
Proceedings of the Cambridge Antiquarian Society

(incorporating the Cambs and Hunts Archaeological Society)

Volume XCI
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**Volume XCI
for 2002**

Editor Alison Taylor

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Editorial

After two themed volumes these *Proceedings* return to the usual PCAS format of mixed papers, covering excavations, local history, landscape archaeology, architecture and historical geography. Indeed, in the finest antiquarian tradition many of the papers involve more than one of these disciplines. There should therefore be something to interest all members in this miscellany.

Two departures from recent practice are the inclusion of Conference synopses and an abbreviated *Conduit*. The synopses are by popular request, rising from a realisation that many members would be grateful to have a lasting reminder of these important papers. We are grateful to the authors who supplied copy so conscientiously after the event (naturally we had not thought of this in advance), and to Derek Booth who collected them all together. *Conduit* had to be an even more last-minute construct, when it became clear that the County Council could no longer keep up with the necessary production time-scale. This year's approach is a bit of an experiment, and it will be useful to know what reaction we have both from members and from affiliated societies.

Alison Taylor

President's Address

Two years as President is too short a time to see through any substantial programme of reform for CAS. When I was elected there were a number of initiatives I wanted to start in the hope they would mature in another President's time. To this end Derek Booth as Secretary and I put out a questionnaire in the year 2000 to profile our membership and to canvas opinion on possible changes.

It has been a central part of my Presidency to re-imbue the Society and its membership with confidence in its right to express opinion on heritage issues. It is essential that there remains a well-informed independent Society to safeguard archaeological and related services at a time when other pressures and agenda take precedence within local and central governmental organisations which we perhaps naively assume will be acting in our best interests in protecting the past. It is particularly regrettable that CAS has been excluded from representation within long-established fora to discuss and scrutinise public heritage services within Cambridgeshire at this time.

Another issue I hoped we could address was to reverse the decline of amateur archaeology, perhaps by re-establishing the Society's post of Director of Fieldwork, and to encourage research-led investigation in the County once more. This latter still awaits the right person and opportunity, but I am pleased there are encouraging signs in the way local groups have attracted grants which will give them solid research foci and draw in new members. Notable amongst these are Thriplow Society, Fulbourn Village History Society, Haverhill and District Archaeological Group and Cambridge Archaeology Field Group.

We asked members if it would be beneficial for CAS to develop other venues for meetings, and would there be interest in workshops on current research topics. We have developed the workshop idea with this year's conference dedicated to the archaeology, architecture and history of Ely, a town that has had considerable investigation in the past ten years, with some startling new discoveries but little co-ordination or academic discussion. Synopses of the talks are published within this volume. From October we shall be holding our monthly meetings in more comfortable and more accessible surroundings, in the newly built Divinity Faculty at the Sidgewick Site.

Other positive steps are that, after two years I can report that the Web page is now complete and will shortly appear at www.Cambridge-Antiquarian-Society.org.uk, and that the Society has taken back full ownership of *Conduit* which, over the past ten years, had been produced jointly with Cambridgeshire County Council.

In summary there has been good progress over the past two years and the Society will continue to build upon its strengths as the paramount amenity society guarding Cambridgeshire's heritage. Government policies at central and local level are capricious and we cannot afford to put faith in them without constant scrutiny and challenge. With the advent of regional government and root and branch reform of the planning system, a Cambridgeshire focus for our heritage provided by CAS will be ever more imperative. The Society is therefore essential and I thank you all for continuing to support and contribute to it. I am pleased to leave it in the capable hands of your secretary Liz Allan, and new President, Tony Kirby.

Tim Malim

Seventeenth Century Water-Meadows at Babraham, Cambridgeshire

Christopher Taylor

This paper re-examines the history of the water-meadows constructed in the 1650s by the Bennet family of Babraham. It also describes the social and political background of their creators.

Introduction

The irrigation or 'floating' of water-meadows was a technique that, particularly in Wessex and the West Country where it was most widely used, was the basis of large-scale sheep-farming from the early 17th to the early 20th century. Even today most of the principal river valleys in Dorset, Hampshire and Wiltshire are characterised by the remains of the complex systems whereby the meadows were watered.

The initial flooding was usually carried out in the late autumn or early winter and then often repeated at intervals throughout the winter. This raised the ground temperature, protecting the grass from frost, thus providing a 'bite' for the sheep up to two months earlier than on pasture elsewhere and just when winter fodder was in short supply. The sheep were then grazed on these meadows until the summer pastures were ready. The meadows were then usually flooded again and produced one or more hay crops in June or July. All of this meant that larger flocks of sheep could be over-wintered, lambing advanced, extra hay grown and, as a by-product, more manure produced for the arable land.

The value of irrigating meadows has been stressed by many writers on agriculture and agricultural history from the 17th century onwards (Paxton 1840; Pusey 1849; Wood 1897, 76, 78, 127; Kerridge 1967, 251–67; Thirsk 1967, 181–2). Kerridge even claimed that much of the success of the 17th-century 'Agricultural Revolution' that he identified stemmed from the use of the technique. More recently, Wade-Martins and Williamson (1994, 20) have suggested that the floated water-meadows in England in the 17th century fulfilled the same role as did turnips in East Anglia in the early 18th century.

Detailed modern studies, as well as some of the earlier agricultural writings, suggest that the technique may have originated in Herefordshire in the late 16th century. It soon spread into southern England where it

became common in the 17th and early 18th centuries. Then, probably as a result of contemporary agricultural improvements, there was a further expansion in Wessex and south-west England. It occurred on a more limited scale in other parts of England and even Scotland (Boswell 1790; Smith 1851; Carrier 1936, 122–4; Kerridge 1953 and 1954; Whitehead 1967; Palliser 1976, 103; Bettey 1977; Bowie 1987; Wade-Martins & Williamson 1994, 22, 33; 1999, 72–5).

There were two principal methods of irrigating meadows. The most complicated and, because of their extensive earthworks, visually the most obvious today, was the *bedwork* system. This involved taking water from a river or stream via a dam and sluice and carrying it along a contour leat or *head main* from which it was fed, through small sluices or *hatches* into a multitude of minor leats or *carriers*. The last were narrow channels cut along the tops of constructed ridges arranged in blocks similar to ridge and furrow. The water overflowed the carriers, ran down the sides of the ridges into narrow drains in the furrows and thence, usually via more carriers, back into the river. The other simpler, and probably earlier, form of irrigation was *catchwork*. Here water was also taken from a river along a contour leat but it was then only allowed to flow from the hatches, either directly back into the river or into one or more smaller parallel leats or *catch drains* where the process was repeated. Bedworks were normally constructed in wide, flat-bottomed valleys, catchworks where the valleys had narrow bottoms and relatively steep sides (Smith 1851; Carrier 1936, 116–25; Curtis 1971; Mingay 1977, 168–70).

The Babraham Background

It has long been known that there were irrigated water-meadows at Babraham. They were first noted by Arthur Young (1797, 177), later by William Smith (1806, 116–17) and then by William Gooch (1811, 258), all of whom appear to have visited them. Yet both Young and Smith, who knew well the workings and advantages of irrigated meadows, were contemptuous of those at Babraham. Young wrote that 'There does not seem to be the least intelligence or knowledge of the husbandry of water'. Smith thought that 'The form

of the work seems to prove that they were not designed by any person from Wiltshire and that the possessors are totally unacquainted with the management and utility of water meadows'. These early commentators were all agreed on the form of the meadows at Babraham; they were of the *catchwork* type. Both Young and Smith noted the existence of a sluice across the River Cam in Little Abington parish, upstream from Babraham, from where the water was taken, as well as the head main and the *cuts* or hatches along its length, through which the water was run across the meadows. Smith also made an additional observation. 'The various grasses and weeds ... in different stages of growth, and of various shades of green, just enable me to discover that small catch drains had at some time been made, but ... most of them do not appear to be of any service to the meadows'. Vancouver recorded that some 165 acres (68ha) of meadow were being watered at Babraham. One other aspect that these commentators noted, and condemned, was that the Babraham meadows were not used to produce early grass for sheep but only for an improved hay crop. They were thus never irrigated until at least Easter time.

Young added a comment that has caused confusion among historians until recently. He asserted that construction of the Babraham meadows had been carried out by Sir Horatio Palavicino, owner and lord of Babraham from 1589 to 1600 (Stone 1956). This attribution, if correct, would mean that the Babraham meadows were amongst the earliest documented in England and thus of considerable historical importance. A number of modern writers have accepted this claim (Darby 1951, 381; Butcher 1954, 8; Kerridge 1967, 253; Whitehead 1967, 264; Taylor 1973, 175). However, the authors of the account of Babraham parish for the Cambridgeshire VCH (1978, 25), using a set of papers relating to an early 18th-century dispute over the flooding of land in Abington (CRO 619/E 14-24), were able to prove that the Babraham irrigation system had actually been constructed in the 1650s by the Bennet family. The fact that parts of the system had survived were also noted in the VCH and confirmed that it had indeed been of the catchwork type. Although this revised date lessens the significance of the Babraham meadows in a national context, there is still much interest in the personalities involved as well as in the origins, construction and working of the system.

The Bennets of Babraham

In 1632 the manor and estate of Babraham were purchased by two brothers, Richard and Thomas Bennet, from the impecunious Tobias Palavicino, second son of Sir Horatio Palavicino. Tobias had dissipated the family fortune by lavish expenditure which had included the embellishment of the great Elizabethan mansion at Babraham, built in about 1580 by Palavicino's predecessor Robert Taylor (VCH 1978, 21-2).

The Bennets were members of a very typical 17th-century family who rose, via trade, the law and judicious marriages, from yeoman farmers to the aristocracy in three generations. The earliest member that can be traced with certainty is a Thomas Bennet (d 1547), a well-to-do farmer of Clapcot, near Wallingford, Berkshire (BNQ 1891, 108, 110; Sherwood 1894, 168; VCH 1923, 548). Bennet had two sons. The eldest, Richard (d 1563), took over his father's lands at Clapcot, and all of his three sons went on to achieve high positions. Two of them, John (d 1627) and William, were lawyers and MPs and John was the father of Richard Bennet (1618-85), later Earl of Arlington and member of Charles II's Cabal (Foster 1891, 106, 108; Hasler 1981, 428-9; DNB 1885). The younger son of Thomas Bennet, another Thomas (d 1623), went to London. He became a wealthy merchant and a member of the Mercers' Company. He married the daughter of another merchant, was successively an alderman (1593) and Sheriff (1594) of London, was knighted in 1603 and was Lord Mayor in 1603-4. He was mindful of his origins and in 1616 founded a charity in Wallingford (Hedges 1881, 326; VCH 1923, 544).

Sir Thomas Bennet had two sons, both of whom also lived in London. But it was the third of his brother Richard's sons, yet one more Thomas (d 1620), who followed his uncle into trade. He was living near Thomas senior in 1589 and was also a member of the Mercers' Company and was Master in 1614. He was an alderman of the City in 1613 and in 1615 became one of the first Governors of the Irish Society, or London Society as it was known in Ireland. This organisation was responsible for the founding of Londonderry and the plantation and development of County Londonderry (Brabrook 1889, 18-19; Hill 1877; Cockayne 1903, 130-1; Beaven 1913, 53; Stanford & Rawlings 1963, 153).

Thomas Bennet junior also lifted his branch of the family into a higher level of society and, in particular, into that part of it with strong Royalist sympathies. His wife was Dorothy May, daughter of Richard May (d 1568) who, like his son in law, had moved from a country estate in Sussex to London trade. He became a member of the Merchant Taylors' Company. Most of Richard May's children rose even higher. His eldest daughter Elizabeth married Sir Baptist Hicks, originally another London mercer but later financial supporter of James I and ultimately Baron Hicks of Ilmington and Viscount Campden (DNB 1894; Hicks Beach 1909). Richard May's fourth son was Sir Humphrey May (1573-1630) who rose from a Groom of the Bedchamber in 1604 to Chancellor of the Duchy of Lancaster in 1618 (DNB 1894). The significance of these, and later, Royalist connections to Babraham will become clear below.

Thomas Bennet junior had two sons, Richard and Thomas, and it was they, together with their mother in law (they married sisters) who bought Babraham in 1632. How much of their father's wealth lay behind the purchase is not known but it undoubtedly played a part. Few details exist of Richard Bennet. He

married Jane Monk and had one surviving daughter. He was described as 'of London' in 1634 which suggests that he remained there with his father's business (Haward & Chester 1880, 64). He was still alive in 1638. His brother Thomas (1597–1667) was originally a lawyer. In about 1630 he married his sister-in-law Mary Monk, and two years later settled at Babraham.

The Royalist links which his father had established were strengthened. One of his maternal relatives was Thomas May (1595–1650), originally a poet at court, although he later defected to the Parliamentary cause. Another maternal cousin was Adrian May, Groom of the Privy Chamber to Charles I who, in 1650, was confined to his home because of Royalist sympathies. One other cousin was another Thomas May who, as a Captain of Horse, fought for his King in the Civil War (*Cal Stat Pap Dom* 1876, 286; Bannerman 1905, 104–6; *DNB* 1894). A further cousin was Hugh May, later to be a major designer and architect and Comptroller of the Works under Charles II (Colvin 1995, 646). Hugh May played an important role in the story of the Babraham meadows.

One last, indirect, Royalist connection of the Babraham Bennets was noted by William Cole in 1765. Just before demolition of the 16th-century Babraham Hall, all its contents were sold. Among these were Bennet family portraits, some of which, Cole alleged, were by Sir Peter Lely (1618–80) (Palmer 1935, 18). Lely was patronised by Charles I and in 1661 became court painter to Charles II. But he was also a close friend of Thomas Bennet's cousin Hugh May which could partly explain the existence of these paintings, although paintings by Lely were very common (Miller 1975).

What support Thomas Bennet gave to the King during the Civil War is unknown but he was certainly punished for it. In 1651 the Babraham estate was sequestered by Parliament. In the same year a 'Sir Humphrey Bennet' who was either an unknown relative or a mistake for Sir Thomas was ordered 'to reside at Baberham (sic) and not go above five miles from there' (VCH 1978, 21; *Cal Stat Pap Dom* 1877, 264). It was precisely at this time, perhaps with his movements restricted, that Thomas Bennet began construction of the water-meadows at Babraham. The two events may not be unconnected. In 1660 he was rewarded for his loyalty by being made a baronet by Charles II. On his death in 1667 he was succeeded by his son Sir Levinus Bennet (c 1631–93), also a lawyer, and MP for Cambridgeshire from 1679 to 1693. Sir Levinus married the daughter of yet another London merchant (Cockayne 1903, 130–1). His son, Sir Richard Bennet (1673–1701), had one daughter, who died a minor. Babraham then passed to the five sisters of Sir Levinus.

The Construction of the Babraham Water-Meadows

Although the immediate circumstances of the laying out of the water-meadows may have been the restrictions placed on Thomas Bennet as a result of his political leanings, three other aspects are significant. The

first were the general agricultural improvements in Britain in the 17th century, first detailed by Kerridge (1967). Although Kerridge was subsequently, and perhaps rightly, criticised for his extreme thesis (eg Mingay 1969), there is no doubt that there were considerable advances in agriculture at this time and that the spread of irrigated meadows was one of these. Thus Thomas Bennet was doing no more than many other contemporary landowners.

Another factor was that his estate at Babraham was compact and unified. Although Babraham had been a typical multi-manorial parish in medieval times, during the 16th and early 17th centuries almost all of the land was gradually concentrated in the hands of one owner. When Bennet purchased Babraham in 1632 the only parts of the parish that were not his were a small farm belonging to St John's College, Cambridge and some Sawston charity land (VCH 1978, 21–5; Teversham 1947, 176; CRO 124/P 5; CUL Plan of St John's College lands, 1785). The final factor was that a large estate in Great and Little Abington, immediately upstream of Babraham, had been purchased in 1652 by John Bennet, a cousin of Thomas (VCH 1978, 5–8). John Bennet was both interested in, and a supporter of, Thomas Bennet's irrigation scheme and he is recorded as visiting the works while they were under construction (CRO 619/E 20 m17). More importantly, for topographical reasons it was necessary for the sluice that directed the water into the Babraham head main to be in Little Abington parish, on John Bennet's land. The scheme could not have been undertaken without John's agreement (CRO 619/E 14, 20 m11, 21).

Details of the construction and early history of the meadows are contained in a group of documents relating to a case in Chancery in 1719. This resulted from a dispute over the validity of the original agreement, made in 1659 between Thomas Bennet and his son Levinus and John Bennet of Abington. The agreement was to allow the cousins to exchange small parcels of land in Abington so that Thomas could build the main sluice and upper length of his head main. The reason behind the dispute was the alleged flooding of land at Abington caused by the ponding up of water behind the sluice. The relevant documents include copies of the 1659 agreement, the Lord Chancellor's judgement, briefs, statements, two maps of the head main in Little Abington parish (Fig. 4) and, most valuable for this paper, many depositions by inhabitants of Abington recalling events and personalities of the 1650s (CRO 619/E 14–24).

Useful as these papers are their value is limited by the fact that they are, inevitably, concerned only with that part of the irrigation system within Little Abington parish. Likewise, the depositions are primarily the recalling of events that had occurred some sixty years earlier by people of considerable age and perhaps impaired memory. Certainly some of the depositions contradict others and there is much alleged information on matters which must have been outside the direct knowledge of the deponents. Some of the details sound more like gossip and legend filtered through village society than accurate reporting.

Nevertheless the documents explain much of the background of the irrigation system, detail some of the construction methods and name people involved.

The earliest event recorded is in either 1653 or 1654, when Thomas Bennet decided that his estate might be improved by 'a cutt from the River and setting of a dam or stank across the river with one or more Sluices whereby to water his lands' (CRO 619/E 20 m10). This involved diverting the water of the River Cam by means of a dam across it and carrying the water in a head main along the north side of the valley from whence it was run back across the meadows into the river. This dam had sluice gates in it to control the flow and was usually referred to as just The Sluice. Because of the nature of the Cam valley at Babraham, as already noted, the only place to construct the dam was not in Babraham parish but some distance upstream on the boundary between Great and Little Abington parishes, on land recently purchased by John Bennet (Fig. 1).

John Bennet and his cousin seem to have had an informal agreement whereby the land that Thomas required for the sluice and the head main in Little Abington parish, just over 2 acres 1 rood (c 1ha), was leased while Thomas carried out 'experiments'. Then, when these were successful, John Bennet exchanged the land required for two small pieces of land that Thomas owned in Little Abington (CRO 619/E 18, 20 m11). The subsequent sequence of events is unclear,

but it seems that Thomas went ahead with the construction of the sluice and the head main, including the continuation of the latter into Babraham parish as far as the village there (Fig. 2). On the completion of the scheme, probably in 1654, it was used to irrigate the meadows on the north side of the Cam at the south-east end of Babraham parish.

The scheme was evidently successful for five years later Thomas Bennet, then assisted by his son Levinus, decided to extend the system further downstream to water the meadows and pastures in the centre of the parish, beyond the village and to the east of Babraham Hall (Fig. 2). This involved a major new length of head main, the widening and deepening of the existing head main and the heightening of the dam and the raising of the level of the sills of the sluices. In May 1659 just before the work began Thomas made a formal agreement with John Bennet which put the exchange of the pieces of land on a proper legal footing. The agreement also included clarification of matters that had obviously led to difficulties between 1654 and 1659. One of the clauses in the agreement was that Thomas and Levinus *accepted* that they had to build and keep in repair a bridge over the head main 'for a passage to Bournbridge'. They also undertook to indemnify the inhabitants of Little Abington for 'not repairing the passage or way to Bournbridge'. The Babraham Bennets also agreed to indemnify John Bennet and his heirs for any damage

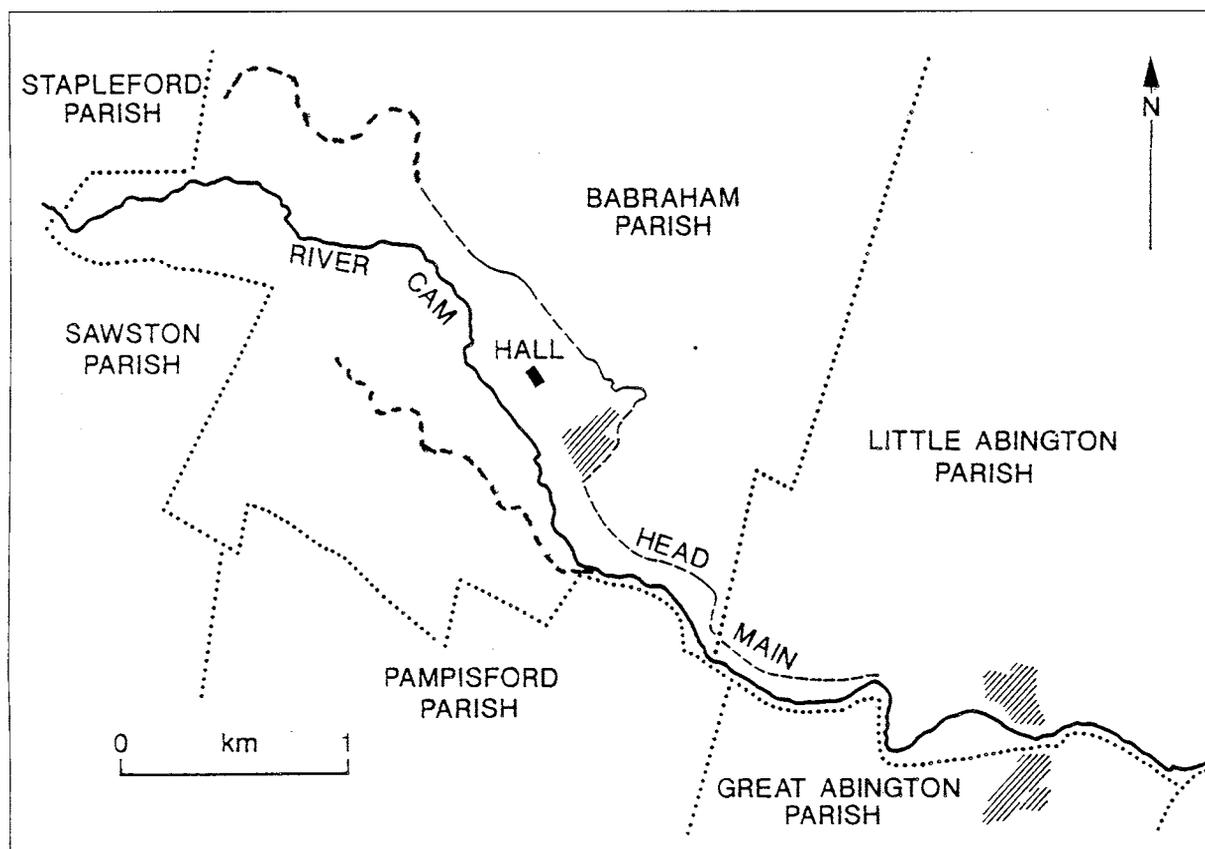


Figure 1. Babraham water-meadows: Location

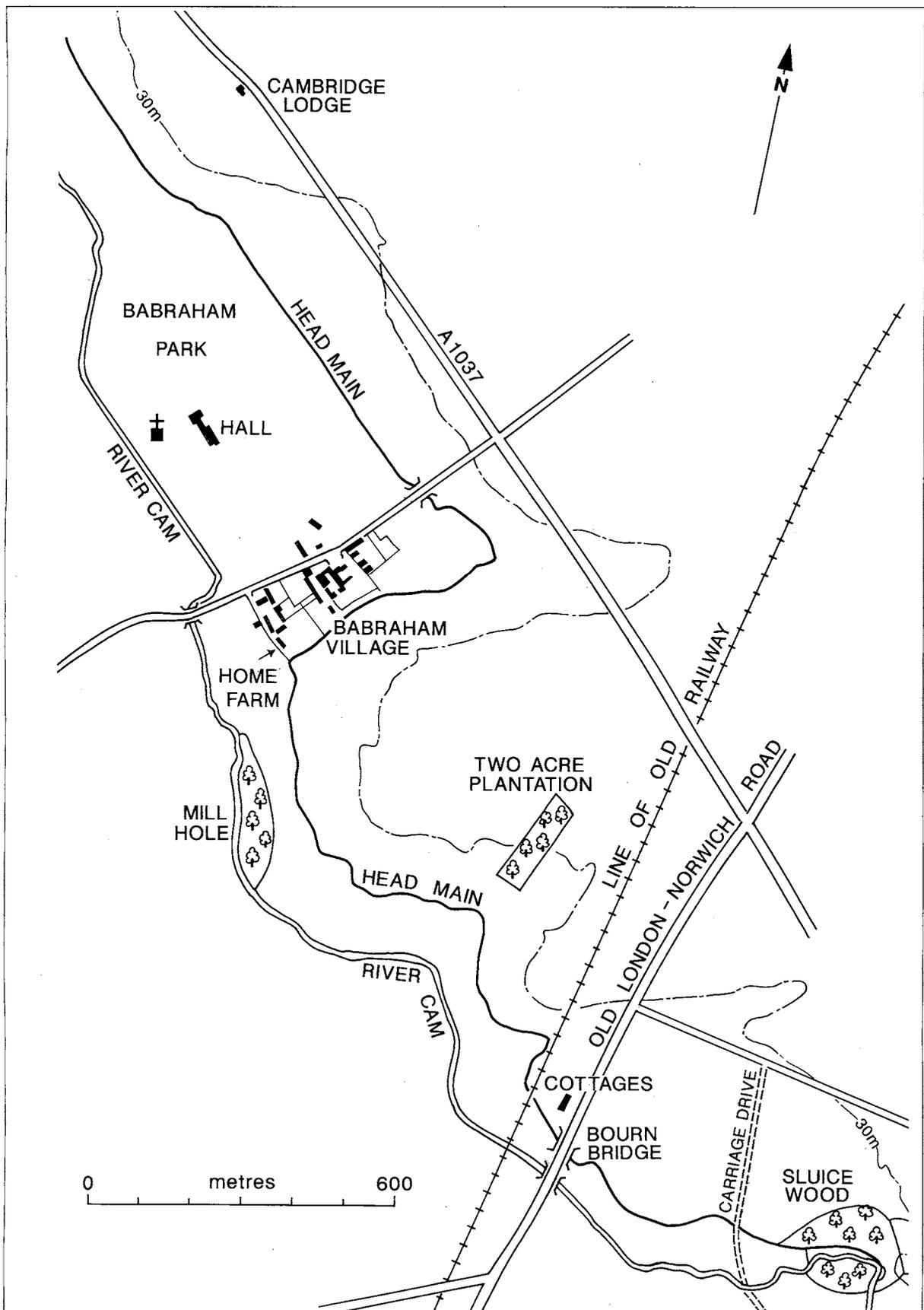


Figure 2. Babraham water-meadows: Plan

or flooding resulting from the alterations to the sluice (CRO 619/E 14–16). The agreement was signed, the sluice rebuilt and the head main deepened and extended downstream as planned.

Some details of the construction work, at least for that part of the scheme in Little Abington parish, are recorded in the Chancery depositions. Because the deponents were recalling events of some sixty years before it is not always possible to be certain whether these related to the first stage of work in 1653–4 or to the 1659 extension. However, one Peter Richards claimed that he saw the head main being dug 'after about 40 rods were cut' and that 'in one part it was so deep that they were forced to make two throws to fast ye soyl out of it'. Richard Sempringham thought that he remembered that it took more than a year to complete the first stage of the head main. Richard Embleton said that in about 1659 there was further work on the sluice which took about six months to complete (CRO 619/E 20 m18, 25). The latter work must have been the raising of the height of the dam and the sluice gate to provide a greater head of water and thus an increased flow for the extended head main.

A Thomas Osler remembered that, on Thomas Bennet's instructions, he had helped to plant a hedge along the outside of the head main to keep cattle 'from coming to each other'. On the other hand William Wright said that he had gone out with his master's cart to collect a load of young willows to plant along the head main. As at the time he was recalling 'the further part of the cut towards Stapleford was not finished', this was probably in 1659. Leonard Westly remembered a cart bridge being built across the head main above Bourn Bridge, probably in 1654, because it was 'to deep for carts to pass'. But Richard Embleton claimed that there was never a cart bridge, only a foot-bridge near the sluice as indeed is depicted on the 1719 plan (CRO 619/E 18, 19 and 20 m25, m26).

Perhaps more interesting are two glimpses of how the gradient of the head main was achieved. The first, a somewhat pragmatic technique, was described by William Wright. He recalled that before the 'new cutt ... was quite finished they had lett water in to it to see how it would run and what Grounds it watered' (CRO 619/E 20 m25). The second method was recalled by Peter Richards who 'before any sluice had the water' had seen the 'Chief Director' with 'an engine which he called a Level to see how the water would run' (CRO 619/E 20 m18). This apparent use of a surveyor's level is not surprising. Not only was the profession of surveying fast developing in the 17th century, but contemporary drainage works in the nearby fenlands provided a demand for and knowledge of surveying to a much higher level than the Babraham works required (Rathbone 1616; Leybourne 1654; Darby 1956; Chilton 1959; Bendall 1992, 129–38).

One event which a number of the 1719 deponents remembered vividly was the 'Great Feast' that Thomas Bennet provided for all of those involved in the construction work on its completion, perhaps in 1654. In particular they recalled the 'very extraordi-

nary pudding with abundance of silver pence and two pence in it for the better remembering the feast'. One deponent 'saw divers of them and some were King Charles the first and others Oliver or the Commonwealth coins' (CRO 619/E 20 m25).

The Instigators and 'Directors'

The Chancery deponents refer to some of the people involved in setting up and directing construction of the Babraham scheme. As already noted, Thomas Bennet was credited with being the leading instigator, supported later by his son Levinus. However, three other people are named as assisting with the construction work. One was a man called simply Hayling but described by Peter Richards, who claimed that he had seen him at the start of the work in 1653–4, as 'Chief Director' (CRO 619/E 20 m18). It was Hayling whom Richards saw using the level. Nothing is known of Hayling, but presumably he was a drainage engineer. The second person was called Cromwell, also described as a 'director'. Again nothing is known of him and his name is too common in 17th-century Cambridgeshire for him to be identified. Here at Babraham, in October 1654, he is said by one Elizabeth Bennet to have had 'not skill enough for some of the works involved and that another director called May dealt with these' (CRO 619/E 20 m17, 25). This Elizabeth Bennet, in her eighties in 1719, may have been the wife of John Bennet, cousin of the Babraham Bennets, who gave them such support (VCH 1978, 5). If so, Elizabeth Bennet would have been well placed to know of the competence or otherwise of Mr Cromwell.

Far more significant, as recorded in the VCH (1978, 25), is the mention of May. In addition, and more specifically, at the same time James Godwin saw 'Hugh May in or by ...' the head main '... he being Sir Bennet's Kinsman and assisting him in causing it to be made' (CRO 619/E20 m17). Hugh May (1622–84) is well known in a very different context. As noted above, he was Thomas Bennet's maternal uncle's son and a staunch Royalist. After 1660 he became a major architect of the English baroque style and was successively Paymaster of the Works, in charge of the restoration of the royal palaces (1660), Acting Surveyor of the Works (1660), Comptroller of the Works (1668) and architect for the restoration of Windsor Castle (1673). He was a well known figure at the court of Charles II and designed houses for a number of courtly acquaintances. These included Cornbury House, Oxfordshire for the Earl of Clarendon (1663–8), Eltham Lodge, Kent for Sir John Shaw (1664) and Cassiobury, Hertfordshire for the Earl of Essex (1677–80) (Colvin 1995, 646; Williams 1980, 1). However, little is known of May's life before 1660. He claimed that he had worked for George Villiers, second Duke of Buckingham, and he may have fought with him at the Battle of Worcester in 1651. Certainly at that time he was overseeing the transport of Villiers' works of art to safe-keeping in Holland. At this period too he was living in London

with the painter Peter Lely who may also have had connections with Babraham. Lely was a close friend of May and in 1656 he smuggled May into Holland, disguised as his servant, so that he might join the exiled Court (Millar 1975, 14, 28; Colvin 1995, 646). The fact that in 1653–4 May was with his cousin at Babraham, engaged in the somewhat mundane work of constructing an irrigation scheme, is an interesting addition to the background of this architect.

The Later History of the Babraham Irrigation Scheme

The history of the Babraham irrigation after 1659 is little known. Minor details such as the inevitable repairs to the sluice gates, at some time before 1667, are recorded (CRO 619/E 22), but more significant are the facts that lay behind the Chancery proceedings of 1719. The apparent success of the initial scheme of 1653–4 led to the extension of 1659. But this seems to have caused problems. To ensure the proper working of the extended head main, the level of the bottom of the sluice gates had to be heightened. This in turn meant that, unless there was very close supervision, after heavy rain more water would be held up behind the dam and thus land upstream flooded. As the hatches on the sluice were usually locked, Thomas Bennet provided a number of keys so that authorised persons could open the hatches when necessary. However the keys were held only by Bennet's employees and, with the sluice in the next parish some distance from Babraham and with most floods usually occurring when the system was not being worked, delays in opening the hatches were inevitable. As a result floods upstream of the sluice in both Little and Great Abington became increasingly common (CRO 619/E20 m11).

All of this perhaps mattered little while Thomas Bennet and his cousin John were alive. But after John Bennet's death in 1663 the situation changed. John was succeeded by his son, another John (c 1656–1712), and he took a very different attitude to the Abington estate. He was an agricultural improver who began to exploit his land there. He effectively enclosed most of Great Abington by consolidating his demesne land, probably by agreement and exchange (VCH 1978, 12). His land in Little Abington remained mostly intermingled in the open fields, there being perhaps too many large proprietors to allow enclosure to take place. John Bennet also owned extensive old enclosures around Abington Hall which he seems to have tried to landscape. It is by no means clear what he did or attempted to do. In about 1685 he appears to have tried to divert the water of the River Cam from a place some 800 metres upstream of the Bennet sluice into a new channel and thence back into the river below the sluice. He was, however, 'prevailed upon to desist' by his relatives at Babraham. In about 1690 he erected several 'engines' to carry water in underground pipes into a 'Grove' on a hill 'about 4 Poles from Abington Hall'. The grove was probably the small wood still called The Grove just south-east of the Hall.

Unfortunately the pipes failed and the scheme was abandoned. The 1719 deponents also mention a 'decoy' which 'Mr Bennet wanted but never built' (CRO 619/E20 m27, 28). Exactly what all of this work was for is uncertain. Landscaping around the Hall seems to be partly the work of John Bennet's successors in the early 18th century (VCH 1978, 6), partly of the later 18th century (perhaps by Repton for a later owner, John Mortlock) (Daniels 1999, 257), but it was mainly of the early 19th century (also for John Mortlock) (cf CRO 124/P 1, 2 and OS 1836). Certainly the River Cam was diverted at some time before 1801, by which time it flowed, as now, in a broad arc in Little Abington parish, well to the north of its former course.

In 1801 the land between the old and new river courses was meadow divided into doles or strips and owned or tenanted by a number of different people (CRO 124/P 2). It was probably this meadow which was flooded by the ponding up of water behind the Bennet's sluice. Trouble between the Bennets of Babraham and those of Abington was therefore inevitable. John Bennet attempted to cut a channel around the south side of the sluice to relieve flooding while his tenants, outraged at the loss of their hay crops on the meadow, at first complained and then resorted to direct action. The latter involved the breaking of the locks on the sluice hatches (CRO 619/E 17, 27, 29). At the same time allegations of damage by John Bennet were also made by the Babraham side of the family. Bennet's attempt to build the decoy was said to have led to the removal of 'all the water from the River for that purpose for three years together'. This was in addition to the 'continual disturbances and interruptions of the sluice' (CRO 619/E 21).

John Bennet's enterprises overstretched him financially. He was bankrupt by 1697 and eventually died in debt and in prison. In 1690 the estate was mortgaged to Thomas Western (d 1707), a wealthy London ironmonger who finally took possession of the estate in 1697. The arrival of the Westerns at Abington did nothing to lessen the conflict over the sluice and consequent flooding. Improvements to the estate and the Hall grounds continued (VCH 1978, 5, 6, 12). Like John Bennet before him, Thomas Western attempted to solve the problem of flooding by having a short length of new channel some 50ft (15m) in extent cut from the River Cam just above the sluice, in a curving course, which discharged into the river a little further downstream (CRO 619/E 20, m3). This new channel had its own sluice gate which meant that any upstream flooding could be relieved immediately, but also that the operation of the irrigation scheme would be put in jeopardy. Thomas Western's son, Maximillian, later lowered the sill of his sluice, which further lessened the impact of flooding but made the Bennets' irrigation scheme even more difficult to operate (CRO 619/E 17, 18, 24). Finally, in 1718 Maximillian Western took the dispute to the Court of Chancery where in 1719 it was resolved by a complicated technical agreement concerning the height and operation of the principal sluices. The main point was that the bottom of

the sluice on Western's diversionary cut was to remain lower than the Bennet sluice on the main dam across the river (CRO 619/E 23, 24).

Information regarding the subsequent history of the irrigation scheme is scant. The meadows seem to have been used throughout the 18th and early 19th centuries for the production of hay and, as has already been noted, Arthur Young, William Smith and William Gooch all saw the system working between 1797 and 1813. In 1820 Robert Jones Adeane (d 1823) who then owned Babraham repaired the main sluice and his son, Henry Adeane (d 1847), a renowned agricultural improver, was still involved with it later. The sluice is said to have been repaired again in 1890 (VCH 1978, 26) although the ground evidence suggests a total rebuilding, probably in 1894 (see below). From 1885 all OS maps and plans show the flow of water along the head main as having been reversed. This seems unlikely and may be a cartographic error. Certainly the whole system had been abandoned by the early 20th century, almost certainly because it was uneconomic and because of the declining need for hay in the parish (Butcher 1954, 8; VCH 1978, 26).

Cost and Value of the Babraham Irrigation Scheme

The cost of the construction of the scheme is recorded as £10,000 in the Counsel's brief for the 1719 Chancery proceedings (CRO 619/E 20, m11). This seems an unlikely figure, particularly when compared with contemporary and later costs from elsewhere. Estimates and claims for the expense of other schemes range from £3.6s (£3.30) per acre in Hampshire in the 1670s and £4 to £10 an acre in Wiltshire in the late 17th century to £7 to £8 an acre in Dorset in 1812 (Whitehead 1967, 276; Bettey 1977, 42–3; Bowie 1987, 155). All these figures relate to bedwork systems which, with their extensive earthworks, were much more expensive than the simpler catchwork schemes, as at Babraham. Given that there were somewhere between 165 acres (68 ha) (Vancouver 1794, 56) and 300 acres (125 ha) (Young 1797, 177) of land irrigated at Babraham, the system is unlikely to have cost more than £4,000 at the most and probably under £1,000.

The value of the improvement of the meadows at Babraham by irrigation is also far from clear. The figures given by the 1719 deponents are very varied and probably none of these people were in any position to know the true financial benefit of the scheme. One person said that the value of the meadows had risen to 5s (25p) per acre another that the increase was to 30s (£1.50) per acre (CRO 619/E 20 m18). Again comparison with elsewhere suggests that these figures are also too high. The increase in value brought about by bedwork systems in Wessex from the 17th to the early 19th centuries varies from £2 to £1.25 per acre. But the Babraham catchwork system could never have been as productive as those in southern England, being used only for growing hay. Indeed Young (1797, 177) goes to great lengths to show that, because the water at Babraham flowed directly downslope and not laterally along carriages, the resulting grass growth was

very uneven. Nevertheless although the Babraham system may seem to have been somewhat inefficient and unusually operated it was worked, presumably at a reasonable profit, for over 200 years.

Irrigated Meadows in South Cambridgeshire

At present the Babraham scheme is the only fully documented one known in Cambridgeshire. However, elsewhere re-examination of unappreciated documents or the careful investigation of unlikely sites has led to the identification of irrigation schemes in areas hitherto considered devoid of the practice (Wade Martins & Williamson 1994). Cambridgeshire is unlikely to be different, although irrigated meadows were probably always rare. The particular interest in Babraham taken by the early agricultural writers would suggest that this was the case. Young in particular was sure that no similar use of the River Cam had been made either up or downstream of Babraham. Nor did he know of any irrigation in the Granta valley (Young 1797, 177). On the other hand, it is always possible that irrigation systems had existed but had gone out of use and been forgotten by the later 18th century. Certainly one other, undated, example of a catchwork system has been recognised at Swaffham Bulbeck but the published description shows that the discoverer did not then fully understand the catchwork method and was interpreting the remains from first principles (Taylor 1973, 176–7; 2000, 134–6). Sadly these remains have been destroyed.

There is indeed the possibility that another, so far undated, catchwork system once existed on the opposite side of the Cam valley at Babraham. A plan of 1829 of the Babraham Estate shows a very irregular length of ditch extending from a sluice on the River Cam, south-east of Mill Hole Copse (TL 515506), for a distance of some 2km until it terminated in an alder bed south of Ash Grove (TL 503509; Fig 1). Except for the 19th-century foundations of the sluice little remains on the ground. However, Young (1797, 177) described a catchwork system on the western side of the River Cam at Babraham, which he attributed to Horatio Palavicino. It seems likely that this is the system that Young identified. It is either an 18th-century addition to the original 17th-century scheme or contemporary with it. The lack of documentation may result from the fact that it lay entirely within the Babraham estate and did not involve external landowners and therefore litigation. One other possibility is that, in this case, Young was correct and this scheme was indeed Horatio Palavicino's.

Description of the Babraham Water-Meadows (Figs 2–6)

Although largely destroyed, the few remains of the Babraham irrigation scheme clarify the details recorded in the Chancery proceedings and in other sources. The Cam valley at Babraham is cut into the underly-

ing Middle Chalk that outcrops along its sloping sides and which has been eroded into a series of low flat spurs alternating with shallow dry valleys. The lower parts of the main valley are covered by deposits usually termed River Gravels but which are actually a complex mass of glacially derived sands, gravels and silts. The Cam itself flows within a narrow band of alluvium mostly less than 100m wide (Geological Survey 1952; Pollard 1995). The relative narrowness of the valley floor is perhaps one reason why the catchwork system was used at Babraham. Most of the land between the head main on the valley side and the river within Babraham parish is on sloping ground, and thus it would have been impossible to construct and run a bedwork system.

The sluice that allowed the waters of the River Cam to be diverted along the head main lies in Little Abington parish, on the north-eastern edge of Abington Park, within an oval copse known as Sluice Wood (TL 526492; Fig. 3). This wood did not exist in 1801, but it was planted soon afterwards perhaps as part of the landscaping of Abington Park (CRO 124/P 2; OS 1836). But that area of the wood between the head main and the River Cam was not part of the Abington estate and is shown as belonging to the Bennets of Babraham on the 1719 plan (CRO 619/E 18, 19). An old hedge bank, running north to south between the river and the head main, terminates just short of the latter at a wooden gatepost inscribed CA

1894, presumably for Charles Adeane (d 1943) who inherited Babraham in 1870 and who may have rebuilt the sluices (VCH 1978, 22). This hedge bank is the western boundary of the land that the Babraham estate owned around the sluice and which was granted to Thomas Bennett by his cousin in 1653 (CRO 619/E 18).

In 1801 a track, the continuation of Church Lane in Little Abington church as far as the sluice. On the 1719 plan (Fig. 4) this track is shown as continuing west-south-west. It crossed the head main close to its junction with the river, apparently at a ford, for no bridge is depicted. However, adjacent to this crossing, the plan shows a schematic 'footbridge'. This is doubtless the site of the alleged cart bridge and later footbridge noted by a deponent as having existed in the 1650s (CRO 619/E 20 m26). No trace of either ford or footbridge exists today. The continuation of the track beyond the sluice, running along the south side of the head main, is called the 'Road from Little Abbingdon to Borne Bridge' on the 1719 plan (Fig. 4). Today faint traces of a trackway are still visible in an area of scrubland to the west of Sluice Wood (TL 452492). This track was part of a road along the Cam valley in medieval times. Most of it has long been abandoned.

Of the sluice itself (TL 526492; Fig. 5) little remains, largely because of later alterations. Nevertheless its original form can be reconstructed. The Cam flows

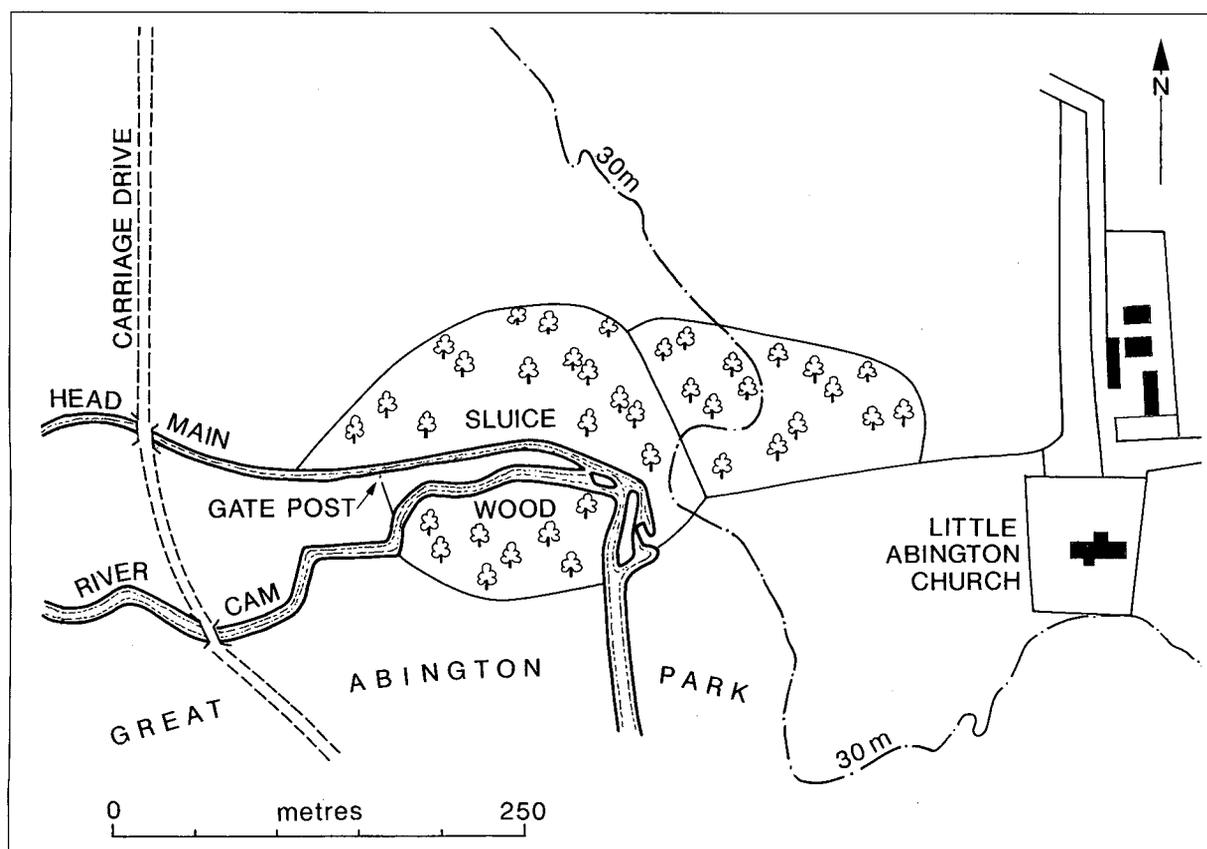


Figure 3. Babraham water-meadows: Area of Sluice Wood

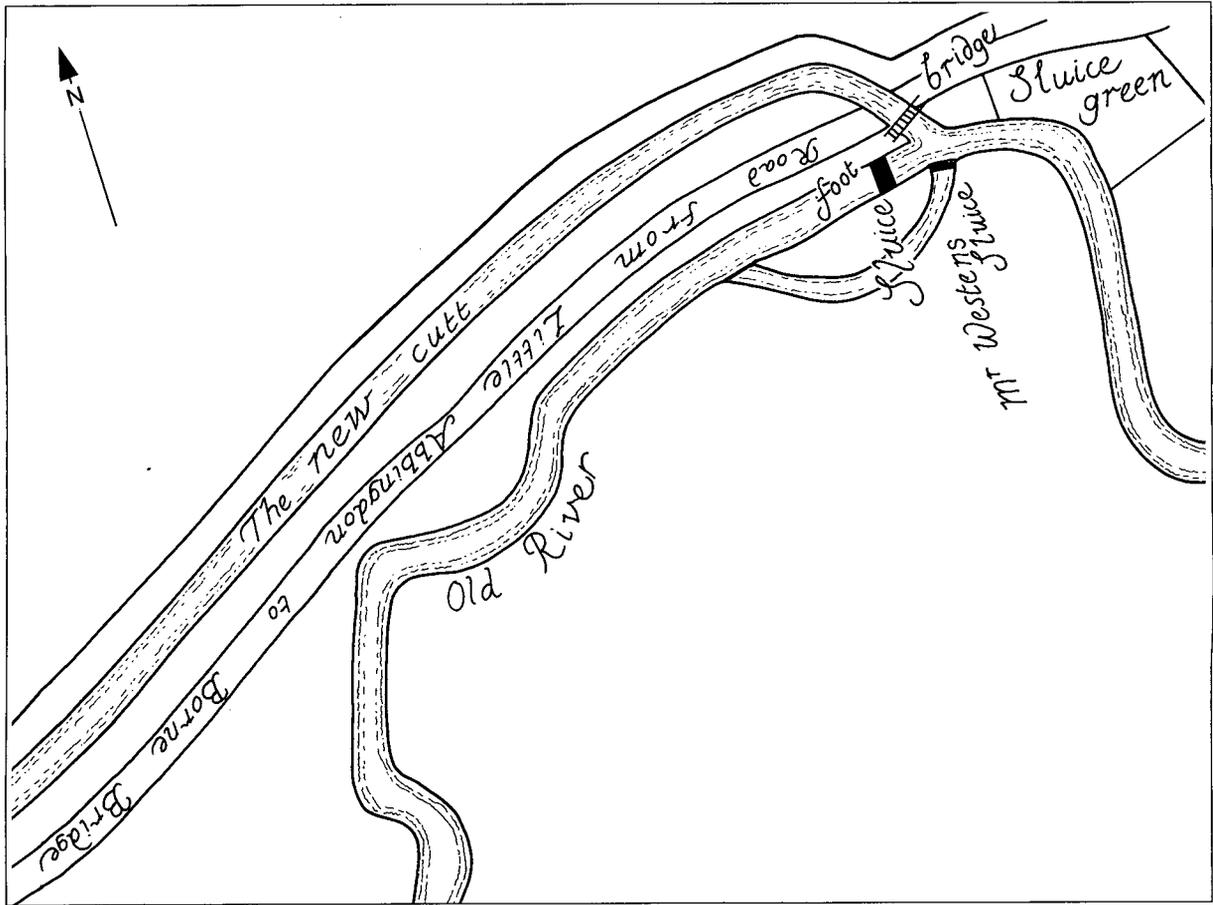


Figure 4. Babraham water-meadows: Sluice Wood, 1719. Based on a plan in the County Record Office, Cambridge, 619/E 18

north across Abington Park and as it enters Sluice Wood it divides into two channels, the western of which has a cast-iron hatch at its northern end. This channel and the hatch are apparently of 19th-century date. The river then turns sharply west and again divides into two channels on either side of an elongated island some 20m long and up to 6m wide. The northern branch is the main channel of the River Cam while the southern branch now flows only in times of flood. At the west end of the north side of the island are the remains of a late 19th-century sluice. These include a concrete sill in the bed of the river, brick retaining walls along the north-west end of the island and along the opposite river bank, brick and concrete rubble downstream of the sill and parts of the winding gear of a hatch in the bed of the river upstream. This is the site of the original sluice of the Bennets, shown here on the 1719 plan (Fig. 4), although the existing remains must belong to the rebuilding of 1894 by Charles Adeane.

Also presumably Adeane's work is the positioning of two stone panels, re-set side by side within the late 19th-century brickwork on the island side of this sluice. Each panel is some 30cm wide and 45cm high with identical inscriptions. These read 'The Bottom or Lowest Point of this Stone is ye height of the

Floodgate of this Sluice. 1721'. Each panel was probably originally set on the Bennet and Western sluices respectively. They bear out the instructions specified in the final agreement between the Westerns and the Bennets, that the sluice of the former was to be set three inches lower than that of the latter (CRO 619/E 24). This would have allowed the Westerns to prevent upstream flooding without involving the Bennets.

The channel on the south side of the island is the diversionary cut, perhaps originally made by John Bennet of Abington in the 1680s, but certainly recut or possibly cut by Thomas Western in or soon after 1697 to relieve the alleged flooding upstream. It is now much wider than it was, presumably as a result of erosion. More late 19th-century brickwork at the south-east end of the island and on both sides of another concrete sill lie at the point marked as 'Mr Westerns Sluice' on the 1719 plan (Fig. 4). This too was probably rebuilt by Adeane in the 1890s.

The head main, which carried the water from the Cam as far as the edge of the Babraham estate, survives almost completely intact (Fig. 2). It commences as a shallow channel some 5m across and 1.5m deep cut into the north side of the river immediately above the site of the Bennet sluice, at a height which can be estimated as between 95 and 96 ft (29m) OD (Fig. 5). It

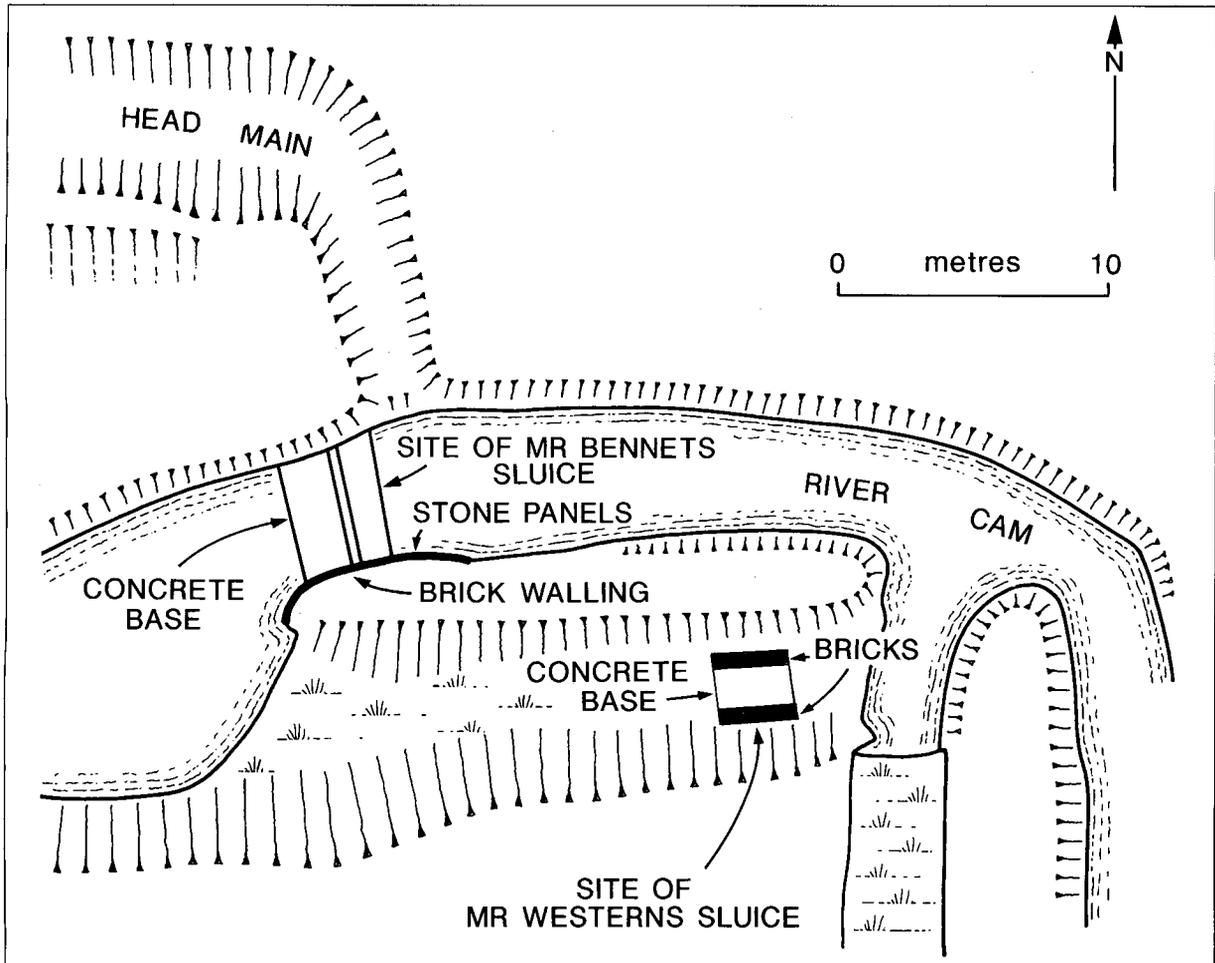


Figure 5. Babraham water-meadows: Plan of sluices

runs north-north-west for some 10m and then turns sharply west and runs for some 650m until it reaches the old London to Norwich road at Bourn Bridge (Fig. 2). The head main consists of a well preserved channel cut into the edge of the river gravel and glacial deposits which here form a low natural break of slope separating them from the river alluvium to the south. The upper edge of this slope has been sharpened by modern cultivation, and also presumably by medieval ploughing. However, it is the recent cultivation that now extends to within 0.5m of the outer edge of the channel and that has presumably destroyed the bank along its north side which was shown on the 1719 plan (Fig. 4). The actual form of the channel is remarkably consistent along its length but its dimensions vary. Just north-west of the sluice the channel, even today, is still some 7m across and 2.5m deep below the northern edge and 1.8m deep below the southern side where there are slight traces of an outer retaining bank 4.5m wide. These massive dimensions recall the details noted by one of the deponents in the Chancery proceedings that the channel here was 'two throws' deep. Further west, towards Bourn Bridge, the head main is much less massive, being some 5m in width, 1.5m deep below the northern edge and 0.5m

deep below the spread outer retaining bank. About half way along this section the head main is crossed by the 19th-century so-called Carriage Drive to Abington Hall (Fig. 3). The drive is carried over the head main on a small late 19th-century red brick bridge with a semicircular arch.

At Bourn Bridge the head main passes beneath the old London to Norwich road in a modern concrete culvert with red brick parapets. This culvert was rebuilt in the 1990s to match the equally new bridge across the River Cam 50m to the south (TL 520493). The earlier, similar, culvert for the head main is just visible in the background of a photograph published in 1935 (Palmer 1935, pl III). Beyond, the head main survives in poor condition for 100m as the southern boundary of the Bourn Bridge Cottages gardens. It is here only a shallow ditch 0.5m deep and 3 to 4m wide with a low spread outer bank less than 0.25m high.

At the rear of the Cottages the head main is crossed by a massive embankment of the former Chesterford to Newmarket railway, where it traversed the Cam valley. The line was constructed in 1846-7 and opened in 1848 (Brown 1931). It soon became involved in one of the early railway company wars, was taken over by the Eastern Counties Railway and was closed in 1851.

The crossing of the valley here necessitated not only a bridge across the Cam but a culvert to take the head main. The culvert still exists, near the south-western corner of Bourn Bridge Cottages (TL 519494). It is of white brick, built on the skew, with a semi-circular arch and the tunnel bricks laid on the 'English' or 'helicoidal' system (Simmons and Biddle 1997, 46–7). The outer retaining wall of the culvert on the east side is decorated by three courses of red brick with a red-brick string course above them. Any parapet that may have existed has been removed. The western side of the culvert and the next 200m of the head main were completely destroyed by the construction of the A11/A505 road junction in the 1990s. OS plans show that the head main turned sharply north-north-east after exiting the culvert and ran for 120m roughly parallel to the railway embankment before turning west again. Its original line here was altered somewhat by the construction of the embankment. A plan of 1829 (CUL), to which the line of the railway has subsequently been added, shows the original position of the head main partly beneath the later embankment.

From here the head main ran in a generally north-westerly direction, roughly parallel to and between 100m and 175m north-east of the River Cam, for some 700m to the outskirts of Babraham village (TL 513501; Fig. 2). It was this section, the first to be built, that watered the sloping meadow land between it and the river. Its line, shown on the 1829 plan and on all OS plans until 1999, was some 3.5m above the river (CUL; OS 1885, 1901, 1956, 1999). Immediately south of Two Acre Plantation (TL 517497) it mirrored the course of the Cam and curved into and around the head of the dry valley here to maintain its level.

The whole of this section of the head main has now been completely destroyed by ploughing which had already begun in 1976. At that time an aerial photograph (CUCAP BWS45) showed the head main in the process of being flattened although enough remained to indicate that it then had exactly the same form as the surviving section in Little Abington parish. That is, it consisted of a narrow channel cut into the slope, with a down-slope bank to retain the water. This is confirmed by the less clear but more extensive vertical aerial photographs taken in 1946 (RAF 1946a). These show that the head main was still intact, with specimen trees along its line. None of the hatches through which the water was released down the slope are visible or even their general positions ascertainable. The early OS plan (1885) shows a slight widening of the head main in one place, 120m east of Mill Hole Copse (TL51454980), which is marked and named as a sluice on the 1829 plan.

Vertical aerial photographs taken in 1946 show other features of interest (Fig. 6). At that time in the centre of the section under discussion was one field, between the head main and the River Cam, which was still bounded on the north-west and east by hedges and still permanent pasture (TL 515497). Within this field the photographs show faint traces of slight and narrow ridge and furrow running exactly straight, directly across the slope from north-east to south-west.

The ridges, which were no more than 3m wide, lay within the field boundaries that included the head main, and are thus later than the latter. They are of a type normally called *narrow rig* and conventionally dated to the late 18th or early 19th centuries (Bowen 1964, 47; Taylor 2000, 143–4). These ridges cut through at least three somewhat irregular and very slight ditches running across the contours and roughly parallel to the head main and the river. Two of these ditches extend south-eastwards beyond the area of the narrow rig. There are also traces of other ditches running obliquely across the contours. What these ditches were is by no means clear. They must be earlier than the narrow rig but also, probably, later than the head main. Yet, situated as they are on the sloping valley side, it is difficult to assign a function to them unless they are connected with the head main. If indeed they are contemporary with or later than the head main they must date from between the 1650s and the later 18th century or perhaps a little later. In this case they could well have given rise to the 'various grasses and weeds ... of various shades of green' that Smith saw soon after 1800 and which he thought was evidence of small catch drains (Smith 1806, 116–17). The rather irregular pattern of these drains certainly supports Smith's view that they did not 'appear to be of any service to the meadows'. Perhaps these catch drains, if such they were, were a later and somewhat crude addition to the original scheme.

When the head main reached the southern corner of Babraham village, just south-east of Home Farm (TL 513501; Fig. 2), its character and function seem to have changed entirely. So much so that it is likely that it was at this point that the original 1653–4 scheme ended and that the later 1659 extension commenced. The total area watered by this first stage can be estimated with some accuracy as about 30 acres (12ha). Exactly how the head main might have terminated here is unknown. The surplus water may have been returned to the river some 200m away, although there is no trace of any channel. A sluice is marked and named a little to the south on the 1829 plan. The head main may later have fed an animal drinking pond which certainly seems to have existed here by the late 19th century (OS 1885). But any original termination is likely to have been altered or destroyed by the construction of the extended head main. The latter ran in a north-easterly direction from the back of Home Farm along the rear of all of the village properties on the south-east side of the main street. Along this length the head main changed direction very slightly at a number of points where major internal boundaries met the principal rear boundary of the village. This indicates that, wherever the medieval village of Babraham was located, by the mid 17th century the block of properties along this side of the village street was already in existence. There is now no trace of the head main along this line, it having been destroyed by agricultural buildings in the last fifty years but it is depicted on all OS plans and on the 1829 Estate Plan.

From the north-east corner of the village the head main survives as a ditch, albeit only as a field bound-

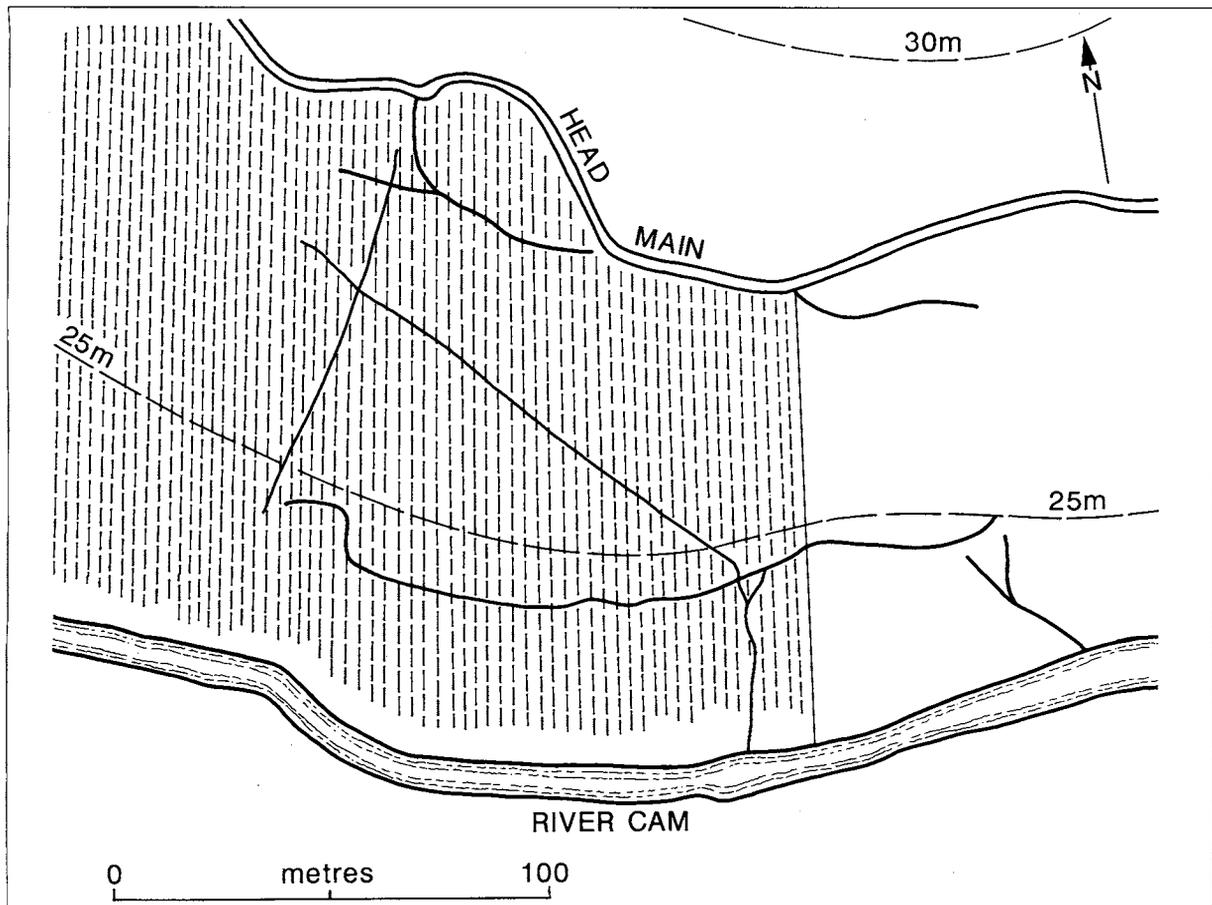


Figure 6. Babraham water-meadows: Plan of catch drains

ary. It turns sharply east-north-east and runs in a broad and somewhat angular arc into and out of a small dry re-entrant valley in order to maintain its level at about 27m (85ft) above OD. Here the head main is a ditch 3m to 4m across and only 0.5m deep at the most. Along this section as well as along the short section to the north-west of the village street, the head main was never used to water meadows. Its function was merely to carry water from the earliest part of the system to the later part to the north-west. The head main passes in a culvert beneath the street, its line marked by a low rise in the road. The culvert appears to be of late 19th-century date although it is now completely filled with rubbish and its constructional details cannot be seen. Both parapets are part of the adjacent 19th-century estate walling of flint panels edged in red brick and with a white brick coping.

Babraham Hall and Park are now the property of the Institute of Animal Physiology which was established here in 1948. Until then the Hall lay towards the southern end of a large landscaped park, the history of which has not been studied. The part south-west of the park seems to have been created between 1829 and 1885 by one of the Adeane family (CUL 1829 Plan; OS 1885). The more extensive north-eastern part of the park, through which the head main ran, seems to have been in the process of being laid out in 1785 (CUL Plan

of St John's College Lands). Over the years this park has been ploughed over and divided into paddocks, many laboratories and workshops have been erected and a large housing estate for staff built. These developments have led to the almost complete destruction of the head main which once ran across the park in a north-westerly direction. However, its line as depicted on the 1829 plan and on OS plans (CUL; OS 1885-1956), details visible on the 1946 vertical aerial photographs (RAF 1946b), as well as a few surviving fragments, enable the overall form and appearance of this section to be recovered (Fig. 2). Immediately beyond the village street the head main survives in a boundary belt of trees as a ditch 4m across and 0.5m deep for a distance of 50m. In 1785 this section was called New River. Thereafter almost all trace of it has vanished. Originally it turned sharply and then ran for 600m and, at least from the 19th century, terminated on the edge of a small copse to the north-west of the drive between the Hall and Cambridge Lodge (TL 510509). The first part of the head main across the park was very different from the rest; it was ruler-straight and its line had no regard for the local topography. Indeed the centre 200m of this section was cut across a low flat spur projecting south-west between two shallow dry valleys. This meant that it would have been impossible to run water down the hillside

here. Further, to maintain the correct gradient the head main would have needed to be cut very deeply across the spur. The actual depth here is unknown although aerial photographs show a ditch of some size (RAF 1946b). Certainly it must have been at least 2m deep and possibly more. There may originally have been no intention to irrigate the face of the spur here, the object being to carry the water into the adjacent dry valley. However, there is evidence of a probably later attempt to run water down the spur. The 1946 aerial photographs show a broad ditch that came off the head main, ran south-west along the side of the spur and then curved south-east to run across it for about 100m before terminating just short of the eastern drive to the Hall (RAF 1946b; TL 507512). With a suitable hatch on the head main this ditch would have made possible the irrigation of the lower part of the spur.

Beyond the spur the head main continued north-west into the adjacent dry valley. By the 19th century it was crossed by the Cambridge drive to the Hall although there is now no trace of the presumed culvert at the crossing. A linear area of rather disturbed ground marks the former line of the head main east of the drive (TL 508511) but north-west of the drive there is no trace at all, the whole area having been ploughed regularly. The aerial photographs and OS plans show the head main running on a broad curve around the edge of the next rather steeper spur and into the adjacent dry valley, where in the late 19th century it ended on the edge of New Plantation (TL 512505). Here it ran parallel to and roughly 150m up-slope of the River Cam. The 1946 aerial photographs show that the then tree-lined head main was much narrower here than further upstream. They also show traces of another ditch parallel to it and to the river, roughly half-way between them. This may well have been another catch drain. If this section was the total length of the 1659 extension it increased the area irrigated by some 50 acres (20ha), making a total of some 80 acres (33ha) being watered.

However, the 1829 plan shows a ditch continuing the head main and turning sharply north-east. It runs for 1.3km in a broad north and north-west curve into and out of a dry valley, around a further spur and into yet another dry valley. It is depicted as ending at a now unnamed building, called Shepherds Cot in 1829 (TL 49885195). Little survives here of the head main, if such it be, except for a slight drainage ditch 4m across running through New Plantation and, elsewhere, for a hedge ditch of similar proportions. If this ditch was part of the original head main it extends considerably the area that was irrigated from 80 acres (33ha) to about 170 acres (70ha). This figure is very close to the 165 acres (68ha) recorded by Vancouver (1794, 56). This additional section of ditch would also make the total length of the head main some 5km, of which 3.7km was actually used for watering meadows.

Conclusions

This analysis of a small irrigation scheme of the 1650s sheds a little light on one aspect of the history of agriculture in Cambridgeshire and, perhaps, on 17th-century agriculture in general. It has also produced new information on a hitherto little known county family. Inevitably it has raised more questions than it has answered. These questions range from those of minor interest such as the possible existence of the catch drains to one of rather wider importance, the involvement of the architect Hugh May as a 'Director' of the scheme.

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