it expected to reveal in the era before scientific autopsies? Gough's account suggests that the examination of the corpse of the unfortunate Alice was – to say the least – extremely perfunctory. It would be reasonable to ask what purpose it this examination served. In the medieval period there had been a custom of leading suspects past the open coffin of someone who had died violently, as it was believed that the wounds would re-open and bleed when the culprit approached the corpse. A more modern view might be that the perpetrator would reveal his guilt from tell-tale signs of nervousness or apprehension when confronted with the body of his victim. But in this case, neither parent was put through this ordeal.

The office of coroner is an ancient one, probably pre-dating its establishment by the King's council in 1194, and it carried both financial and judicial responsibilities, the latter including seizing the property of outlaws on behalf of the crown. But it was not till 1276 that Parliament defined the coroner's duties when dealing with violent or unexpected death. Its provisions are surprisingly detailed, requiring him to establish when and where the death had occurred, to visit and search the house of any suspect and to obtain the necessary pledges to ensure that he or she did not abscond. If he did so, the coroner could 'levy hue and cry' in pursuit of the escapee. The coroner also had to determine whether the individual had been slain, drowned or strangled by a cord round the neck, or if there was other visible evidence of hurt on any part of the body.(Williams 1791, i, 115) It would seem that the coroner who ordered the exhumation of Alice

Jones at Myddle had failed to do what was expected by taking only a quick glance at her face while the rest of the body remained shrouded. The jury were no more keen on this unpleasant task.

It was not until the Coroners Act of 1836 that the coroner had the power to summon medical witnesses, and to order post-mortem examinations if deemed necessary. In 1860, in response to a perceived surge in intentional poisonings, the post was made a salaried one (rather than a fee per case payment). It was not till 1887 that the use of public houses for inquests was banned, perhaps to the disappointment of the jury though – as will be seen – pub premises continued to be used for performing post mortems well into the twentieth century. Further legislation in 1926 gave coroners discretion whether or not to order a postmortem, or to decide if an inquest was indicated. This Act also removed the obligation for the jury to view the body (though the coroner's obligation to do so remained in place until 1980). (www..parliament.uk...) In country areas, well into the first decades of the twentieth century, GPs were expected to perform the postmortems in less than ideal conditions – often barns, outhouses and stables. Dr Barber of Great Dunmow recalled a bitterly cold Christmas in the early 1930s. About to leave for the hunt ball in his tail coat, he received a message that a body had been found in a ditch at High Easter, and that the local policeman would wait for him at a nearby pub until he came to do the post mortem. The village pump was frozen, but the constable had managed to get two buckets of water and had commandeered a Tilley paraffin pressure lamp from the pub to provide light. Having established the cause of death, Dr Barber was only a few minutes late for the hunt ball dinner. Did any of the attendees know exactly what the doctor has been doing moments earlier? (Barber 1973, 85)

Before the very detailed nineteenth century newspaper reports of local judicial matters (which included inquests), there is little information about coroners' work in Essex. In the latter part of the seventeenth century, the county had either two or three coroners (ERO Q/SR 495/50, T/A 418/200/6 & 14 & 38) who must often have needed to travel considerable distances to perform their task. The diaries of Josselin and the Countess of Warwick have nothing to say about coroners' inquests, perhaps both their compilers were concerned more about religious affairs than the details of unexpected deaths. Bufton's diary, on the other hand, records much casual violence and mentions four visits made by the coroner to Coggeshall between 1680 and 1700, on two occasions on the day following the death. None of the brief accounts make it clear by whom, or how, the coroner was summoned, though local gossip seems to have been a strong factor in suggesting the need for his presence. It is worth looking at these cases in more detail

The first, on 13 June 1680, was a young lad from Ipswich who was apprenticed to Elias Spunner who died in the Row, Coggeshall (presumably his master's house). The unnamed coroner attended, and Spunner's wife was sent to jail on suspicion of causing his death 'by her bad usage of him'. No further details can be found (Brotherton MS8, 144)

The second, on 3 March 1685/6, was the infant of Richard Poulter, labourer of Coggeshall, found drowned in a pond. John South, the coroner, came the day following this discovery, and on 5 March both Poulter and his wife Jane were committed to Chelmsford prison on suspicion of murdering the child. The case was considered by a grand jury at the Assizes on 12 July 1686 on the coroner's evidence which indicated that Jane had given birth to a female infant which she 'had cast into a pondfull of water and mud', thereby causing its death. Only the case against Jane was deemed true bill and presumably went on to trial at the assizes, but no record of the outcome can be found. However in a very similar case of the drowning of a neonate a few years later, and investigated by the same coroner, the wife was hanged. (Brotherton MS8, 89; ERO T/A 418/200/6 & 418/208/19)

The third, on 18 March 1688/9, was the death of a nine year old boy following a beating by Philip Gazzard who seems to have been the boy's stepfather. Again the unnamed coroner attended the next day and the jury, failing to be convinced by the evidence, freed Gazzard. However 'a great many' of the jury 'would not set their hands to it', and in the town there was 'great suspicion that he was guilty of ye death of ye Child'. No further details can be found. (Brotherton MS8 82)

The final case was on 12 February 1693/4. Thomas Till had been buried for a week before the unnamed coroner attended. On arrival he ordered an exhumation, as Till had been beaten by Anthony Jepps a few days before his death. No more details can be found, but presumably the coroner examined the corpse for signs of significant bruising or other injury. Till, however, was probably no stranger to violent altercations, as he had appeared at the quarter sessions in 1686 for assaulting another man. (Brotherton MS8, 74; ERO Q//SR 452/128)

These cases only give the briefest glimpse of the coroner's work. It is perhaps striking how swiftly he was mobilised in at least two of the above mentioned cases. What is not clear is how, and by whom he was informed that he was needed, and to what extent local views about a suspicious death were contributory to his involvement. It is apparent that he assembled a jury, took evidence which was later presented at the assizes or quarter sessions, and had the power to commit an identified suspect to prison. It is not clear if coroners were subject to any form of scrutiny but, in 1698, John South, who has already been mentioned above, indicted his fellow coroner, John Thorey of Billericay, for obstructing a warrant that he had issued. This was in connection with Thorey's pressure on a Fyfield jury to return a verdict of suicide (ERO Q/SR 495/50) .

Any other fragments of information about Essex coroners would be very welcome.

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The Doddinghurst Balloon Incident

Neil McCarthy

The August 1836 ascent of a gas-filled balloon carrying Charles II, Duke of Brunswick, 'the talk of Europe',[1] and Margaret Graham, pioneer female aeronaut,[2] was first reported in light-hearted terms:

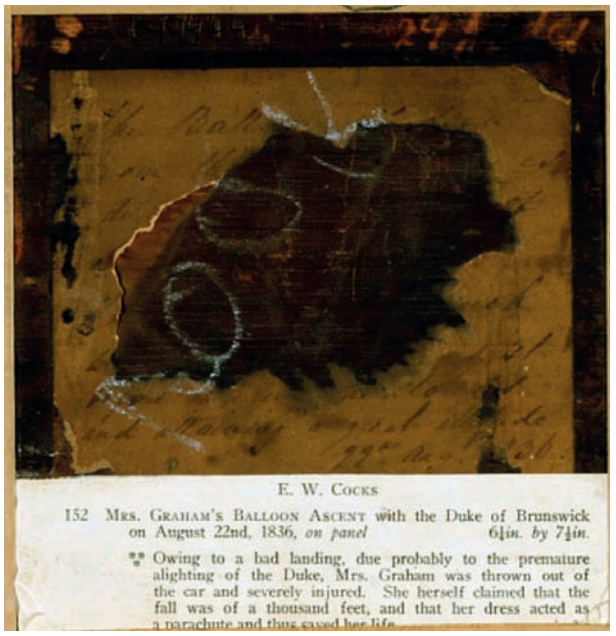
"His Royal Highness came on the ground a little after three o'clock, accompanied by several elegantly dressed ladies, with whom he entered into lively conversation. He was dressed in a chocolate coat, dark waistcoat, and light trousers, and blue silk handkerchief with gold spots. His hat was of the Quaker make. Mrs. Graham wore a blue silk cottage bonnet and green silk pelisse. The Duke carried a red and Mrs. Graham a white and red flag. When the Duke and Mrs. Graham entered the car, considerable applause took place; which his Serene Highness graciously returned. His cheeks which appeared flushed before entering, partook, we thought, of paleness before he left Flora Gardens.[3] The balloon on its rising took a north-easterly direction, and kept in sight a considerable time; the Duke and Mrs. Graham waving their flags until they were lost sight of."[4]

Similar early coverage in the London newspapers along with the estimated 10,000- strong crowd at the launch, were unaware until the following day of the real story. That occurred two hours after take-off, the balloon rapidly descending over Doddinghurst in Essex, and crashing on to farmland, leaving Mrs. Graham feared killed and the Duke's conduct in moments of crisis in dispute. For the farmer who saw the balloon car's momentary contact with the ground before, suddenly empty of passengers, soaring away, it was also the start of a protracted, frustrating, and costly episode.

Portrait of the Duke of Brunswick in decorated uniform

Small 1820s monochrome drawing profiling the Grahams

There are seven extant independent versions of what occurred[5]; two supplied by the protagonists themselves, an anxious husband, two eye witnesses, two correspondents who visited the scene – and a contemporary visual account, sketched by the artist daughter of Doddinghurst's parish rector. Discrepancies in these accounts challenge the Duke's explanation of



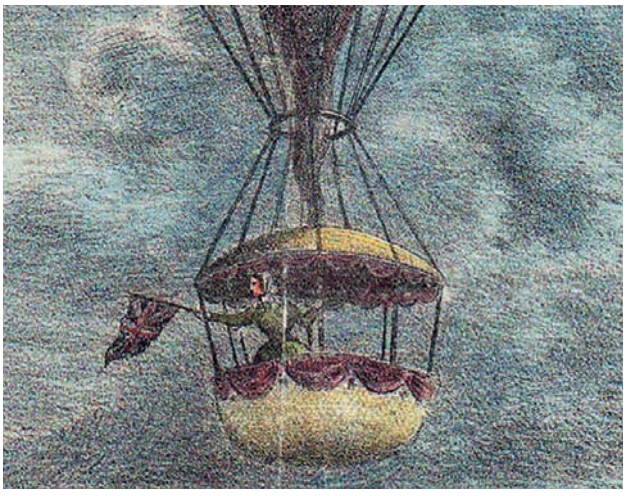
Detail of 1836 painting by E.W. Cocks titled 'Mrs Graham's Balloon ascent with Duke of Brunswick'

his escaping unharmed as Mrs. Graham plunged helplessly from a greater height with potentially fatal consequences. Another dispute arose over estimates of the distance of her fall, varying from 20ft to 1000ft – survival from the greater height being attributed to billowing clothing providing parachute-like velocity reduction before she thudded into a field of clover.

Both the Duke and Mrs. Graham had Royal associations but like the substantial gulf in social status between the two, these were also markedly different. Margaret Graham, nee Watson, was raised in Somerset. In 1820, aged 16, she met widower George Graham, a chemist who'd begun demonstrating, for a fee, the technique of using coal gas to inflate balloons, then attaching its car (a wicker basket strung below) for ascents. Married at 17 years she had seven children and was pregnant again at the time of the accident.[9] The Grahams achieved fame through a series of ballooning initiatives, notably her becoming Britain's first solo female flyer. Their ascents were twice included in programmes of public celebrations following coronations, her exploits thus achieving indirect royal recognition.[6]

Tinted sketch by Queen Victoria's portraitist John Hayter (1800-1895) of Mr and Mrs Graham shown aloft in a balloon basket

The Duke's royal connections were much deeper. Rulers of the Duchy of Brunswick-Wolfenbüttel (now subsumed in Lower Saxony, Germany), enjoyed close familial ties with Britain's Kings and Queens. Charles' father Frederick, known as the 'Black Duke' was first cousin and brother-in-law to the Prince Regent, George IV. Frederick was shot dead fighting for the Allies at the Battle of Quatre Bras in 1815, 11 Charles then inheriting the Dukedom under the guardianship of the Prince Regent until reaching his majority in 1823. In 1830 he was usurped by his younger brother following a popular uprising and went into permanent exile, although maintaining until death he was the legitimate ruler.[7]

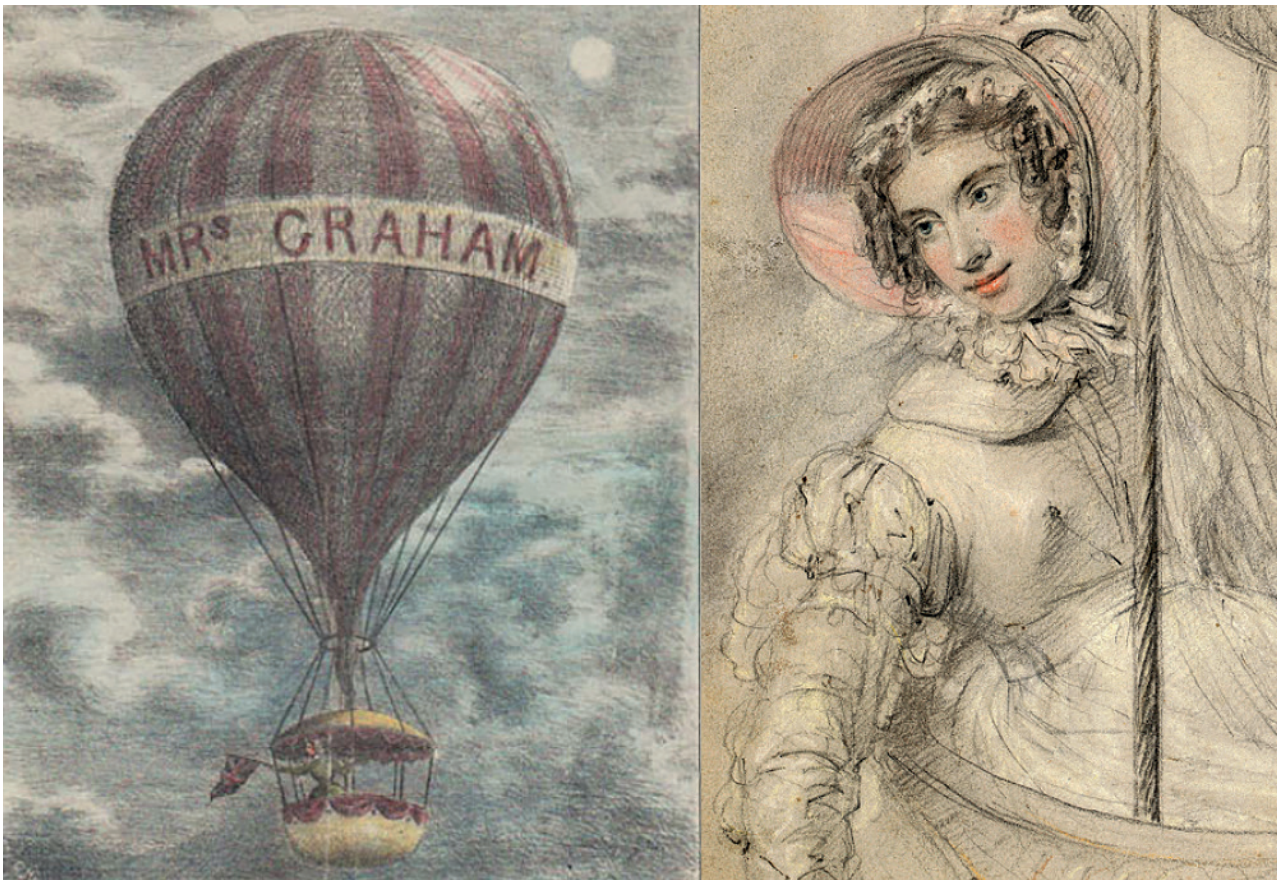


Undated illustration of balloon and basket with Mrs Graham waving a Union Flag during a night flight

Contemporaneous accounts all accept that as the balloon descended towards Converse Farm, the Duke dropped unscathed to the ground in one field and, as it rapidly reascended out of control, Mrs. Graham fell from a greater height into an adjacent field. There she was found lying inert before farmhands carried her to the home of farmer George Aitken Moir.[8]

The Duke acted promptly to ensure his version of the incident was circulated. As Mrs. Graham lay unconscious in another room, he penned a 1,050-word letter at the farmhouse with 'an exact account of what happened'. This was couriered to the Marylebone home of his aide-de-camp, Captain Robert Currie. After a preamble describing how agreeable his first ever flight had been until its last moments, he continued:

> *"I felt the car strike with the utmost violence on the ground and overturn, the balloon itself touching the earth and dragging us about 30 yards until it rose again. By the violence of the shock I was thrown head foremost out of the car at the height of about 18 feet, but I contrived to fall upon my hands and escape uninjured. Having gained my feet I had the great grief of seeing Mrs. Graham fall from the car from a much higher distance than I had fallen, and, from the apparently lifeless manner in which she lay, I was at first fearful she was killed... "The balloon, with my great*



August 1837 illustration showing Mrs Graham ascending from Hackney with two other ladies – 'the only three female Aeronauts that ever ascended alone'

> *coat, hat, and telescope, &c., is gone I know not where, I saw it rise for a great height after Mrs. Graham had fallen.*[9]

The Duke, having dispatched the letter, returned to London. On his departure, Mrs. Graham was attended at the farmhouse by two local doctors, Mr Barlow of Blackmore and Mr Potter of Ongar. A third doctor, Mr Coborn of Brentwood, was later also involved in her treatment.[10] At the patient's bedside was Mrs. Harvey, wife of the local rector, the Rev. Bridges Harvey. Their elder daughter Jane, a prolific amateur artist was to commit to canvas her own recollection of events.[11]

Mr Barlow's examination revealed serious concussion, lower spinal injuries, a 'shattered frame' but no fractures of the limbs. He asked for her hair to be cut close, bled from both arms, and afterwards 'cupped' at the temple.[18] In the delicate terminology of the period, 'the unfortunate lady was *enceinte*. 'Premature accouchement' occurred; the baby being stillborn two days later.[12]

Updated Press accounts based on the Duke's letter appeared in the following days along with conflicting medical reports. Rumours of Mrs. Graham's death were published and then amended to accurately predict a long recuperation leading to full recovery.[13] The story remained a subject of interest to the newspapers for weeks, not least because the parties involved were providing competing descriptions of events. Next in print was Mr. Graham, having travelled by post-chaise to Doddinghurst, in company with Capt. Currie, on learning of the accident. Back at the family home in Poland Street, Soho, he stated:

> *"The Duke of Brunswick immediately got out of the car with perfect safety; the loss of his weight caused the balloon to ascend suddenly, and the grappling iron tore away from the hedge, which Mrs. Graham hoped had been secure, and catching in the bank caused a jerk, which threw her out upon the ground, from a height of several feet. This was attributable to her great anxiety respecting the Duke, whom she was looking at, fearing the grappling iron would strike him... Nothing can exceed the kindness of Mr. Moir and his family at whose residence Mrs. Graham is now staying. The benevolent Clergyman of the parish and his lady are also unremitting in their attentions to her".*[14]

By Friday the Chelmsford Chronicle had compiled and printed its own report, questioning the accuracy of those published elsewhere. In part it read:

> *Mr. Graham's account is rather erroneous, and, in some particulars, that of the Duke of Brunswick is not correct. We have visited the spot, and from the persons who were eye witnesses of the descent (though their accounts somewhat differ) we are enabled to lay before our readers a few facts that may be relied on... The Duke of Brunswick was thrown out by the suddenness of the concussion, but we understand from those who saw him that he has miscalculated the height from which he fell, it being only nine or ten feet instead of 18 feet. The Royal Duke was was seen to hang from the*

> *car and drop down... Mrs. Graham was observed clinging to the car, and when she reached the fearful height of at least 100 feet she fell. At that altitude she appeared very diminutive in size, and in her descent she was seen to turn over two or three times, and then fall like an inanimate mass. She fell in a clover-field, and though the ground was very hard, there is an evident impression of her form upon it.*[22]
>
> *Mr. Southall, proprietor of the Eagle Tavern, Mile End, had also spoken to witnesses at the farm, one of whom, Mr. Allen, made a signed statement. He informed the Morning Advertiser: Many inaccurate accounts having appeared respecting the late balloon accident... It is almost incredible, but Mr. Amor, his men, and his neighbours all concur in stating that Mrs. Graham must have fallen from an elevation of at least 100 feet. Her miraculous escape from death is attributed to the circumstances of her fall being broken by the buoyancy of her clothes, and her turning over three or four times before she touched the ground.*[23]

At the end of September, Mrs. Graham, now sufficiently recuperated at Mr. Moir's expense, composed her own 1,040 word response. Addressed *"To a humane and sympathizing public I am induced, through the medium of the journals, to communicate the particulars of my recent unfortunate accident, and from the effects of which I am still suffering severely"*. She listed her ballooning achievements including ascending from Green Park at the 1831 Coronation celebrations – a journey that ended with a 'most successful descent on the estate of Lord Petre, near Brentwood'. [24&25] She wrote:

> *The car alighted on the earth in a field near a wood enclosure, and I saw the Duke of Brunswick step out of the car safely upon terra firma, with apparently not the slightest inconvenience to himself. The moment his Highness was out of the car, and before I could alight on the earth, the balloon rapidly ascended into the air...I made up my mind to descend into the car and secure my valve line in order to effect my descent. Unhappily, however, my feet were outside the car, and consequently when I let go of the hoop, instead of falling into the car I was precipitated to the earth: and here I must distinctly state that I fell more that three hundred yards or one thousand feet. Having commenced my fall in a perpendicular position, I perfectly well remember that the silk pelisse which I had on at the time became fully inflated with atmospheric air, and prevented the rapidity of my descent...Mr. Moir was the first to approach me. He states that in my fall I turned over several times, on reaching the earth I rebounded some feet. It was a fortnight before I became sensible to the past event... In conclusion I wish to state, in consequence of several erroneous reports, that no person (with the exception of my husband and relatives) have visited me at Doddinghurst, or contributed to the expenses to which my unfortunate calamity has subjected me.*

Charles II, Duke of Brunswick Monument, Geneva 2024

Mrs. Graham's allegation of the Duke stepping from the car without 'inconvenience' was rejected on his behalf by Captain Currie in an October letter of rebuttal to the London papers. The Captain insisted that Farmer Moir had confirmed the accuracy of the Duke's account and challenged as 'extraordinary' her claim to have survived falling from 1000ft, the Duke estimating the distance as being at the most 150ft.The Captain's defence of the Duke brought a limited retraction from Mrs. Graham. She blamed her own misreading of her 'unintelligible scrawl' for any mistake. What she had meant to convey was: *"Immediately after the concussion to the earth, I was suddenly elevated in the air, and saw his Highness standing on the field". However, she remained adamant she fell from the greater height, "I was told that several men, who were close to the spot, first thought that an individual in the car had dropped a handkerchief; then thought it was a little girl; and as I fell lower, discovered it was a woman".*

It was Mr Moir the farmer who had the last word, providing a summary of events to *The Times* after the final October exchanges between Captain Currie and Mrs. Graham. He denied ever supporting the Duke's version of 'falling 18ft' to the ground, having told the Captain face-to-face the Duke 'miscalculated' and …

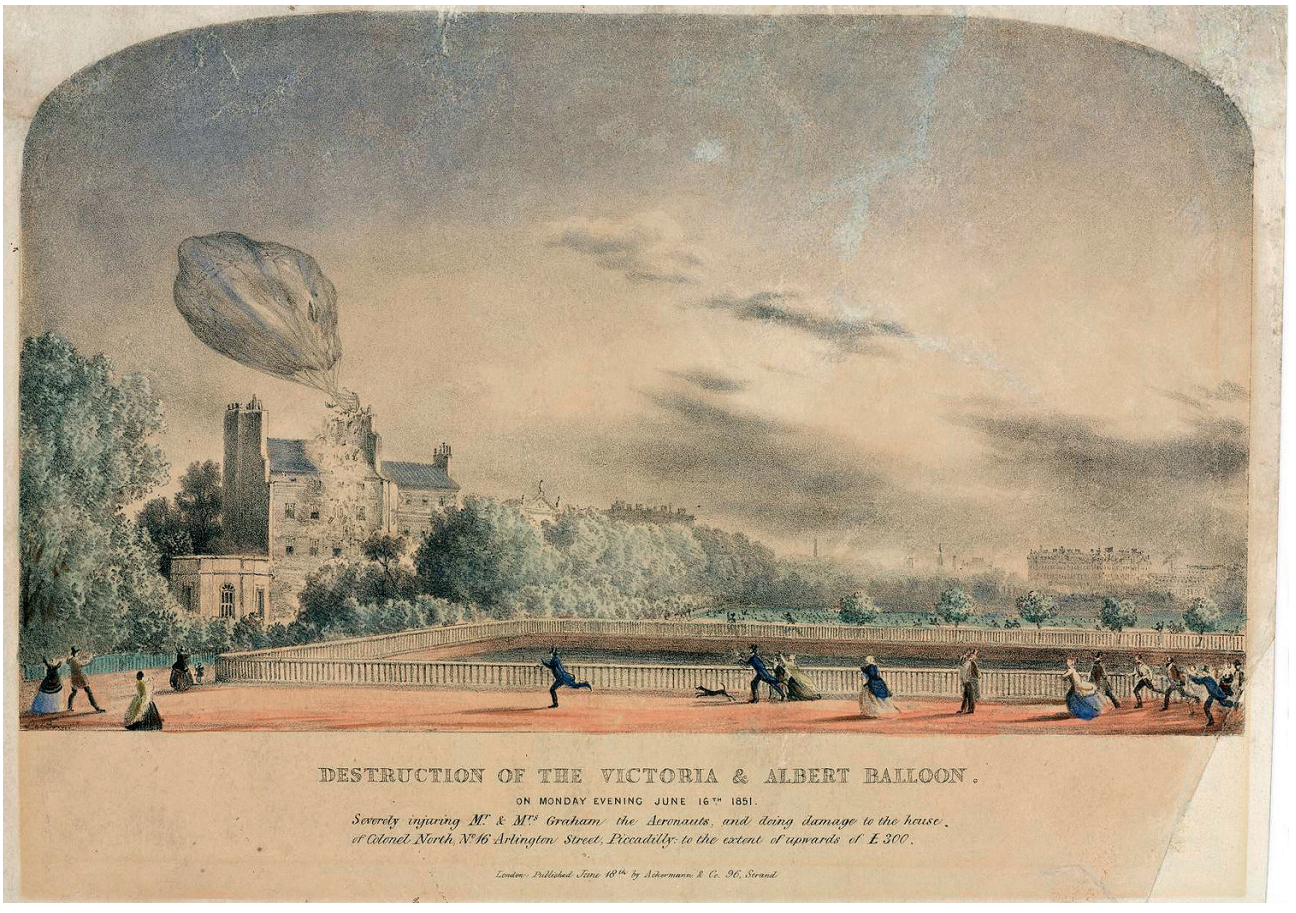
> *[I]nstead of any medical advice being thought necessary to offer the Duke from "strangers at a distance," as the Captain asserts, I was the only person that had a distinct and clear sight of the Duke's fall, and immediately after his coming to my house I requested him to take some refreshments, and offered him with my own hands a glass of brandy and water, thinking that would do him more good than doctor's stuff or bleeding, which he politely refused, so I drank it myself to his good health...*
>
> *Before I conclude, I beg to fresh Captain Currie's memory regarding what he and Mr. Graham said when at my house on the Wednesday after the accident, they having assured us that the Duke of Brunswick would pay every expense attending*

July 1850 ('first ever attempted by a female' - sepia) and August 1850 advertising posters of night flights by Mrs. Graham from Vauxhall Gardens and a further poster from that July of an ascent with a Party of Young Ladies

> *this accident, at the same time requesting nothing might be wanting for Mrs. Graham's comfort, which Mr. Graham also assured me in the presence of the lady of the Rev. Bridges Harvey, who had been very kind in sitting up all night with Mrs. Graham. Mr. Graham came down from London in a cab about nine o'clock the next morning after the accident, and returned again to London after remaining for about two hours, when he made this promise.*
>
> *How far such promise has been fulfilled I leave the public to judge. Mrs. Graham having remained at my house for upwards of five weeks, and her son four weeks, which expenses attending the same, along with the medical gentlemen's bills, and attendance, have not been paid. Mrs. Graham left my house on the 27th September in a postchaise for Brentwood, and on her departure did not not even return common thanks for the trouble and inconvenience she put us to, let alone the attention that was shown towards her comfort during her long stay. So much for balloon gratitude![15]*

By the time of the 1845 Tithe Commutation for Doddinghurst, not only had Converse Farm become Cowes Farm along with other land in his occupation but farmer Moir himself – perhaps as a result of his surname's irregular spelling – was officially Mr. Moore.

The Duke of Brunswick remained in exile, primarily in Paris and in later life Switzerland. He died unmarried in 1873, leaving his wealth to the city of Geneva with the provision it staged a grand funeral and built a mausoleum



Dramatic 1851 illustration of the Grahams' crash into a rooftop after a flight over the Great Exhibition

April 1837 advertising poster announcing Mrs. Graham's first ascent since the Doddinghurst accident

Mrs Graham's grave

in his honour. The huge elaborate monument still stands today.[16]

Mrs. Graham was able to resume ballooning in April the following year. She and her husband were seriously injured when pitched out onto a house roof during an 1851 flight over the Great Exhibition in Hyde Park. Mr. Graham was unable to fly again but Mrs. Graham continued until 1858, accompanied on occasions by three of their daughters. She died impoverished in 1864 and was buried in an unmarked grave at Abney Park Cemetery, Hackney. Her pioneering accomplishments have since been recognised, becoming the subject of books and articles. A headstone commemorating her achievements was erected in 2022 above her grave.

Jane Harvey married wealthy lawyer Charles Vickerman, the squire of Thoby Priory Hall, Mountnessing. She continued to paint, mainly landscapes from the couple's travels in Continental Europe and then in Wales after Vickerman bought and renovated Hean Castle, Pembrokeshire. She died in 1870 and is buried in the same Abney Park cemetery as Margaret Graham.

As to the fate of the balloon that soared unmanned away from Doddinghurst. It was seen early that evening passing overhead by inhabitants of Maldon before it came down two miles north of the town on the farm of Charles Eve at Great Totham. Mark Cottee, landlord of the Shoulder of Mutton inn managed to tether the balloon. The basket contained two telescopes, a military coat, life preserver, lady's shawl, and a travelling cap. It was carted to Doddinghurst, collected by Mr. Graham and returned to flying after repairs to its torn fabric.

Notes

1 In addition to a turbulent inheritance as contested ruler of the Brunswick Duchy, Charles (1804-1873) achieved notoriety through political intrigues, many libel trials, and a losing role in the celebrated chess 'Opera Game' staged in Paris. He was remembered in Paris as "that painted, bewigged Lothario whose follies, eccentricities, and diamonds, made him the talk of all Europe." Rictor Norton (Ed.), "Libels against the Duke of Brunswick, 1840s, *Homosexuality in Nineteenth-Century England: A Sourcebook*, 5 August 2016.

2 In 1826, Graham became the first British woman balloonist to fly solo, ascending from Islington aged 22. Her other career achievements and many accidents are catalogued in the volumes listed under Bibliography and at the Abney Park Trust, Hackney.

3 Flora Tea Gardens (later Victoria Gardens) close to Hyde Park was a pleasure resort hosting musical performances and events such as ballooning. The grade ll listed Swan pub in Bayswater Road is the only remaining relic of the venue following development of the area. *CAMRA Good Pub Guide, 2024* www.camra.org.uk

4 Among the many newspaper accounts published the following morning(23rd August) in London, describing only the preparations and ascent of the

MR. AND MRS. GRAHAM DEBTORS TO MR. GEORGE A. MOIR, DODDINGHURST, ESSEX.
From August 22 to September 26, 1836.

	£.	s.	d.
To men's time and use of horses, going for doctor's for the assistance of Mrs. Graham when she fell out of her balloon, and expenses attending the same	0	10	0
To refreshments to men employed conveying Mrs. Graham from the field wherein the accident occurred to the house	0	5	0
To man going to Brentwood on account of Mrs. Graham, with a horse	0	2	6
To man sitting up all night, with horse in readiness to be off if required, on Mrs. Graham's account, for doctors, &c., with refreshments to same	0	7	6
To sundry expenses and refreshments during the night of Mrs. Graham's accident	0	10	0
To bait for cab-horse and breakfast to man who brought Mr. Graham down from London	0	2	6
To man going with horse and cart for sick bedstead, including time, &c.	0	5	0
To Mrs. Lortwel, nurse, for attendance on Mrs. Graham, being five days and four nights	0	10	6
To board and accommodation for Mrs. Lortwel, nurse, at 4s. per day, &c.	1	0	0
To washing clothes for Mrs. Graham	0	4	7
For board and accommodation for Mrs. Pool, the other nurse to Mrs. Graham, seven days and nights, at 4s. per day, &c.	1	8	0
To boy's time, and horses, going to doctors daily for medicine, &c. for Mrs. Graham, at 1s. 6d. per journey, during seven days	0	10	6
To extra coals and candles, &c.	0	7	0
To Mrs. Lawkins, for sitting up with Mrs. Graham, with attendance (after Mrs. Lortwel's departure), viz. four nights	0	6	0
To refreshments, &c., to Mrs. Lawkins, nurse	0	6	0
To boy, going to doctors, &c., during the week, and use of horse	0	7	6
To board and accommodation for Mrs. Pool, nurse, seven days and nights, at 4s.	1	8	0
To washing clothes for Mrs. Graham	0	4	9
To boy, going to Brentwood, for Mrs. Graham	0	1	0
To extra coals and candles for Mrs. Graham	0	7	0
To Mrs. Pool's board and accommodation on Mrs. Graham's account	1	8	0
To extra coals, firing, and candles	0	7	0
To Mrs. Pool's board and accommodation, as nurse to Mrs. Graham	1	8	0
To extra firing and candles	0	5	0
To Mrs. Pool's board and accommodation, on Mrs. Graham as nurse	1	8	0
To extra fire and candles	0	5	0
To Mrs. Graham for use of room and kitchen for five weeks, at 21s. per week	5	5	0
To use of linen, &c., at 5s. per week, for five weeks	1	5	0
To board and refreshments for first two weeks, at 3s. per day and night	2	2	0
To Mrs. Graham's board for last three weeks, at 5s. per day, since her convalescence	5	5	0
To Mrs. Graham's son for four weeks' board and lodging, from Aug. 26 to Sept. 24, at 21s. per week	4	4	0
To washing for Mrs. Graham, linen, &c.	0	5	6
	32	9	10
Credit by cash	7	0	0
	25	9	10
To Mrs. Pool's (nurse) wages at 14s. per week, for two weeks	1	8	0
To three weeks' wages, at 10s. 6d. per week	1	11	6
To carriage of sick bedstead back to Mr. Potter's, Ongar	0	5	0
	28	14	4
Credit by cash—George A. Moir	10	0	0
Leaving due	£18	14	4

balloon, were those in *The Globe, True Sun, Morning Post* and *Morning Advertiser*.

[5] Each of the seven are attributed within the text, the illustration was made by Jane Dorothy Harvey, then living with her parents at the Old Rectory, a short distance from Converse Farm. Many of her paintings and sketches are conserved in the collections of the Wiltshire fine art company Somerset and Wood.

[6] Biographical details concerning the Grahams are documented in the several books listed under Bibliography below.

[7] *Appleton's Journal* (New York City), Pp 655-7, Volume 14, issue 348, 20th November 1875.

The Companion to British History, P196, Charles Arnold Baker, 2008, Longcross Denholm Press.

[8] *Essex Chronicle* 26th August 1836; Mr. Moir's letter to *The Times*, dated 13th October 1836.

[9] *True Sun* (London), *The Globe* (London) 24th August and many London and provincial newspapers in the days following.

[10] Letter dated 26th August 1836 to the *Morning Advertiser* from Mr. B. Southall, proprietor of the Eagle Tavern, Mile End, after visiting the scene and recording witness statements.

[11] Mrs Graham was to later write in *The Times*, 13th October, 1836: "To Mrs Harvey, I am at loss for words to express the gratitude and admiration I feel for her, as well as the amiable young ladies, her delightful and accomplished daughters".

[12] *Morning Post*, 27th August 1836

[13] *London Packet and New Lloyd's Evening Post* 24th August 1836

[14] *Morning Herald* (London) 27th August 1836

[15] Farmer Moir's list of expenses for caring for Mrs. Graham was reproduced in the *St. James's Chronicle*, 15th October, 1836. A total of £28 14s.4d had been incurred of which just £10 had been recouped.

[16] Swiss Tourism/City of Geneva www.myswitzerland.com

The itemised bill from George Moin who had the care of Mrs Graham during her enforced stay at Doddinghurst. The most expensive single items were £5/5/- (five pounds and five shillings) for Mrs Graham's use of a room and kitchen for five weeks at one guinea per week, and then £2/2/- (two pounds and two shillings) for board and refreshments for two weeks at 3 shillings per day and night. Five shillings was spent on 'Extra fire and candles' for Mrs Pool, the nurse, paid for by Mrs Graham, and even one shilling for a boy to go to Brentwood on her behalf. Refreshments for the men who conveyed Mrs Graham to the house cost five shillings.

Detail from a watercolour of The Old Rectory, Doddinghurst

Painting of the Black Duke's death in battle at Quatre Bras, 1815

Essex and the Battle of the Atlantic: the Ford End Direction-Finding Stations

by Michael Kirwan

Essex played an important role in both World Wars, due partly to its location on the east coast of England along with its proximity to London. Heavily fortified following the fall of France in the Second World War, aircraft from its airfields defended the country, during the Battle of Britain, against aerial attack by the Luftwaffe. It was airpower that Essex was really renowned for later on in the war, as many airfields were constructed for the United States Army Air Force whose aircraft carried the war to the Germans in Europe. This campaign was very much focused to the east on mainland Europe, while on the west the longest running battle of the war, the Battle of the Atlantic, the outcome of which was of major concern to Winston Churchill, was being fought a long way from Essex. However one location in Essex played an important role in defeating the German U-boats, in the wild expanse of the North Atlantic, that were sinking so many allied merchant ships. This article will examine the role that the Ford End direction-finding (D/F) site played during the war.

My interest in direction-finding came about because my father, Dermod Kirwan, was employed by the Admiralty Civilian Shore Wireless Service (ACSWS) during the war and the first direction-finding station he was stationed at was Cooling Marshes, which was just above sea level to the south of Buckland Marsh on the Hoo Peninsula, Kent. While there, they were having air raids every night, so he had some anxious times with enemy bombs exploding nearby and British anti-aircraft shells exploding overhead and showering their fragments all around. At the end of April 1941, the wireless operators got instructions to close the station and re-locate to Lydd, near Dungeness, where a better site for a D/F station was found. After Lydd he was posted to D/F stations in Jamaica, Wick and HMS *Flowerdown*, near Winchester.

Befehlshaber der Unterseeboote (BdU))[i]

By the start of the Second World War, Rear-Admiral Dönitz was supreme commander of the Kriegsmarine's U-boat arm, *Befehlshaber der Unterseeboote* (BdU). The BdU operated under the direction of the Naval Warfare Staff, and had operational responsibility for submarines deployed on war patrols in the North Sea and the Atlantic Ocean. It shifted its headquarters location several times during the war:

- October 1939 to September 1940 — Sengwarden, a suburb of Wilhelmshaven, Germany
- September 1940 to November 1940 — Paris, Boulevard Suchet, France
- November 1940 to March 1942 — Kernevel, a suburb of Lorient, France
- March 1942 to March 1943 — Paris, Avenue Maréchal Maunoury, Paris, France
- March 1943 to December 1943 — Berlin-Charlottenburg, Steinplatz, Germany
- December 1943 to February 1945 — Bernau, Stabsquartier "Koralle", Germany
- February 1945 to April 1945 — Sengwarden, Wilhelmshaven, Germany
- April 1945 — Plön, Germany
- May 1945 — Flensburg-Mürwik, Germany

Dönitz kept close contact with his U-boats and ships by Morse code. Instructions were sent to the submarines giving details on convoys movements etc. Each submarine carried two telegraphists or wireless operators. They generally replied in short coded messages on convoy sightings, weather reports, estimated time of arrival and fuel and torpedoes remaining.

The U-boats employed in the Second World War were technologically the same craft used in the First World War. That is German Second World War U-boats were not true submersible craft, like today's nuclear submarines, but ones that could remain underwater for short periods of time, moving at slow speeds over limited distances. While a surfaced U-boat could manoeuvre efficiently to intercept and attack an Allied

convoy, a submerged U-boat could not catch or keep up with even the slowest merchant ship in a convoy. The Allies quickly learnt that a submerged U-boat could not move quickly enough to attack a convoy and soon lost contact with the Allied formation. Thus it became the tactical objective of the Allied escort to intercept U-boats as they approached a convoy, force the enemy craft to submerge, and then if possible attack and destroy the U-boat.

'Y' Service

During World War Two there were several different ways the Allies exploited German radio communications from U-boats for intelligence purposes. One method was known as 'Y' or traffic analysis – the study of radio call-signs, networks, signals, together with direction-finding[ii]. The term 'Y Service' derives quite simply from the word 'Wireless Interception' – 'WI'.[iii]

The second main technique was direction-finding (D/F). The year before the Second World War broke out the Admiralty had only three active D/F stations: Scarborough, HMS *Flowerdown*, and Dingli in Malta[iv] There was initially, resistance to increasing this number. The reason for this was the fact that the main German naval threat was perceived by many in the Royal Navy, including the Chief of the Naval Staff, to be surface raiders, not U-boats.[v] Nevertheless, at the insistence of the Naval Intelligence Division (NID) of the Admiralty and the Government Code & Cypher School (GC&CS) it became a 'definite target' of the British, in the event of war, to intercept and direction-find every message to and from the enemy.[v]

In the months before the beginning of the war the Admiralty began to establish a network of 'Y' and direction-finding stations around the United Kingdom. This was followed by a string of D/F stations around the rim of the North and South Atlantic Ocean and subsequently a world-wide network. The main 'Y' stations in the United Kingdom were located at Scarborough and HMS *Flowerdown* and by the end of 1943 three more stations were added:[vii]

Location		Nr. of receiving radios in 1944
Scarborough	North Yorkshire	128
Flowerdown, Winchester	Hampshire	85
Cupar	Fife, Scotland	10
Chicksands	Bedfordshire	6
Shetlands	Shetland Islands, Scotland.	4

The stations were staffed by Admiralty staff, ex-CPO telegraphists retired from the Navy, Women's Royal Naval Service (Wrens) and Admiralty Civilian Shore Wireless Service (ACSWS) wireless operators.[viii]

Intercepted Morse code messages from the 'Y' stations were copied and sent by teleprinter to Bletchley Park to be deciphered. When deciphered, the messages were sent to the Operational Intelligence Centre. The centre had moved in early 1941 from the sub-basement of the Admiralty building to the so-called Citadel, a modern bombproof concrete bunker at the side of the Admiralty building in London.[ix]

Direction-Finding Stations

The function of the shore D/F organization was to enable early warning of imminent attack to be given to convoys being threatened by U-boats. The time that elapsed between the transmission of the first report by a U-boat sighting a convoy and the receipt by the escort of this warning, had a direct influence on the subsequent proceedings. In order that this time should be a minimum, the pre-requisites were:-

- Accurate bearings
- Quick transmission of bearings to Admiralty
- Quick plotting
- Quick transmission of the warning signal[x]
  The plotters sent information to the operational commands rather than direct to ships.

As well as being a 'Y' station Scarborough was also the centre controlling the direction-finding stations. It collected D/F bearings from all the British D/F stations. These stations were located at the following places around the United Kingdom: Baldock, Cooling Marshes (until end of April 1941), HMS *Flowerdown*, Ford End, Goonhavern, Bower, Anstruther, Kilwinning, Land's End, Lydd, Maidstone, Norwich, Pembroke, Perran, Portrush, Scarborough, Shetlands, Sutton Valence and Wick. See Map 1.

1 WW2 RADIO SITES GREAT BRITAIN (M. Kirwan/C. D'Alton)

D/F bearings also came in to OIC, (Operational Intelligence Centre) from stations around the rim of the Atlantic Ocean such as Iceland, Greenland,

east coast of North America, Canada, Bermuda and Jamaica.

Scarborough D/F Control Centre

When a German Morse code message was intercepted in Scarborough 'Y' station it was also processed by the direction-finding section.

After the fall of France, the Germans moved their control base to Lorient/RXÚ on the French coast for their U-boats and ships in the Atlantic. Messages were broadcast in Morse code and would come up on known frequencies to the 'Y' stations at, for some time, ten minutes past the hour, consisting of long messages of four-letter groups e.g. ZMPQ CLRB FXDS JTLM RNQX KUJY MHTY MNBV. The messages would then be repeated from another German coast station so that should any of their intended recipients miss a group or letter for any reason there was a second chance for their operators (and for Scarborough!) to check the message and insert any missing letters or groups. By using another station to repeat the message there was the chance that the second station might not have the same atmospheric interference as the originator.

Ships and U-boats were not supposed to ask for groups to be repeated for fear of being D/F'd but occasionally they did. If so, the 'Y' service wireless operator shouted the frequency and Scarborough Control would direct, via land-lines, his choice of D/F stations to that frequency. If bearings were obtained these would be reported to Scarborough Control when he asked the station if it had obtained a bearing and these bearings would be reported by telephone to the NID/DSD 9 (Director of Signal Division) Duty Officer at the Operational Intelligence Centre (OIC) at the Citadel in London.[xi]

Sometimes the D/F stations would be told to monitor a specific frequency and if they heard a ship or U-boat come up on their frequency, they would shout over their land line to Scarborough e.g. E-bar and frequency and at the same time taking a bearing of the transmission. A U-boat sighting report was usually prefixed by what the Allies called an E bar which in Morse was "dit-dit-dah-dit-dit" or ".. - .. "[xii] Scarborough Control would then direct a few suitable D/F stations to the frequency, if possible to produce a fix where the bearings intersected.

Each D/F hut wireless operator sat in the hut waiting for the control centre to announce a frequency on the loudspeaker. The supervisor at the control centre would then flick a small switch on the control panel, which had the effect of diverting the signal heard on the operator receiver down a landline direct into the D/F hut and into the right hand earpiece of the headphones of the D/F operator. The operator would then search on the given frequency until the signal in the left hand earpiece of the headphones matched the one in the right earpiece, which was coming down the line. The D/F operator then spun the 360 degree goniometer finding the null or minimum signal. The bearing was then read, logged and called back down the telephone to the control centre.[xiii] When not directed by the supervisor the D/F operator would search up and down the receiver band of frequencies in the hope of finding a German transmission.

As the bearings were never one hundred percent accurate it gave a triangle on the map which became known as a cocked hat. Speed was of the essence as U-boat transmissions were short to avoid bearings being taken and their presence in a certain area being detected. These D/F bearings were also phoned to NID/DSD 9. They were quite a way from being accurate. Even an A rated bearing had an arc of 4 degrees which over, say, 1,000 miles created a considerable area. Fixes were often derived from 20 or so bearings.

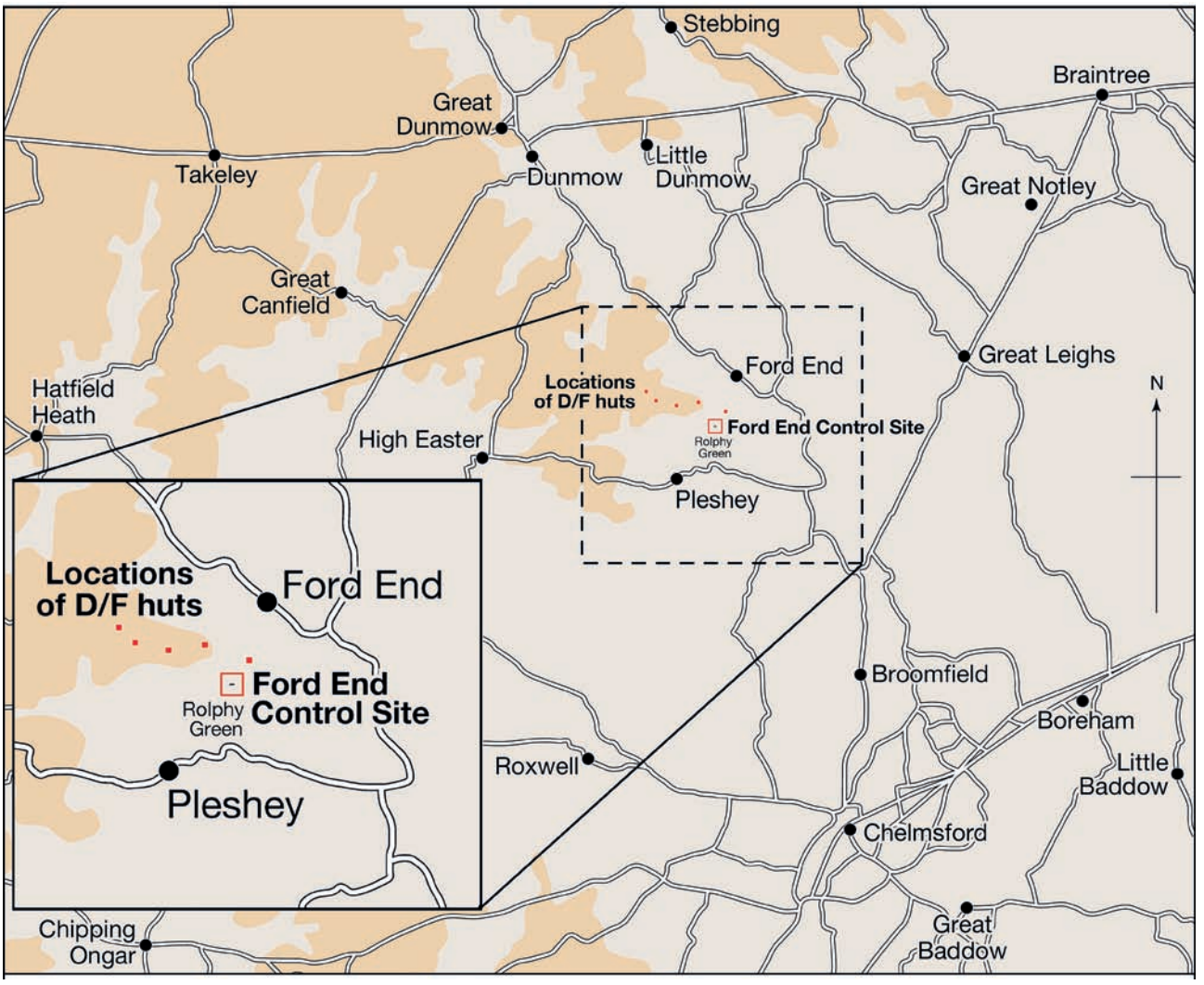
Operational Intelligence Centre, London

The Citadel was located beside Admiralty Building in Whitehall, London. It housed the Operational Intelligence Centre (OIC) from 1941. The D/F section took up a quarter of the Submarine Tracking Room.[xiv] The head of the section was Lieutenant Commander Peter Kemp, RN. The procedure for plotting D/F fixes was as follows: Scarborough wireless station collected the bearings with their appropriate classifications from all the British D/F stations around the coast. The wireless operator would add Class A with the report if he/she thought it was within 4 degrees, Class B within 10 degrees and Class C within 20 degrees.[xv] Some dozen sets of bearings could be collected in a matter of minutes and were immediately phoned by direct line to the D/F section at OIC. Here the plotters on duty noted the bearings in a log, together with all relevant details such as times of intercept, origin, indicator group, and so forth.

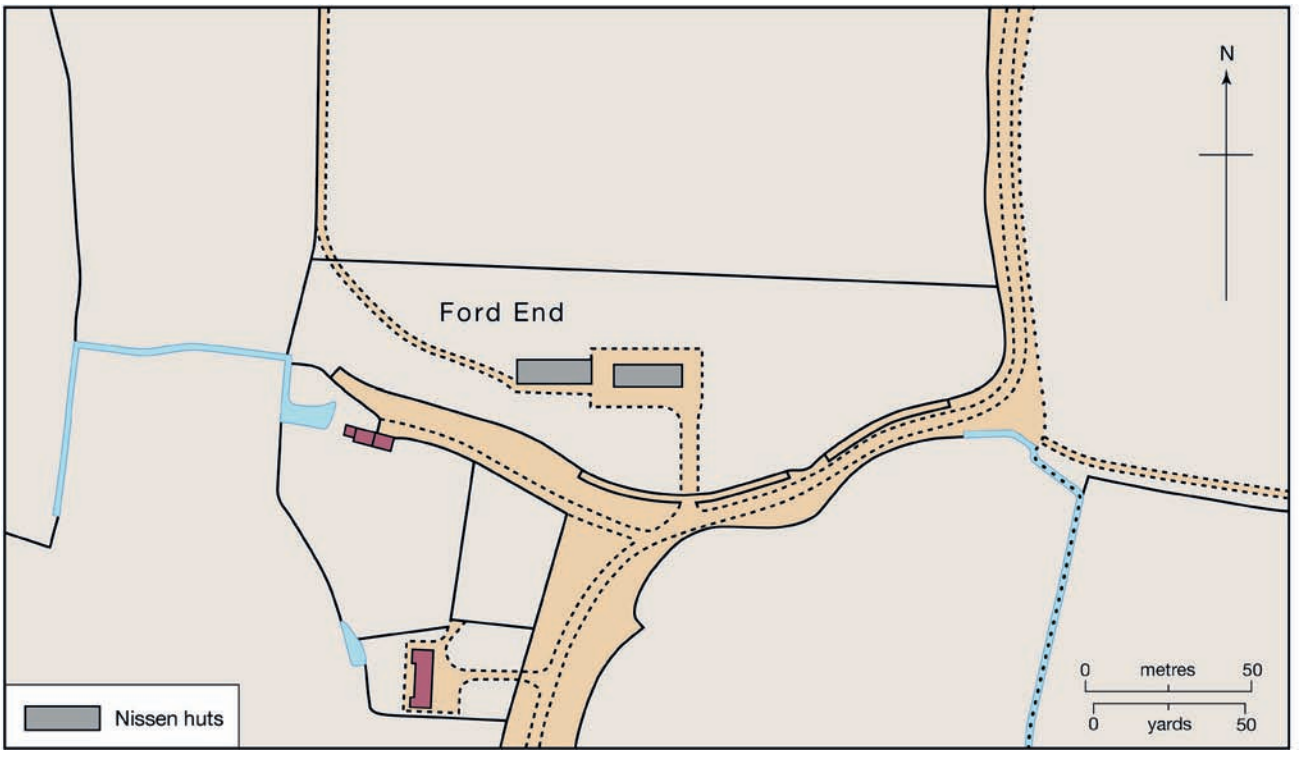
Lieutenant Commander Kemp, as a result of experiments with elastic cords, pins etc. eventually devised a plotting chart which proved extremely efficient and was used throughout the time in the Citadel. This consisted of a sloping board fixed to the wall in the same manner as the reading boards for newspapers in the 1950s on which were mounted two charts, each surrounded by strips of thick linoleum. Each D/F station was marked on these charts and a hole drilled through the spot. Through these holes a cord was threaded, to the outer end of which was tied a coloured plastic headed drawing pin and the other end was tied to a hook behind the chart. A lead weight on a pulley kept the cord taut. It was found from experience that the ideal cord for wear and tear was a thin fishing line.[xvi]

To plot a bearing, one took hold of the pin on the appropriate D/F station and, pulling on the cord, stuck it in the linoleum strip opposite the bearing, as indicated round the margin of the chart. This procedure was repeated with all the other bearings, and in the end a spider's web of cords would be criss-crossed across the chart. With a perfect set of bearings – a rare event – the correct position required would be where all the cords met at a point or near enough.[xvii] Two or three good bearings would suffice.

After the bearings were plotted there was a five-way daily phone conference to discuss the situation: OIC, Western Approaches (Liverpool), Coastal Command,



2 Takeley to Chelmsford. Ford End inset. (C. D'Alton)



3 FORD END SITE PLAN. (C. D'Alton)

and Combined Headquarters at Plymouth and Rosyth. OIC would give the latest plotted position of the U-boats, and discussions would then follow about convoy routes and diversions, the movement of support groups and plans for air escorts and offensive patrols.[xviii]

Group D/F Stations

Direction-Finding bearings were never one hundred percent accurate because of the radio waves going by ground wave and sky wave, being diffracted by land and objects, night-time effect and other reasons. To improve the accuracy of bearings, and to have a more efficient system, Group D/F stations were introduced. A formal definition of a D/F group was given as: 'a collection of two or more D/F stations connected to a suitable centre and organised in such a way that the bearings from the different stations on a given transmission can be combined together to give a single 'group bearing' which is then regarded as emanating from some convenient point centrally placed with respect to the stations of the group'.[xix]

The Admiralty proposed to build D/F groups comprised four or five in the UK (four went ahead), Jamaica, Iceland, Nova Scotia (subject to Canadian blessing) and Morocco to collectively cover the North Atlantic. Ford End was the first group station to be put into service in December 1943[xx], followed by Bower in April 1944, Anstruther in June 1944 and Goonhavern in July 1944. On 1 January 1944 a report on installation tests was carried out by Baddow Research Laboratory, Great Baddow, Chelmsford.[xxi] Ford End and Anstruther were Marconi equipped and Bower and Goonhavern Plessey equipped.[xxii] In June 1944 it was taking one hour to receive a bearing from Iceland and the American continent and two to six hours from other D/F sites overseas.[xxiii] This had to be improved.

Ford End Group Direction-Finding Station

The Ford End group consisted of five D/F sites and a control centre or command post. The control centre consisted of two Nissen huts, each 70 feet long x 24 feet wide.[xxiv] The huts were located north-east of Park Farm in Rolphy Green, then in the parish of Great Waltham between Ford End and Pleshley, and some ten miles from Chelmsford. The control centre was linked to the five D/F huts spread across a mile in fields to its north between The Gorse (a wood in the parish of High Easter) and Ringtail Green, Great Waltham.[xxv] Each hut was 11 feet x 11 feet, with 7-foot eaves, and built with slatted timber with an A shaped roof and were staffed by ACSWS operators.

The sites chosen usually had a good earth, such as damp ground, free from trees and bushes nearby. Power cables, telephone or control lines, water pipes and the like were brought into the D/F hut, buried underground within a radius of 1,000 feet from the building. The hut was surrounded by a low wooden fence.

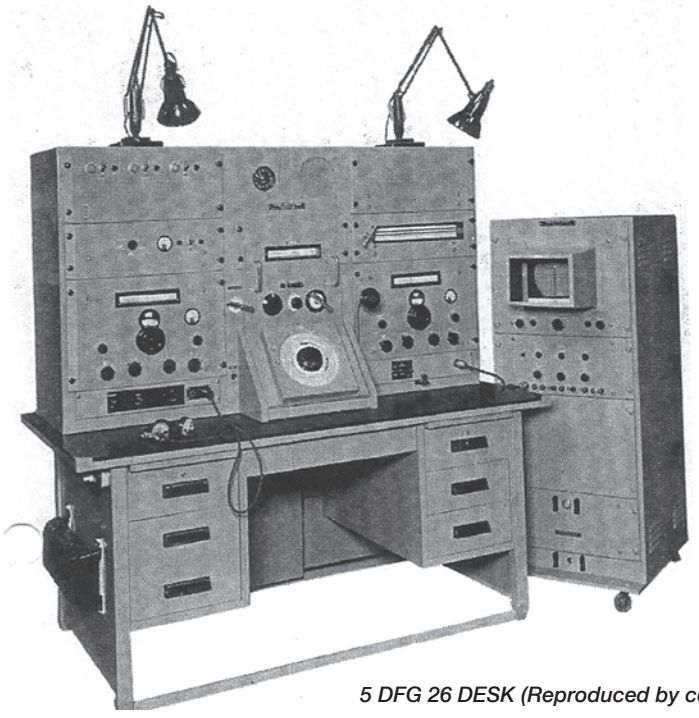
To overcome irregularities in site conductivity, a false 'earth' had been devised of copper. This copper mesh was built of wire in 2-foot squares about 1 foot above the ground, held up by a series of iron stakes driven into the ground, and covering a circle of 50 feet radius from the centre of the aerial system. By the use of this screen, good results were obtained on sites where heretofore direction-finding had been impossible. Access to the hut was provided via a timber catwalk erected over the screen. In order to eliminate as far as possible the necessity for leads trailing across the floor to electric fires, two air warmers were supplied as standard for heating the hut and fixed to either side of the operator's desk.[xxvi]

The direction-finding equipment was initially a Marconi DFG24/2, replaced in 1945 by a DFG26, housed on top of a steel desk 66 inches x 34 inches x 30 inches. It consisted of a goniometer (see paragraph below) with two Marconi receivers – one on each side of the goniometer allowing the wireless operator to listen to two frequencies. Also on the console unit was a bearing-correction indicator, the line signalling panel, a clock and a loudspeaker. The receivers and ancillary equipment were on sliding rails which could be easily removed for maintenance. A power distribution board was fixed at the back of the table, and a mounting board where the telephone lines terminated.[xxvii] An oscilloscope to give a visual display of the signal, together with its associated power packs and accessory equipment was housed in a separate steel cabinet fitted with castors, so that its position could be adjusted to suit different requirements.[xxviii]

The wireless operator sat in front of a goniometer which had a 360° scale. The goniometer was wired up to the aerials and spinning the dial through the 360° was the same as rotating the aerials. The radio signal was minimum at two points on the scale and maximum at two points. The equipment was configured in such a way that the minimum signal gave the direction of the transmitter as it was easier to detect a minimum signal. For example, the signal becomes weak or inaudible at 270°, audible and of equal strength at 267° and 273° the operator then can confidently send in a bearing of 270°. There would also be a reciprocal minimum at 090° but it is often obvious which one is correct. If in doubt a sense aerial is switched in to confirm the correct one.

The standard Marconi-Adcock permanent type aerial was used consisting of four 30 feet tubular steel self-supporting masts around the D/F hut at the corners of a square, the diagonals of which were 20 feet. The masts were insulated from the ground and acted as aerials. Each mast was connected to the mast diagonally opposite by a shielded underground cable thereby giving two U-type Adcock aerials at right angles. They were connected to the D/F equipment in the hut by a length of steel-armoured low-loss feeder cable which was lying on the surface of the ground under the hut. A fifth aerial (sense aerial) was situated at the centre point of the system and consisted of a four-wire cage aerial supported by an insulated triatic system from the top of the four mast aerials. This entered the hut through a roof insulator. The aerials were preferably orientated true North, South, East, and West about the centre of the system.

4 FORD END D/F HUT – (Reproduced by courtesy of L. Meulstee – www.wftw.nl)



5 DFG 26 DESK (Reproduced by courtesy of L. Meulstee – www.wftw.nl)

At Ford End when a bearing was taken in each hut it was phoned through to the control Nissen hut and then the mean bearing was phoned through to DSD 9 at OIC.[xxix] Overall, the method was not as successful as expected because the stations were too close together and would all receive the same distortion of the reflected radio wave if for any reason it became bent.

Benefits of groups

There were a number of advantages to grouping facilities together, rather than operating a dispersed site. Having a cluster of huts meant senior staff could train new entrants on the job easily without one of them having to travel to an isolated station. Even group training would have been practical on-site.

As the Nissen huts could contain a full range of spares it was quite possible that there was enough work to justify an engineer being on site

6 & 7 BEFORE AND AFTER NISSEN HUT PHOTOS (reproduced by courtesy of J. Freeman)

for repairs, maintenance, calibration and servicing of equipment etc.

Regarding those who were deployed to the site, sickness and other cover could be sorted out quickly from the pool of staff housed locally which also would have benefited morale. Staff would be less isolated over the week in what was a very lonely day during the shifts while a small, on-site canteen would hopefully engender a good team atmosphere.

Direction-finding Explained

Back in the 1970s the introduction of portable medium wave transistor radios in homes highlighted direction-finding. Reception could be improved on medium wave by turning the radio at right angles to the radio transmitting station as there was a ferrite rod aerial running along the top of the radio under the casing.

In the early D/F's in the 1900s, it was the aerial that was rotated but in the war instead of rotating the aerial it was possible to use a system of fixed aerials with an instrument called a radio-goniometer in the hut.[xxx]

If a U-boat position 60 North 20 West transmitted on 4860 kc/s (Nowadays kc/s is known as kHz) Scarborough would possibly pick up the signal. The U-boat signal was often recognizable by the tone of the transmitter as it gave a distinct sound with the aerial drying out when the key was first pressed after the submarine surfaced. Scarborough would tell a few stations to take a bearing. Bower would respond with a bearing of 280°, Ford End 305° and Iceland 169°. Scarborough would phone these bearings to DSD 9 and they would plot them on a chart and then see the U-boat was in the area of 60 North 20 West.

The big advantage of D/F was that no knowledge of the contents of the message was required, and the position of the U-boat could be located in less than 15 minutes.

In August 1977 Patrick Beesly, Deputy Director in the Operational Intelligence Centre from 1940 to 1945, corresponded with my father about D/F during the war and said:

> *The Bismarck would not have been sunk but for H/F D/F and many many convoys were kept clear of U-boats or at least given some advance warning of an impending attack because of your efforts. – so well done!* [xxxi]

Post Second World War

After the war many of the D/F stations closed down and by 1951 there was only one operator at Ford End. However, it continued as a research centre and continued to be developed. In one particularly wet winter (possibly 1959/60) there was an upgrade and new trenches were dug from the Huts to the aerials sites. This resulted in the construction of around 10 manholes covering the trenches which made arable cropping difficult. The Freeman family, the owners since 1955, had planted sugar beet in that year, and the wet weather and disruption from the trenches meant that most of the crop had to be harvested by hand. Mr Freeman was allowed to park lorries on the concrete entrance way to be loaded by hand and then onto Felsted sugar beet factory.

The staff of ACSWS were absorbed into GCHQ in 1964 and Ford End finally closed down on 31 July 1976 and finally decommissioned in 1979, when Mr Freeman was given the option of either having the site cleared, and the land returned to agricultural use, or keeping the buildings and using them as they were for storage. He opted for the latter and the Nissen hut control centre was thus used until the early 2000s, by which time their condition had deteriorated. A decision was made to renovate them and local architect Paul Scott was engaged, the project taking 18 month to finish, being completed in 2018. The Nissen huts, which once could have fallen down, are now two impressive homes, witness to the role Essex played in the Battle of the Atlantic. Nothing remains of the five direction-finding sites.

Acknowledgements

I would like to thank Stan Ames, Ross Bradshaw, Martin Briscoe, Cath D'Alton (for maps), Messrs Freeman the current owners of the Nissen Huts for the information they shared, Shane Joyce C.J. Kidd (ex-Curator of Collingwood Radio and Radar Museum), Paul Marks, Paul Reyland, Paul Scott and Neil Wiffen their assistance in researching the article. Also Louis Meulstee's and his website' Wireless for the Warrior' www.wftl.nl and the Essex Society for Archaeology & History for a grant to commission the accompanying maps.

The Author

Michael Kirwan lives in Limerick, Ireland. He is a retired Watch Manager, having worked at Shannon Aeradio - the North Atlantic Aviation Communication centre near Shannon airport, Ireland. In the 1970s he worked as a Marine Radio Officer for the Marconi Marine Company in Chelmsford working for various shipping companies. His father Dermod Kirwan was also a Radio Officer and during the Second World War he worked in the 'Y' service for the Admiralty Civilian Shore Wireless Service. Michael writes articles in Sea Breezes shipping magazine and the Radio Officers Journal.

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[iii] S. McKay, The Secret Listeners: how the Y Service intercepted German codes for Bletchley Park (Aurum Press, 2012), p.6.

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[v] TNA, ADM 1/9822. Conversations between Captain Ingersoll USN and Naval Staff at Admiralty, 1937-1938.

[vi] Syrett, p.7.

[vii] TNA, HW 41/405. Historical Review of 'Y' work on German Naval W/T Communications. 1939-1945; HW 8/97. HMS Flowerdown. History of the 'Y' station during the Years 1939 to 1945.

[viii] Letter to author from Rosemary Lyster, 09/11/1997, author's collection.

[ix] D. Kahn, *Seizing the Enigma* (London, 1991), p.146.

[x] TNA, ADM 1/13072. Grouping of HF/DF Stations, 1943.

[xi] Ibid.

[xii] Syrett, p.145.

[xiii] D. White, 'Radio Secrets of the War', *Shortwave Magazine*, February 1997, pp.20-1.

[xiiv] D. Kahn, *Seizing the Enigma*, (London, 1991), p.145.

[xv] TNA, ADM 220/181, p.6.

[xvi] Syrett, p.382.

[xvii] Ibid.

[xviii] P. Beesly, Very Special Intelligence: The Story of the Admiralty Operational Intelligence Centre 1939-1945 (London. 1977), pp.21-3.

[xix] P. Marks, 'Ford End HF/DF Group During WW2', *e-Defence Electronics Newsletter*, 134 (January 2024), p.11.

[xx] The site of the station was on land owned by Walter Smith. (Information via the Freeman family, current owners of Lavender Farm, Ford End, which they purchased in 1955).

[xxi] Oxford, Bodleian Libraries. MS. Marconi 941. Report on Installation tests carried out at first five station HF DF group at Ford End.

[xxii] TNA. HW 8/98.

[xxiii] TNA, ADM 1/13072.

[xxiv] Nissen huts were originally designed by Peter Norman Nissen (1871-1930), a Canadian-American-British mining engineer, inventor and army officer. He held a number of patents for his inventions and developed the Nissen hut prefabricated shelter during the First World War. https://en.wikipedia.org/wiki/Peter_Norman_Nissen. (Viewed 29/07/2023).

[xxv] A. Begent, *Chelmsford at War* (Chelmsford, 2020), p.188.

[xxvi] Marconi Brochure. Description and operating instructions; Wireless for the Warrior Volume 3. https://www.wftw.nl/ (Viewed 01/07/2023).

[xxvii] Ibid. HF Direction-Finding Equipment. DFG 26/4.

[xxviii] Ibid.

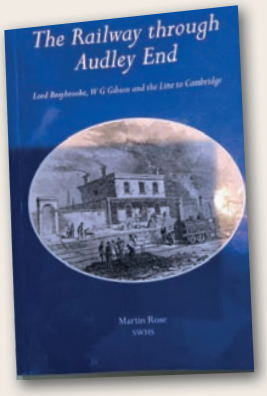
[xxix] The aerials were situated on the land of Poulters Farm and Old Park Farm.

[xxx] Admiralty Handbook for Wireless Telegraphy (London, 1938), p.36.

[xxxi] Letter from Patrick Beesly, Roger Winn's Deputy Director in OIC, to Dermod Kirwan, 05/08/1977, author's collection.

Book Reviews

Martin Rose



The Railway Through Audley End:

Lord Braybrooke, W.G.Gibson and the Line to Cambridge

ISBN 978-1873669923-5 £6.00
card covers, 64 pp.Ssaffron Walden Historical Society

The planning and building of the railway lines that connected Cambridge to outside world were both contentious and vexatious. The coming of the railways was generally considered a 'good thing', because it opened up rural areas to wide networks in commerce and recruitment, providing scope for profits and careers which isolated communities could not match. The railway companies were keen to maximise their reach, to provide for the carriage of goods and people between major population centres and points along the route, to connect seaports to their hinterlands and areas of industrial production to the outlying markets which needed or wanted their goods. By this means, they hoped to monopolise the developments in trade. Market towns likewise hoped to expand the range of goods and services they could offer, bringing in trade goods from distant parts at a cheap price. However, there was a difficulty: wealthy landowners often occupied territory which would need to be surrendered for the public good. Building a railway was a ruinously expensive business, so avoiding unnecessary deviations from the shortest route was always preferable.

Such was the case with Audley End House, which stood in the way of the surveyor's preferred route from London to Cambridge. The line would have to run straight through the landscaped parkland in front of the great house. Lod Braybrooks, a member of the gentry and the House of Lords, had many legislative tools at his disposal to ensure that this would never happen. The three-way tussle and stand-off among Braybrooke, the townsfolk of Saffron Walden and the Great Eastern Railway proved bitter and unseemly. Braybrooke took the view publicly that the railway would suck trade out of the local economy in favour of London; privately, he hoped to use his opposition as a lever by which he could exact financial benefit. Committees were convened to advocate for their preferred routes for the railway, but Braybrooke outmanoeuvred them all and the line was forced to pass at some great distance from his estate. He made a great deal of money out of the railway, and the line proved a moderate success when connected to the existing route from Sudbury via Clare to Cambridge, but it never delivered the full benefits that were expected due to Braybrooke's interference.

Rose's short and engaging account of the three-way fight could probably be repeated for any of a dozen other instances of landowners thwarting popular advancement while profiting from the results. This is a very useful booklet for anyone researching the early railways or mid-19th century social history.

Heather Godfrey

Continued on page 38

CARPENTERS' KNOWLEDGE IN SETTING OUT CRESSING TEMPLE BARNS REVISITED

By Paul Reed MA Cons. York, FSA

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The late Adrian Gibson and the late Laurie Smith published their papers in the Essex Archaeology and History Journal 27 (1996). Gibson's theory is based on intersecting circles using the dimensions of the imperial rod (pole or perch) 16.5 feet to produce a hexagon and an equilateral triangle to lay out a floor plan and section. Both Gibson and Smith worked together sharing ideas. Smiths' idea is based on the geometry of the floor plans of both barns based on a rectangle for the Barley Barn and a square for the Wheat Barn employing overlapping circles as used by Gibson. Gibson on the other hand showed that his theory sets out the floor plans of both barns and creates diagrammatic sketches of the plans and sections of both buildings, not only the Cressing Barns but also listed other barns that complied with his theory.

This paper is based on a completely different approach based on the author's discovery of how medieval carpenters set out their buildings by dividing the span of the tie-beam into 16 units to produce a measuring rod to set out the roof, the floor plan and the height of the building with precise accuracy, without using geometry or numerical measurements. This method gives common roof pitches of 43, 48, 52, 55 and 58 degrees which are found on all historic buildings throughout England from the early Medieval period to the 18th century, published by the author in Vernacular Architecture, 51 (2020), amended 2023, VA Spring newsletter. This paper will describe in detail and explain how this method works in the setting out of the Barley and the Wheat Barns.

Introduction

The Cressing Temple estate was originally owned by the Knights Templar who first built the barns to store the proceeds from the annual harvests from their estate. The medieval Barley Barn and the Wheat Barn are part of a group of farm buildings on the present site in the parish of Cressing in Essex known as Cressing Temple. Cecil Hewett (with his historical knowledge of the barns) brought this to the attention of Essex County Council who subsequently acquired the site in 1987. Originally a moated manor with farm buildings, the barns are the only remaining medieval buildings on the site with about a third of the moat surviving. The Barley Barn has been dendrochronologically dated to 1205-30d and the Wheat Barn, 1257-80d[1].

Cecil Hewett gives a detailed description of the barns in his book '*The Development of Carpentry 1200-1700 An Essex Study*' (1969)[2]. Before dendrochronology was established Hewett dated the Barley Barn c.1200 and Wheat Barn 50 years later based on carbon 14 dating and the use of lapped joints in the buildings as archaic carpentry. He struggled to get his papers accepted, but 'Carpentry in Medieval Essex'[3], his home county, was finally published in 1962 with the help of the Essex historian academic the late Gus Edwards[4]. From there on Cecil was recognised as a researcher and published many books about medieval carpentry before he died in 1998. However, Hewett's illustrations in his publications are not very accurate, he very rarely took site measurements, therefore these cannot be used or referred to as references[5].

The late Adrian Gibson had been researching his theory for many years, he made a presentation at the day conference at Cressing Temple in September 1993 on 'Pre-conquest Building Techniques'. Attending the conference was Peter Huggins who brought it to Gibson's attention that the Wheat Barn is 2½ rods wide and about 8 rods long, and the Barley Barn is 3 rods wide by 9 rods long approximately (the imperial rod being 16.5 feet); trusses in both barns appear to be based on equilateral triangles. Gibson took this up and based his theory on the commonly used measurement of the modern rod being 16.5 feet or 5.03m, using these triangles based on the diagonal of two bays of the Wheat Barn and the Barley Barn. Gibson published his theory in the Essex Archaeology and History Journal 25 (1994) 107-112. This paper caught the attention of the late Laurie Smith who was also working in a similar field to Gibson. Smith's theory is based on medieval carpenters using daisy wheel geometry to set out their buildings. Gibson and Smith shared their research and they both published their papers in the Essex Archaeological and History Journal 27 (1996) two years later.

Following collaboration with Smith, Gibson amended his theory and this time Gibson divided up the Barley Barn with 6 concentric circles with 1½ rod radii giving an overall width of the barn to be 3 rods. With the Wheat Barn the first circle he sets out is based on a hexagon with one side of the hexagon giving the width of the aisle

posts, see p.83 in his article Figure 1[6]. Gibson's plan drawing of the Barley Barn shows the original length of the barn to be 7 equal bays and the section drawing p185 Figure 3[7] shows the barn to be 3 rods wide. The present barn standing today is shorter, having been subject to later alterations according to Andrews. The section Figure 3[8] is based on the dimensions of the floor plan giving the setting out of the parallel bracing and the parallel tie beams using triangles.

Smith in his article[9], pages 188-192, states that his setting out of the Barley Barn is purely based on daisy wheel geometry and the ratio of 1:2 using rectangles. Smith does not refer to any dimensions so it may be assumed he is working to Gibson's dimensions based on the 16.5 feet rod. Smith's interpretation uses the ratio 1:2 measured between transverse and diagonal alignments of the aisle posts with intersecting circles. Smith states that the layout is the same for the Wheat Barn except that rectangles are used for the Barley Barn and squares are used for the Wheat Barn[10].

In 2020 a revised version of the 1993 book by Essex County Council was published, titled: '*Cressing Temple A Templar and Hospitaller Manor in Essex and its Buildings*'. The 1993 book, contains an assessment of the Cressing Barns set in a national context by David Stenning. The 2020 revised version edited by David Andrews has new tree-ring dates and supplementary material by John Walker.

The author's comments on the papers given by Gibson and Smith in 1996

The author has visited the site and taken many measurements and referred to the survey drawings in D. Andrews 2020[11]. From these survey drawings and the author's site measurements, the width of the Barley Barn is about 14m. Gibson states this to be 3 rods wide[12] (49'-6") which is about 15.05m, an error of about 1.05m, or maybe Gibson was assuming the barn was over 1m wider when it was first built. However, Andrews states that the barn had been reduced during the rebuilding of the aisles by about 300mm but not as much as 1.05m. On the Wheat Barn Gibson does not give the overall dimensions of the barn, however scaling off his drawing Fig. 2 gives a dimension about 2½ rods wide, thus 12.5m approximately. Measured on site by the author the barn is about 12.2m, a possible error of 300mm. Therefore, the setting out plans drawn in Figure 1 p.183 and Figure 2 p.184 in Gibson's article 1996[13] do not appear to be very accurate. When the author drew the section from the survey drawing Figure 2 with a roof pitch of 55°, the mortices in the back of the aisle posts and the isle ties line up with the perimeter outside stud walls and the rafter feet sit perfectly on the reverse assembly wall plate. If the outside north-west and south-east walls were originally wider, even by a few feet the roof pitch of the barn would be shallower.

The author finds it difficult to accept that medieval carpenters would use the imperial 16.5-foot rod lengths of 1½rods (7.54m) to draw all these 6 circles precisely on the framing floor to set out the Barley Barn and a √2 rod, about 7.10m length, to construct the circles of the Wheat Barn. What a mammoth task to get it accurately set out! If the master used string or cord there would be a constant error drawing the circles due to the string/cord stretching over the lengths of 7.10 and 7.54m. To overcome the error of the string/cord stretching they may have used a trammel or metal wire 7.54m long.

Secondly, there is no evidence that medieval carpenters used a modern imperial 16.5-foot rod for setting out. It is well documented that the foot and yard were not fixed until 1498 by Henry VII[14] and finally by Elizabeth I in 1588 who established the imperial 16.5-foot rod. Before these dates every town and borough in England used their own measurements. So, if the rod was in use in the early 13th century, the true length of the rod was not known, it could have been any measurement. In the author's article published in Vernacular Architecture 51 2020, explaining how medieval carpenters set out roofs and buildings, the statute of measurement in the Tudor era is discussed. This article explains again how the medieval master used a practical simple method based on a rod the length of the tie-beam of the building and dividing it into 16 units. The medieval carpenter did not need to use numerical measurements (rulers) or geometry based on a hexagon, circles, squares, rectangles, and daisy wheels as stated by Gibson and Smith. Each building built by the master carpenter had its own unique rod to set out that building; unless another building had the same width overall wall plates then it could be reused for another building, however, tie beams vary in length depending on the number of trees at the right height for the right size beam. Therefore, the rod described in this method used by the medieval master to build the Barley and the Wheat Barn is different to the rod, (pole or perch) established by Elizabeth I in 1588 decree being 16.5 feet. This rod is a fixed measurement which was used by Gibson and Smith in their analysis when writing their 1996 papers and is still used today in measuring acres of land, in setting out cricket pitches and garden allotments.

THE SETTING OUT OF THE BARLEY AND WHEAT BARN USING A METHOD NOT REQUIRING NUMERICAL MEASUREMENTS OR GEOMETRY

This article makes the case that medieval carpenters set out these buildings using an entirely different method. This ancient method just uses a unique rod marked out into 16 units taken from the tie-beam, including overall the wall plates, used to set out the roof and building, see below[1]. This method has been successfully applied to hundreds of original historic buildings by the author with accurate results. To date, the author has not found a single historic building that does not comply. This is convincing evidence that medieval carpenters used this method to set out their buildings. This setting out method also applies to stone buildings; churches, abbeys, and cathedrals[2].

[1] As published in *Vernacular Architecture* vol. 51, 2020, p.30–49 and amendment in VA newsletter spring 2023.
[2] The author has recently presented a paper to the Vernacular Architecture winter conference title: Medieval Carpenter's Knowledge in Europe in Setting out Roofs and Buildings Without using Geometry or Numeric Measurement, forthcoming

During spring 2022 there was an opportunity for the author to set out a full-size oak frame building to be used as an extension to a farmhouse in Kent. The setting out of this frame has been recorded by video and can be viewed on the author's website[3]. This video has 4 parts: Part 1 dividing up the tie beam into 16 units using string and dividers, and the units are transferred to a timber rod; Part 2 setting out the rafters from the rod. Part 3 setting out the common rafters using a rafter-hole jig; and the final Part 4 setting out the jowl posts and the wall and sole plates to produce the height and plan of the building all measurements taken from the 16-unit rod.

Setting out method explained

The author has researched medieval and historic buildings up to the 18th century to discover how medieval and later carpenters set out their roofs and buildings. This method is based on the overall length of the wall plates and tie-beam of the building, dividing the tie beam into 16 equal units from the outside face of the wall plates, from points **0** to **16** (Fig.1). This can be done simply by folding the cord in half to find the centre of the tie-beam at **0** to **8**, marking it on the side of the tie beam with chalk or charcoal, then folding the cord again so that points **4** and **12** can also be marked on the side of the tie-beam. The cord is again folded two more times so there will now be eight divisions of the half span or **16** divisions of the full span of the tie-beam, as marked out in (Fig.1). Once the division **0–1** has been determined, dividers can be set to **1** unit so that the **16** divisions of the span can be checked for accuracy and the dividers can be adjusted accordingly.

These **16** marks on the side of the tie-beam can be transferred to a rod to become a measuring stick to set out using these increments or units of measurement. Every building will have different units of measurement unless the tie-beams of both buildings happen to be the same length.

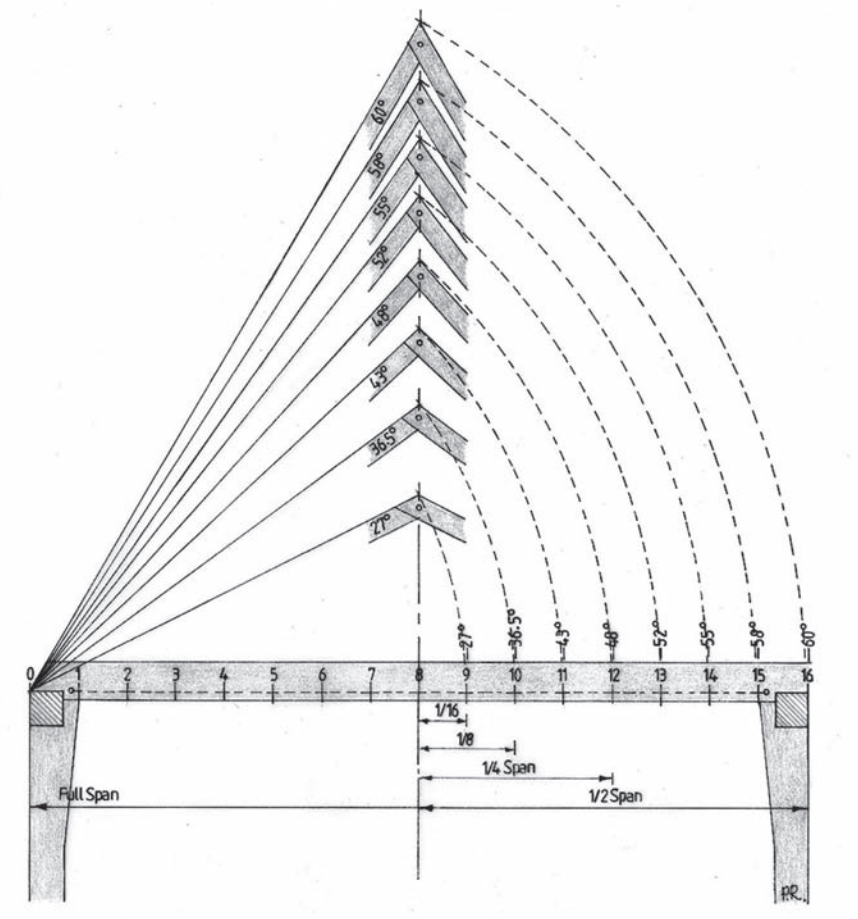

Figure 1: Different rafter lengths and pitches from the unit measurements of the tie-beam. Drawn by the author

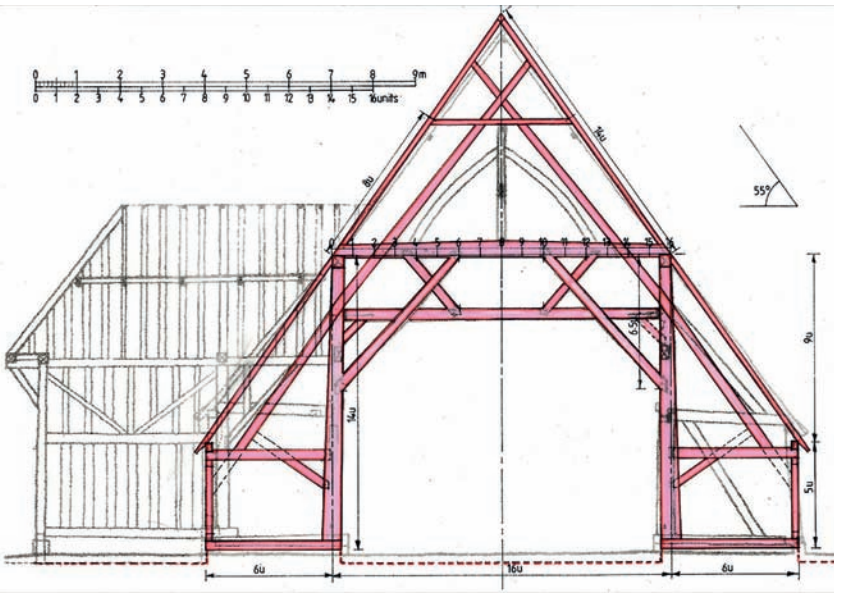

Figure 2: The Barley Barn, showing the setting out of the original structure in red superimposed over the survey drawing of truss frame 3 by David Stenning. The superimposed drawing in red is by the author

[3] www.medievalbuildings.co.uk

HOW THE MEDIEVAL CARPENTERS USED THIS METHOD OF SETTING OUT FOR THE BARLEY AND THE WHEAT BARN

The Barley Barn

The lengths of the tie-beams are first determined by the carpenter selecting 8 tie-beam timbers for the Barley Barn[4], see Figure 2 truss frame 3 . The shortest length is selected becomes the accepted length of all the beams. This determines the width of the nave, the length from points **1** to **16** shown above (Fig. 2). This selection of the tie-beam lengths reduces the amount of waste timber and gives the maximum span width available. From these unit measurements in Figure 2, a point taken from **0** to **12** will give a rafter length on the tie-beam at **1** and **16**. The outside edge of the arcade plates gives the width of the barn nave being **16** units (7.95m) scaled from the survey drawing. The tie-beam is laid on its side so that the dovetail joints at both ends can be set out, and the mortices for the arcade posts are set out on the underside of the arcade plates. (The rafters that are morticed into the top of the tie beam will be referred as tie-beam rafters to avoid confusion.) Tie-beam rafters can be set out using points **1** to **14** units giving the length of the rafter, allowing for the depth of the tie-beam. The position of the collar is located by the carpenter marking the tie beam rafters at **1** to **8** units as shown in Figure 2. When the tie-beam rafters have been joined at the apex and assembled into the top of the tie-beam, the collar timber is laid across the tie-beam

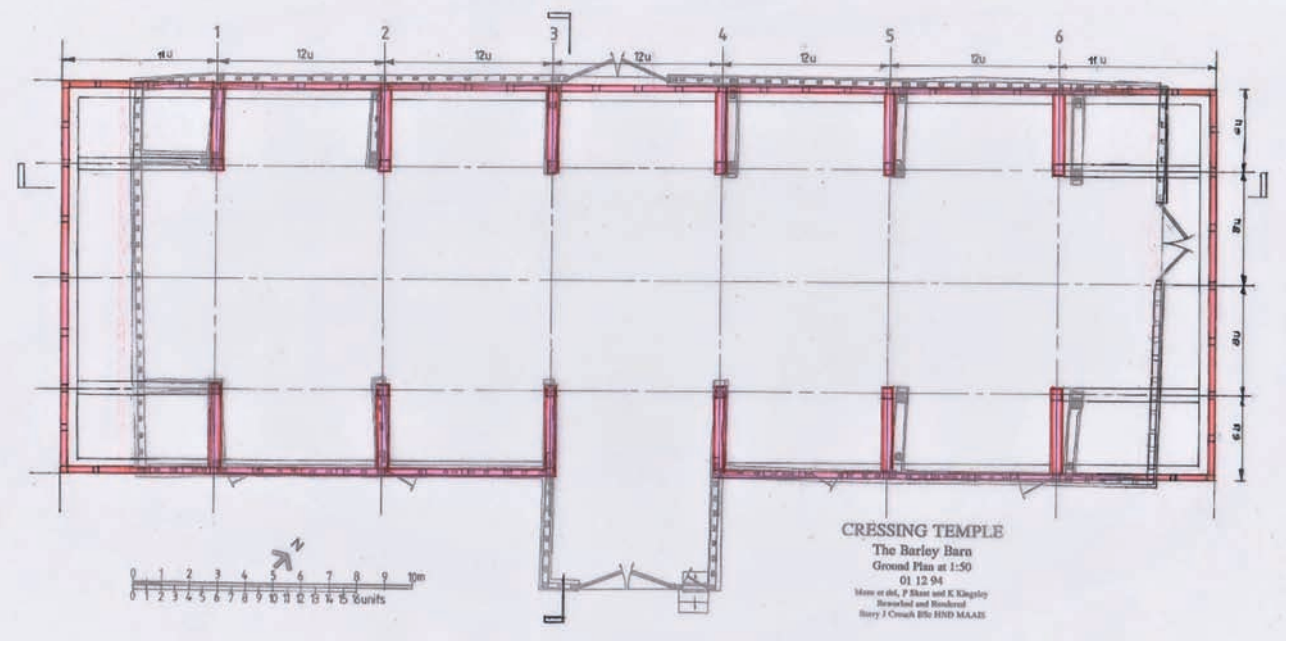

Figure 3: The survey floor plan by P. Skeet and K. Kingsley of the Barley Barn, showing the original setting out overlaid in red with dimensions in units by the author.

and a roof angle of 48°. Using these measurements from **0** to **16** of the span gives a range of angles, from 27° to 60° (Fig. 1). Thus, a rafter timber laid on top of the tie-beam and marked at **0** and at **14**, will give a rafter length for a roof pitch of 55° as is the case with the Barley Barn (Fig. 2). This is an angle suitable for thatch, shingles or for peg tiles which are found on the present building.

The **16** units marked on the side of the tie-beam can be transferred to a rod by the carpenter, using a knife or a race knife. Alternatively, dividers can be used to stride out the marks on the rod. The marked-up rod will become the measuring stick for the whole building. All the setting out of the building would be done on the framing floor, a level area where the building is to be constructed, or in the carpenter's yard. Arcade plates are selected to be straight and free from large knots to support the tie-beams and rafters. The arcade plates are laid on the framing floor parallel on levelling blocks spaced out to the marks rafters at points **8**, where it has been marked on the back of the principal rafter (Fig. 2), giving the height of the collar.

The next stage is setting out the arcade posts which are laid on top of the sole/sill plates[5] and fitted into the underside of the arcade plates. In Figure 2 the arcade posts are marked out to **14** units for the overall height of the arcade plate and sole/ground sill plate. The main brace from the arcade posts to the tie beam is **6.5** units from the arcade plate and at **6** and **10** units on the tie beam (Fig.2). The lower secondary tie beam is **3** units down from the top of the arcade plates. Secondary cross bracing between the tie-beam and the lower secondary tie-beam is set out using units **4** and **12** (Fig.2). The arcade posts are set out using the centre line of the arcade posts at their feet because they are tapered. The width of the aisle out-shot is 6 units which fits well with the external wall of the existing barn on the northeast side, and on the southwest side the original outside wall is shown to be outside the present wall by 300mm which supports

[4] Cressing Temple A Templar and Hospitaller Manor in Essex and its Buildings 2nd rev. ed by David Andrews Fig.21 p.63
[5] Arcade posts probably earth fast according to Andrews but no archaeological evidence to support this statement.

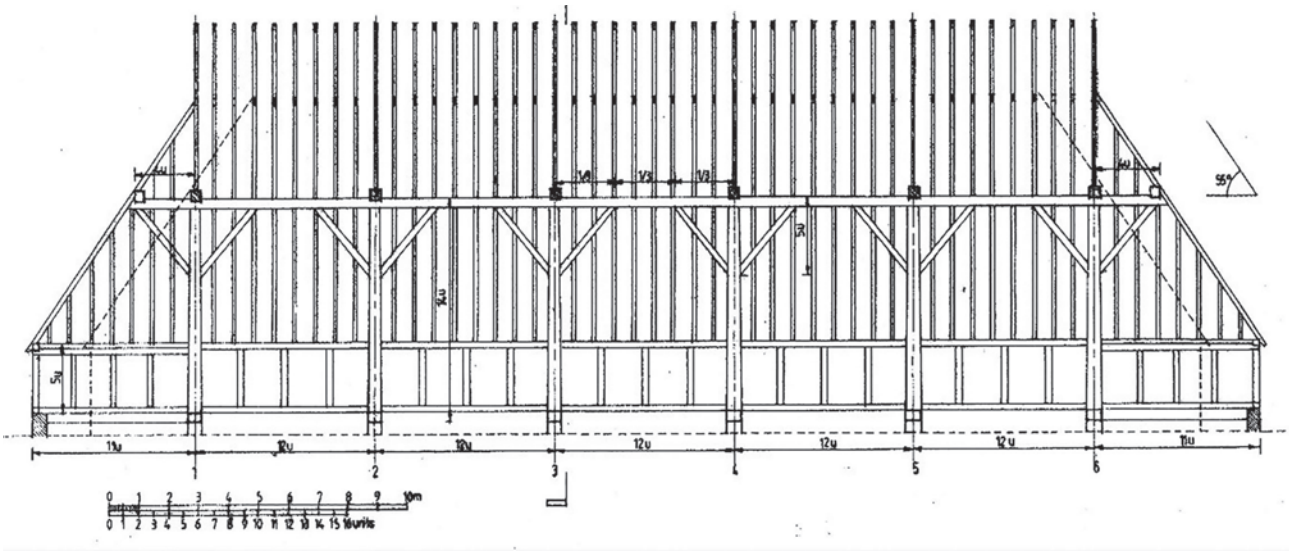

Figure 4: The longitude section of the Barley Barn as built showing the setting out dimensions in units

Andrews finding on page 70[6]. The line of the original roof pitch of 55° lines up with the aisle wall plates.

The height of the aisle wall plate is **5** units which lines up with the aisle tie which is morticed into the back of the arcade post and supports the wall plate in reverse assembly. This frame is set out on the framing floor. Once assembled, the very long secondary diagonal passing bracing timbers are laid over the frame running parallel with the rafters, halved, and let into the aisle posts, arcade posts, tie beams, collar and morticed into the back of the rafters near the apex providing additional bracing to the frame. Figure 2 shows the proposed original building as built in 1205 in red highlight superimposed over the survey section drawing which shows later alterations to the original building frame with a crown post roof of 52°.

The floor plan (Fig.3) shows the setting out of the plan as built marked out in red, drawn by the author, and overlaid on the survey plan of the present barn. Hewett mentions that the arcade plates were cantilevered supporting a flying tie beam, as in the Wheat Barn. There is evidence of this by existing mortices in the north east face of the aisle posts which would have supported the flying arcade plates as observed by Andrews and Hewett (Fig.2 in his book)[7].

Figure 4 shows the longitudinal section through the barn as built showing the setting out of the end bays and the bracing of the arcade posts **5** units from the top of the arcade plate and 1/3 from the centre line of the aisle posts. The end bay is **11** units which allows the rafters to fit well against the flying tie-beams supported by the arcade plates as in the Wheat Barn, posts **1** and **6** giving a roof pitch of 55°. The setting out of this building could be done with a rod taken from the tie-beam or by striding out with dividers set to one unit (Fig. 2). The barn is 82 units long by 28 units wide.

The Wheat Barn

The Wheat Barn 1257-30d with an orientation east-west, porch facing south, is situated about 20 metres east of the Barley Barn. The Wheat Barn was built about 50 years after the Barley Barn and is 93 units long and 28 units wide. The Wheat Barn is more complete in its original construction than the Barley Barn (note the unit measurement is different on the Wheat Barn, 1 unit is about 400mm compared to the Barley Barn where 1 unit is approximately 500mm.

Figure 5 section drawing shows how much the frame has distorted over the years especially on the south side of the barn. However, the tie beams have

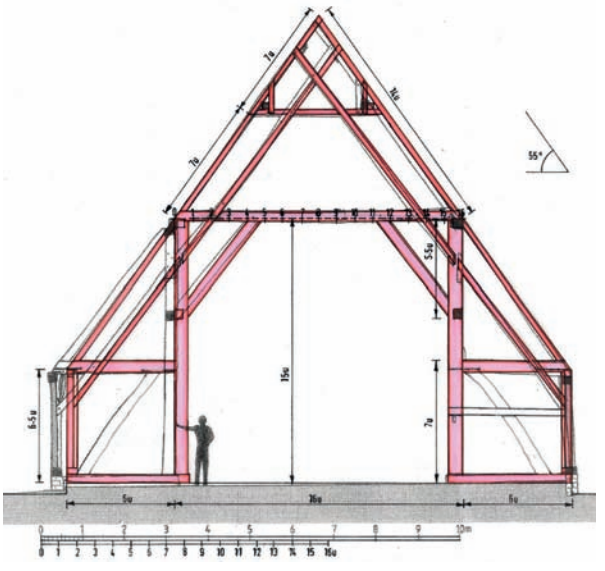

Figure 5: Section through the Wheat Barn showing the original frame highlighted in red superimposed over the survey drawing by David Andrews. All dimension in rod units.

[6] Andrews, Cressing Temple A Templar and Hospitaller Manor in Essex and its Buildings, 2020 p.70
[7] The Development of Carpentry 1200-1700 by Cecil Hewett (1969) p.23 Fig.2

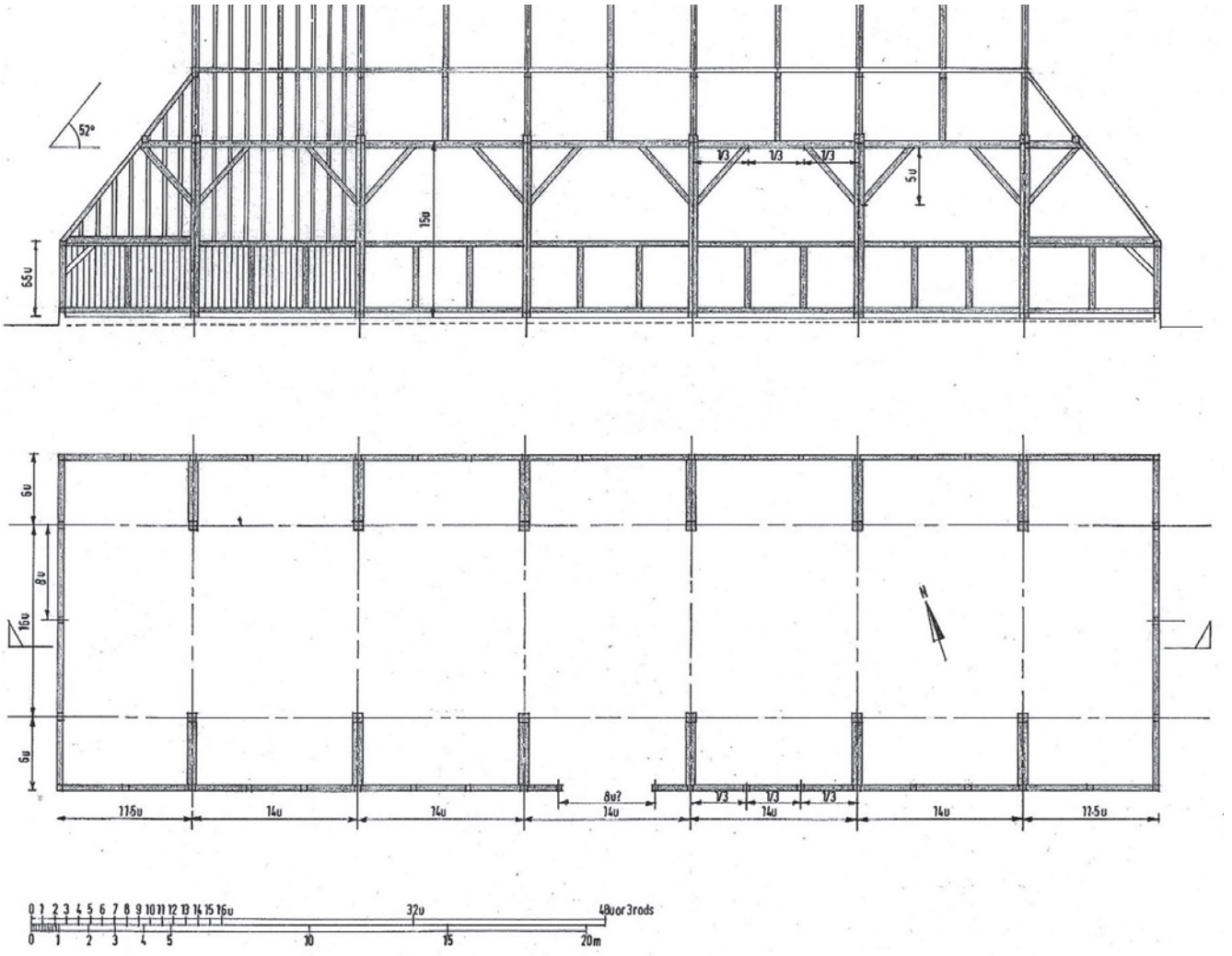

Figure 6: Floor plan and longitudinal section of the Wheat Barn as originally built

been scaled off the survey drawing allowing for the distortion over the years to be 6.9m (**16** units). As described for the Barley Barn the roof pitch is the same, 55°. The collar height is **7** units, half the span of the rafter. The main tie beam braces to the arcade posts are **5.5** units down from the top of the arcade plates and morticed in the underside of the tie beam at **5** and **11** units. The arcade posts are 15 units high including arcade plates and sole/sill plates. The outside aisle wall plates are 6.5 units high supporting the aisle ties which are morticed into the back of the arcade post. This supports the rafters to sit on the outshot tie and wall plates giving a continuous roof slope of 55°. However, Hewett has shown his section drawing (Fig.13b) of the Wheat Barn with a 58°roof pitch. In his longitudinal section, same page, he has also shown wind bracing which Andrews says was added later. Hewett also shows cantilevered aisle plates with flying tie-beans (which is correct) that gives an end roof pitch of 52° with a gablet hip. It is most probable that the Wheat Barn builders decided to copy the Barley barn canter levered flying tie-beam arrangement. Hewett also shows a secondary aisle brace on his section drawings down from the aisle tie which Andrews states was added later (Fig. 5). Hewett also states that the passing bracing timbers were inserted once the frames was erected. The author suggests that these passing braces would be fixed as each frame was erected to keep the frame square and ridged while the remaining frames were being erected.

Summary

These great barn buildings have survived 800 years because they were built with good sound materials and were well designed. It is interesting to know how medieval carpenters set out and built these magnificent timber barns and to understand that they were set out and constructed by carpenters on the framing floor all based on the 16-unit measurements of the tie-beam. No scale drawings were required, no geometry using circles, arcs, squares, rectangles, and hexagons are used nor measurements in modern feet or the imperial rod 16.5 feet. The building could be squared up using diagonals with cord/string/batten or by using the 16-unit rod at 3, 4, 5 or 6, 8 and 10 units (Pythagoras) which may have been known to the carpenters.

The setting out of both these barns is based on the knowledge of the carpenters who built them using a piece of string or cord and dividers on the tie-beam and transferring these marks on to a timber rod, a very simple practical method which the author has applied to hundreds of medieval and later buildings, with convincing and consistent results. Even though

the Barley Barn had undergone major changes and alterations in the 15th century with a crown post roof and alterations to the side aisles, the arcade posts and tie beams are original having all their mortices giving clues to the original frame layout. With the knowledge of the ancient method of setting out described in this article an accurate reconstruction is achievable as shown.

Notes

[1] Tyers, I Dendrochronology reports DEN05/89, DN01/92 and DEN02/94 Museum of London

[2] Hewett, C. Published by David and Charles Ltd. South Devon House Newton Abbot Devon, Barley Barn p.22-31and Wheat barn p.40-47

[3] Hewett, Structural Carpentry in Medieval Essex, Journal Medieval Archaeology Vol.6 (1962)

[4] *Cecil's Hewett Obituary* by A Gibson and D Andrews (1998)

[5] Unpublished Carpentry Archives of Cecil Hewett (1926-1998): A survey of his letters and drawings in the Essex Record Office in Chelmsford by Ming Shan Ng and James W.P. Campbell, 2018 online publication at: www.researchgate.net/publication/335397271

[6] Gibson, A. Further light on the design of the Great Barns at Cressing Temple, Essex Archaeology and History 27 (1996) p.183

[7] Ibid Fig.3 p.185

[8] Ibid Fig.3 p.185

[9] Smith, L. The geometrical design at Cressing Temple, Essex Archaeology and History 27 (1996) p.188-192

[10] Ibid Figs. 4a-4d p.191

[11] *Cressing Temple A Templar and Hospitaller Manor in Essex and its Buildings* edited by D. Andrews 2020' of the Barley barn circa 1205-30 on p.61-63 and the Wheat barn 1257-80d on p.91, and 93.

[12] Further light on the design of the Great Barns at Cressing Temple by Adrian Gibson, Essex Archaeology and History 27 (1996) Fig.1 p.183

[13] Essex Archaeology and History 27 (1996) p.182-187

[14] *British Weights and Measures* by R. E. Zupko p.75 (1977)

[15] As published in *Vernacular Architecture* vol. 51, 2020, p.30–49 and amendment in VA newsletter spring 2023.

[16] The author has recently presented a paper to the Vernacular Architecture winter conference title: Medieval Carpenter's Knowledge in Europe in Setting out Roofs and Buildings Without using Geometry or Numeric Measurement, forthcoming

[17] www.medievalbuildings.co.uk

[18] *Cressing Temple A Templar and Hospitaller Manor in Essex and its Buildings* 2nd rev. ed by David Andrews. Fig.21 p.63

[19] Arcade posts probably earth fast according to Andrews but no archaeological evidence to support this statement.

[20] Andrews, *Cressing Temple A Templar and Hospitaller Manor in Essex and its Buildings*, 2020 p.70

[21] *The Development of Carpentry 1200-1700* by Cecil Hewett (1969) p.23 Fig.2

[22] Ibid Fig.13b p.41

Acknowledgements

The author would like to thank David Andrews for providing the survey drawings of the great barns and for his comments and amendments on the draft text also to John Walker for references. Many thanks to Bob Beasley for proof reading the text.

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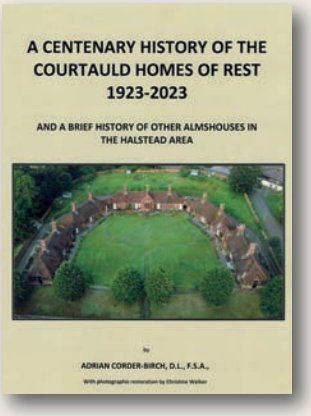
Book Reviews

Continued from page 30

Adrian Corder-Birch



A Centenary History Of The Courtauld Homes Of Rest 1923- 2023:

And A Brief History Of Other Almshouses In The Halstead Area (Halstead, 2023)

ISBN 978-0-9567219-5-2. PP.104. £15.00. Available from the author: acb@corderbirch.co.uk

This book, written by well-known historian and Halstead expert Adrian Corder-Birch, has been written to mark the centenary of the Courtauld Homes of Rest (CHR) and their founder, Samuel Augstine Courtauld (SAC) (1865-1953). With this author we know we're in safe hands, not only for his knowledge of Halstead and environs but as he is also the current clerk of the homes! Obviously the book concentrates on the CHR (well over half the content is about the institution and SAC) but the author also delves into other almshouses in the Halstead area (those in the Hedinghams, Earls Colne and Great Yeldham – all very much part of the authors stamping ground), along with a selection of interesting appendices, including one on the other buildings of SAC – who clearly had a passion for construction. A bibliography and a very good index round off the publication and I suspect many of the excellent illustrations came from the authors extensive collections.

The history of the CHR is intimately bound up with the story of the Halstead Union Workhouse, it being built on the site of the latter after it was knocked down in 1922-3 (only the boundary wall remaining from the workhouse). This solved a mystery for me as, being aware of the location of the workhouse from historic OS maps, whenever I drove down Hedingham Road, I'd look out for it but, being the driver, I could never concentrate on he 'lie of the land'. Anyway, the reason I couldn't see it was that it was no longer there, the site being occupied the CHR – so that answers that question! The author being the author, we know that the bricks for the workhouse came from the yard of John Tricker of Hedingham. The site was acquired by SAC when the workhouse was no longer required, and it was he who built the CHR.

The CHR was designed by E.W. Coldwell, a London based architect, and built by Charles Deaves, a builder of Bures. Built in a Tudor style, the complex is very attractively designed in a Arts and Crafts style. As built each home comprised a living room, bedroom, scullery and outdoor lavatory. It was only in the 1950s that the provision of bathrooms and showers was considered. However, many residents were not particularly concerned with such modern amenities so it was not until the 2006 that the last of the 20 homes was provided with such.

As is to be expected with the author, this is a very thorough account, what one can only assume must be the most comprehensive history, including sections on 'Electrical improvements', 'Insurance' and the 'Sprinkler System'. The trustees and chairman are recorded and, of course the residents ('person of either sex who had been resident or working in Halstead for not less than 25 years and bear a good character for honest sobriety and steady work'). Meanwhile the section on the boundary wall records several occasions when it was damaged – on all occasions the full costs were recovered from various insurers, one suspects all because of the diligence of the CHR clerk; motorists beware!

George Courtauld in his foreword quotes that the founder, SAC, was described as 'a shy millionaire who did enormous good with his money' - if only there were more of those these days. In their absence, this very interesting book will have to suffice in celebrating a wonderful philanthropic undertaking at 100. And we can all be left hoping that when the time comes, we might find rest in such a contented place.

Neil Wiffen

David C. Rayment

Celebrating the City of Southend

Amberley Publishing, 2023
ISBN 9781398115804
Paperback, 96 pp colour images. £15.99

Essex can boast more than one seaside attraction: its long coastline and its proximity to the populace

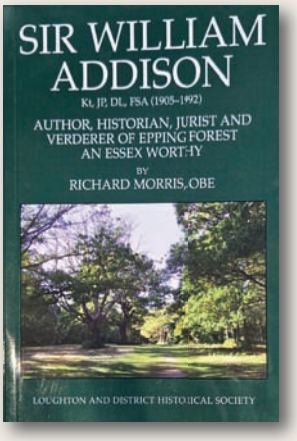
of London have provided ideal conditions for the development of a branch of tourism centred on the daytripper and the weekend break. Southend-on-Sea, with its world-record pier and many transport links, is surely the formost of these. It began as a Thames Estuary fishing village, very much in the shadow of nearby Leigh-on-Sea, and was developed in the 19th century into a fashionable resort frequented by royalty and their circle. Since then the town has re-invented itself as a leisure destination, and as a satellite of the City of London where back-office functions could be housed at an affordable price. Local MP Sir David Amess led a campaign for the elevation of the borough to 'city' status and, following his tragic murder in 2021, this was finally granted.

This book is presented as a 'celebration' of Southend as a new city but it is really a fiercely condensed history of the area, subdivided into thematic chapters of a few pages with a good spread of colour photographs. In so small a space, the text can offer little more than an outline of the back-story and present state of the subjects: 'Early Royal Visits', 'The Arts', 'Southend Pier', 'Adventure Island and the Sunken Gardens' and more. As a starting point for further research, it is useful enough but would have been improved by inclusion of even a short bibliography to guide the interested reader.

The book is not primarily aimed at the historian but the general reader and, with that in mind, it serves very well to introduce the important develpments which have shaped the city's present structure and layout.

Steve Pollington

Richard Morris



Sir William Addison Kt, JP, SL, FSA. (1905-1992) Author, Historian, Jurist and Verderer of Epping Forest. An Essex Worthy.

Loughton & District Historical Society, 2023
ISBN 9781905269-38-9
Paperback, 100 pp colour and monochrome images. £7.50

When I first took up this paperback and read the title's long epitome of accreditations: *"Sir William Addison Kt, JP, DL, FSA. (1905-1992) Author, Historian, Jurist and Verderer of Epping Forest"* I thought that I had already learnt enough about the subject: 'Knight', 'Justice of the Peace', 'Deputy Lieutenant', 'Fellow of the Society of Antiquaries' – what more is there to say? But Richard Morris has taken the opportunity to cast a light on the life of a remarkable man and his even more remarkable output in several fields.

Not an Essex man by birth – he was actually from the Forest of Bowland in Yorkshire – the young Addison took up the study of topography and social history which remained among his passions all his life, always 'with is head in a book' even when employed as a young draper's assistant. In the 1930s, he and his wife Phoebe began a motoring tour of England and ended up in Buckhurst Hill where they noticed a bookshop for sale; they fell in love with the area, bought the shop and it changed their lives. Addison spent the next 20 years exploring the Epping Forest and living a simple but fulfillling life, developing his many talents. A keen poet and author, he drew inspiration from the surroundings and used the bookshop as a centre for all manner of creative activities. Books on local history and topography appeared regularly - Essex, Epping Forest, the Thames Estuary, Suffolk, ancient roads and tracks, the meanings of placenames and surnames, vernacular church architecture; a new title every two or three years from 1945 to 1991.

Morris provides a lively and sometimes very evocative tour through Addison's life: the small village of Mitton with its ferry crossing of the Ribble; the bookshop and the local community in Loughton; the Rainham marshes and other topics come alive in these pages. The book also includes some previously unpublished writings and samples of Addison's poetry.

As an example of excellent research and (it must be said) an excellent choice of subject, this book is a superlative example of publication by a local historical society – and at a price which is 'invitational' as the cataloguers say.

It is available from

www.loughtonhistoricalsociety.org.uk or verdmorris@btinternet.com

Steve Pollington

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