MOOR POND WOOD, PAPPLEWICK
An Archaeological Desk-top Study

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A report for the
Moor Pond Wood Project,
Papplewick, Nottinghamshire

by
Richard Sheppard

TPAU Project Code: PMP.1
OS Grid: SK 544513-550504
File Name: 2106 / PMP-Rept
March 2001

Trent & Peak Archaeological Unit
University Park
Nottingham
NG7 2RD
Tel: 0115 951 4823
Fax: 0115 951 4824
e-mail: TPAU@nottingham.ac.uk

SUMMARY

- This report is Stage 1 of a two-part archaeological study undertaken on behalf of the Moor Pond Wood Project, Papplewick, Nottinghamshire, whose aim is to exploit for the benefit of the local community a linear track of land west of the village for both its ecological and historic interest. The project is a grant-aided Local Heritage Initiative initiated by Papplewick Parish Council. Stage 2 will entail detailed site survey.

- The area lies east of the River Leen, close to the site of three former cotton mills worked by the entrepreneur George Robinson in the late 18th century. Three others were also built lower down the river between Papplewick and Bulwell. These mills included both a former corn mill and some others built by Robinson that were of a large scale, similar to those of Richard Arkwright in Derbyshire. The larger mills no longer survive.

- The former corn mill, Wark Mill, appears on a map of 1692 and may be a much earlier site, recorded in documents from the 11th century onwards. A datestone bears the name J. Greene and the date 1710, which is when the mill site may have been rebuilt. Robinson first leased the site in connection with his bleaching activities and these may have also occurred on land below the mill where there remain sunken areas of unknown date or purpose.

- The Leen is a smallish river and Robinson had to build up sufficient 'head of water' to turn the mill-wheels by the use of mill ponds and by having leats transfer water from reservoirs at a level well above that of the river. The study area covers a series of embanked ponds and leats, together with sluices and overflow channels that together supplied and controlled water for two of the mills, Top Mill and Grange Mill (the latter, formerly known as Old Mill and New Mill, two adjoining buildings).

- Outside the immediate area there remain former workers' cottages and estate buildings, along with features (including a bridge) that date from Robinson's time. Other landscape feature may include a relict leat that Robinson had cut first in 1778, running from the Wark Mill's pond to his new site of Old Mill. This was probably superceded by the later construction of his main ponds and leats at a higher level to the east.

- Robinson had to have a sophisticated water supply system to ensure enough power to supply several mills in close proximity to each other. He also had to contend with by variations in rainfall and geology, and the activities of the 5th Lord Byron, upstream at Newstead Abbey, who threatened the continuous flow of water to the mills, and who provoked Robinson into a Court case over water rights. Robinson had steam engines installed in two of his mills, and the system of ponds and leats may include later phase additions and alterations equally designed to safeguard the power to his mills. This possibility can only be checked through detailed fieldwork and survey at Stage 2 of the project.

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MOOR POND WOOD PROJECT, PAPPLEWICK

A. INTRODUCTION

This archaeological desk-top study was commissioned by the Steering Group of the **Moor Pond Wood Project, Papplewick**, a grant-aided scheme set up as a Countryside Agency's Local Heritage Initiative by Papplewick Parish Council and supported by the people of this Nottinghamshire village. The purpose of this report is to provide an historic base upon which the Project can proceed in its aim to use Moor Pond Wood, an area to the west of the village, as an educational resource, a site for nature conservation site and as a recreational amenity. A separate report on the ecology of the area has been produced by Alison Fraser of consultants Baker Shepherd Gillespie.

The linear area covered by the scheme, shown in Figure 2, was formerly a site of industrial activity connected with cotton milling by George Robinson in the later 18th - early 19th century. Largely unaffected by subsequent development and now mostly wooded, there still remain significant earthworks, sunken areas that once contained ponds and other water management features that together helped to supply power to a series of mills to the west of the project site, set over or close to the River Leen (Plates 1-3). Although this report will refer to the general site as Papplewick, the nearby village, most of the area around the mills comes within the parish of Linby.

This report provides a brief summary, an historical background to the site and a preliminary description and analysis of the surviving features; there is also a list of sources consulted and referred to in text. In addition, a set of supporting maps from the 17th century to the late 20th century and a number of plates illustrate the changing landscape and points mentioned in text. The historical background draws heavily on the extensive researches and resulting articles written by the late Nan Greatrex, who probably came to understand the industrial history and archaeology of the site more that anyone else in recent times. This report in no way revises her work but merely seeks to build upon it through a fresh appraisal and by concentrating on the water supply system rather than the mills, where previous study has tended to concentrate.

The report's form is based on a brief supplied by the County Archaeologist, although because of the geographical length of the study area, the plans included here are of a small scale; larger scale overlays will be produced separately in due course. The largest plan reproduced within is at A3 size and at 1:2500 scale (Fig 10). This collectively illustrates the extent of surviving features from their first and most detailed recording by Ordnance Survey in 1880-81 and the few subsequent changes made since. Some lost features have also been included though, derived by overlaying the map onto other earlier plans at similar scale. This drawing also serves as the base map for locating points mentioned in text by the use of numbers in bold italic.

This report is Stage 1 of the archaeological study of the Moor Pond. At Stage 2 it is intended that field survey should provide further detailed information about the area concerned. Figure 11 suggests locations of particular interest both within and outside the strict boundaries of the study area, together with positions for linear profiles (marked A-A1, etc) where the drawing of the existing gradients from the survey data should prove informative.

SOURCES OF INFORMATION

Information has been collated from the following sources:

Documentary sources

Provided by Eileen Appleton of Trent & Peak Archaeological Unit

Published works, documentary, cartographic and illustrative sources were consulted at local and county level. The sources and the locations of the repositories are listed in the Chapter 5. Several important texts or lists are also reproduced as Appendices. In the time available it was not possible to track down an important estate map drawn up for Andrew Montagu (then Lord of the Manors) in 1847. Parts of this map are reproduced in the Greatrex 1986 article. They are not repeated here because only poor copies were available at the time of writing.

Fieldwork

The study area was initially inspected in the field in the company of members of the Steering Committee and on a subsequent visit with Alison Fraser. However, further visits to Moor Pond had to be cancelled due to the closure of the area as a result of the national outbreak of Foot and Mouth Disease. It was possible to visit two of the mill sites for supporting information and some photographs were taken there to help illustrate points in the text.

B. HISTORICAL BACKGROUND

The Topography

The valley of the River Leen runs from north to south for about 12-13 miles (20km), from just north of Newstead to the River Trent south of Nottingham. Although a river of small to moderate size and traversing a valley of relatively low gradient, it has been long been utilised as a source of water power by mills along most of its length. Figure 1 is an amalgamation of the present river course in the north of the valley and its former course in the Nottingham area in the early 19th century (with the scale of settlement of that time). It shows most of the known mills, including those used for milling corn, for fulling cloth and for producing cotton thread. Other early corn mills are likely to have existed elsewhere along the course of the river. Linby had a mill at the time of the Domesday Book in 1086 and again at the time of Forest Perambulations of 1232 and 1538 (Butler, 10). Papplewick is recorded as having two water mills and a mill dam in 1540 (Walker, 231: Butler, 45). Whilst one of these may have been on the site of Wark Mill (see below), the site of the other remains unknown.

The geology of the area covered by this report is generally river alluvium. This includes the area of Papplewick Moor to the east of the study area, but not nearby Congel Hill which is composed of sandstone. To the west of the river the geology changes to Lower Magnesian Limestone, a stone that was used locally as building material and was employed in the construction of the mills. The use of 'Limbeestone' (i.e. from Linby) in Nottingham is recorded as early as 1637 (*Records of the Borough of Nottingham* 5, 180).

General History: pre-Robinson

One of the earliest maps of the area, of the parish of Linby in 1692, shows the general field pattern, the course of the River Leen and a building astride the river at the position of present-day Walk Mill (NA ref LI 1S). This building is highlighted in Figure 3. In the accompanying survey there is a reference to 'land belonging to John Green at the Mill' which included 'his intak(e)', and a 'dam meadow and homestead' (NA ref DD 2052/1). These terms relate to an area of damned water needed to power the mill, and the outline of the enclosed area has persisted as a landscape feature since then, as a comparison of scaled plans reveals. A mill and its associated dam (i.e. mill pond) also showed clearly on John Chapman's survey of 1774. The mill site is occupied by residential buildings today and these are still known as Walk Mill Cottages.

The older buildings at Walk Mill are principally two and three storey cottages, built partly of stone and part brick, and of uncertain date. A datestone now hidden behind the south frontage bears the name J. Greene and the date 1710, which may be when these buildings replaced the existing one on the site (Plate 7). There is also still an arched channel beneath the building (Plate 6) and stone walls in the garden which may once have helped funnel water to a wheel within the building (***14***, Plate 5). Some irregular stonework, presumably part of the earlier structure, also remains butting up to the back wall of the present building.

Robinson's Mills

(Except where stated, most of the following historical detail is derived from Greatrex 1986)

George Robertson came to Nottinghamshire from Scotland and settled in Bulwell in 1738, where he adopted the more English surname of Robinson. Here he was initially engaged in the business of bleaching cloth, which included the practice of 'crofting, the pegging down of cloth and keeping wet in so-called 'bleaching grounds' on meadowland adjacent to a river. The River Leen was favoured for this, having pure soft water derived from the adjoining streams and springs, and from flowing through light soils. The length of the river was to feature a series of bleachworks well into the 19th century. Robinson took over the leases of a mill and adjoining bleachfield at Bulwell, and later at Walk Will near Papplewick, both previously leased by Cornelius Wildbore. Much of the cloth involved was linen from Banff in Scotland, to which Robinson was also commercially linked. In time, Robinson and his sons went on to forge links with different branches of the textile business, both through partnerships and through associations with people such as John Smalley and Richard Arkwright, then based in Goosegate, Nottingham.

In the 1770s the use of cotton was threatening to supercede that of linen, and being at the forefront of new trends, the Robinsons decided to concentrate on stocking-making at Banff and to move into cotton spinning in Nottinghamshire. In 1778 a new lease at Walk Mill was made between landowner Frederick Montagu and George Robinson allowing the latter *'to make a Cut or Canal from the said Dam or River Leen to and for the use of a large building then erecting … intended to be used or employed as a Mill for spinning of Cotton, Silk, Flax or Wool*. This mill, sited to the south in Linby parish, was finished by November of the same year, together with *'divers dwelling houses, workshops and other buildings'*. The mill was described in local newspapers as being 100 feet long, 30 feet wide and 5 storeys high; it was insured for £3000. This mill, situated close to present-day Grange Farm, was later referred to as 'Old Mill', but no longer survives (***29***). It was an unusually large building for its setting and was of a type capable of working about 2000 spindles that Richard Arkwright had pioneered on the River Derwent in Derbyshire (Chapman, 10).

Over the next few years Robinson was to construct five more mills along a three-mile length of the river. The following sequence is based on dates estimated by Greatrex (with some others by Chapman included alongside):

- Old Mill, built by 1778 *
- Top Mill (Castle Mill), soon after * (Chapman: c.1782)
- Lower Mill by 1782
- Forge Mill by 1785 (Chapman: 1783-84)
- New Mill after 1785 but certainly by the early 1790s *
- Nether Mill by 1794

* *mills most relevant to this report*

Whilst the first mill could be powered through its connection to an existing mill pond, the second mill, Top Mill, had to have new ponds built in tandem. These included a large reservoir immediately to the north of a new road outside the mill, the road also acting as its dam, with two sluices to control water flow (***4***). At the north end of this pond, a smaller pond (Top Upper Dam) received water from the river and controlled its entry into the larger reservoir with the help of three sluices (***1***). All sluices are reported to still exist (pers. comm. Lee Scudder).

The Top Mill was a smaller building than the first, three storeys high, with its waterwheel attached at the east gable end; this was fed by a leat running under the road, with the main river flow passing separately to the west, beneath the road and then under the centre of the building (as it still does). The roadside elevation of the mill was embellished with Gothic detailing and castellated, thus its more flamboyant other name 'Castle Mill', although the south elevation of both the mill and the attached tenements were far plainer in appearance. The larger pond was drained in the 1940s with the intention to reclaim it as land for agriculture; the land continued to flood and is now an area of regenerated wet woodland. The mill was derelict and threatened with demolition in the 1940s, but somehow managed to survive and was eventually renovated, and in 1962 received a Civic Trust Award. Although now wholly in domestic use, it remains one of only two surviving mills built by Robinson.

Whilst the first two mills are in Linby parish, the next mill to be built, called Lower Mill, a mile below Old Mill, was actually in Papplewick parish, although beyond the geographical scope of this report. However, a brief description will suffice. It was over 120 feet long, and 6 storeys high, with a mill pond to the north and east, and a 30 foot diameter breast waterwheel placed centrally within the building. The mill pond was fed by a cut which began near the Old Mill, to which the mill was almost exlusively dependent for its water source. A tail-race ran underground from Lower Mill to a pond that in turn fed Forge Mill, the lowest of Robinson's mills. This was also of large dimensions, of similar 120 by 30 foot ground plan but only 5 storeys high; it too had a central wheel turned by a dam and pond immediately to its north.

The fifth mill was built at a right angle to the Old Mill, and in a later valuation this was referred to as New Mill (also ***29***). This mill was possibly already in progress in 1785 when an engineer from Boulton & Watt came on a second visit to Papplewick to survey the building for the installation of a steam engine. The Old Mill had both an existing central wheel and another had been added to the north end, 42 foot in diameter (making it one of the largest in Europe), and driven by water from a high level cistern. The clearest indication of the two mills, Old and New (both now lost), are on the tithe award (Fig. 6) where the lower L-shape represents the combined new and old mill, and the top L-shape may be ancillary parts. The combined mills were also known singly as Grange Mill. The two wheels were both powered from a leat on the east side, running parallel to the river, and the plan shows its inturn towards the older wheel (***28***). A sunken tailrace from this building ran to the west of the Grange (where an angled brick buffer still shows in the garden) and joined another leat from the river lower down.

A final mill, Nither Mill in Bulwell, was first mentioned in an insurance policy of 1794. George Robinson was probably retired by this time and he died shortly afterwards in 1798. The cotton-spinning business was carried on by sons James and John, with the former buying out his brother in 1806, thereafter carrying on in partnership with his own sons. A third generation James took over in 1817 and eventually sold the business as a going concern in 1821 to Richard Hoppers, Senior & Junior for £3000 (although excluding Forge Mill, by then a corn mill). A Deed of Covenant between the two parties included a list of the buildings for insurance purposes. This included the following buildings of interest:

Dwelling House (probably The Grange, ***30***)
Walk Mill, by then 4 tenements, so probably no longer a mill
Top Mill, with 2 tenements attached
Lower Mill, with small building attached
The Old Mill
The New Mill
A 3-storey building standing north of Old Mill (possibly the L-shaped section mentioned above)
An Engine House
A terrace of 10 tenements (?Grange Cottages)
A terrace of 6 tenements (?Grange Cottages)
A terrace of 11 tenements
A row of 4 tenements, referred to as Stone Row, with storerooms and a dwelling house attached?
A Bakehouse and adjoining Stable
A 4-stall Stable, Coach-house and Greenhouse
Stables and Dovecote over
Barn
Cowhouses
A large 5 storey brick building called the Apprentice House, with detached Bakehouse
Wheelwright shop and lumber room
A terrace of 10 tenements (?at Lower Mill)

Most of these buildings can be identified on the tithe award plan, even though only few now survive: two of the mills, two of the tenement rows and several of the ancillary estate buildings, now part of Grange Farm. The surviving tenement rows (now known as Grange Cottages), with one built of stone the other largely of brick, were refurbished in the 1990s. This was shortly after a detailed building survey was carried out by the Royal Commission on the Ancient Monuments of England (RCHME, now part of English Heritage). Its findings on the domestic architecture are not repeated here.

Although most of the buildings at Grange Farm today are modern, there survives an L-shaped range of buildings of 18th century date. Architectural detailing used at Castle Mill was also be seen on a stable and coach-house here. The range includes a large granary or store over a cartshed and several adjoining cottages, together with a heated garden wall to the rear. Although it may be assumed that this range was built by Robinson at the time that Old Mill was being raised, there is some evidence of different phases of construction, and further research might shed light on whether Robinson may have inherited some existing buildings on the site (including perhaps his house, The Grange); this may have

had some influence on his choice of site for Old Mill. The examination by the RCHME of Grange Cottages also provided evidence for different phases of construction at the stone cottages.

In 1831 the Hoppers closed the business and sold the mill machinery at auction. A book published in 1855, referred to Papplewick as 'once the seat of an extensive Cotton Manufactury … the deserted mills and once thronged cottages of the workpeople are still standing in all their loneliness, and for the most part hastening to decay'. (T. Bailey 1855, *A Handbook to Newstead Abbey*). Although most of the industrial buildings survived the ever-present fire risk during their active life, they did not remain deserted for long and were either demolished or, if smaller and more manageable, were converted to other uses such as corn mills or for dwellings. The largest buildings, the 5-6 storey mills and the other 3 and 5 storey buildings were all demolished in the mid 19th century, and The Grange more recently in 1932.

Standing today by the River Leen at Grange Farm it seems incredible that such large and prominent buildings, built largely of local stone and once resounding to the sound of moving water and machinery, could both appear and disappear in this rural setting within so short a time. And leave so little trace. What does survive though is the sophisticated water supply system, without which the mills could not have functioned. This system remains with its prominent landscape features an important legacy of so short a period of intensive industrial activity in such an unlikely setting. Being a subject in itself, it is considered further below.

C. THE WATER SUPPLY SYSTEM

Introduction

Water has been used as an important source of power for hundreds of years and still plays an important role in the generation of hydro-electric power. In Britain, from the medieval period up into the early 20th century water has powered mills for grinding corn, for sawing timber, for paper manufacture, and on a major scale for textile production in Derbyshire, Lancashire and West Scotland in particular. Even where rivers and streams are slow or liable to flood due to low gradient mills have been built where sufficient 'head of water' could be guaranteed by the manipulation of environment, gravity and the flow of water. This was achieved by channeling water to where required through artificial channels or leats, and by conserving and building up quantities of water in ponds and reservoirs. Here water could be damned behind a weir and led off by sluices into a leat, or an overflow channel at time of flood, to eventually arrive at a wheel and turn it from above or below its axle level. A tailrace would then return water to the main stream from whence it came. Where a series of mills were built along a slow moving river or one of small volume, an efficient use of water resources was vitally important, to both provide power and to ensure sufficient water flow at the sites below the immediate one; many disputes arose where a mill owner's 'head of water' was adversely affected by the actions of another further up stream, or even lower down if a tailrace was affected.

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At Papplewick, Robinson had a series of mills in close proximity to each other along a smallish sized river of gentle gradient. He needed a sophisticated water management plan to ensure sufficient power for each mill, many of which must have been in the planning stage from early on. With the widespread construction of canals in Britain during the second half of the 18th century, the engineering skills to move and store water were already well established.

The earliest known mill, Green's Mill, was operated with a dam or pond from at least the 16th century, suggesting that it was long realized that this stretch of river alone could not provide sufficient power. Robinson used the same enclosed source and made *'a Cut or Canal from the said Dam or River Leen'* to the first mill he had built, Old Mill. How he did this is unclear but the 1841 plan shows the new building away from the river and not powered directly by it. The dam at Walk Mill (numbered 42 on Fig. 6) has what appears to be a channel running from its south-east corner, under the road and by plot 38; this longitudinal feature can still be traced today (***13, 18***), and *may* have been the original cut referred to, bringing water to the east side of the mill from above the level of the river. Nearer to the mill it became more embanked, providing a good head of water to the mill-wheel. To help achieve this the dam above Walk Mill was probably heightened as banks show prominently around the pond on the 1841 plan. The river also appears to funnel into the top end of the pond, giving it a longitudinal plan. This effect shows on the earlier plans but by 1880 (Fig. 7) the pond had largely dried out and curiously, the earlier foreshortened shape of sunken ground shown on the 1692 plan had reappeared.

The area below Wark Mill features not only what may have been his original leat, but also one, possibly two, rectilinear sunken areas close to the river (***25, 27***). What purpose these served is unclear, but they may be relict features from when Robinson operated bleaching grounds in association with the mill.

Maps show that the stretch of the river below Wark Mill has had a tendency to meander over the last century or so (***17***); lower down by Grange Farm it is canalized and controlled. This indicates how the river gradient here is gentle and why Old Mill could only have operated efficiently via a leated supply of water. However, it leaves unanswered just why the site close to Grange Farm was chosen to site the mill, and whether this original leat provided sufficient power.

With the building of Top Mill, Robinson used another system of dams, into which the river again flowed directly and was not diverted around. Here a double pond arrangement was used, with a smaller upper pond, triangular in shape, controlling by weir and sluice both the content of the larger lower pond and a leat along its east side that channeled water away to the south-east. The dam above Top Mill diverted water through one sluice and a leat to the waterwheel (probably at breast level), and by another sluice into a straightened course of the river.

The leat running to the south-east took water to a new large pond known as Moor Pond. Here there was another double pond arrangement, with a small upper banked area (***6***), also triangular in shape, that had a sluice opening on its east side (***8***) visible today as a break in the banking with stonework showing. Another strangely curving bank occurs at the north end (***7***), the purpose of which is far from clear. However, a dip at the south end of the pond, over which a footbridge now passes, was the position of curving stonework with two sluice openings, one feeding water into the north-west corner of the larger pond, the other into an overflow channel to the south-west (***9,*** pers. comm. Lee Scudder; Plate 3). The purpose of the north and east openings is not clear as the area beyond is not now evidently a manmade sunken area, yet is currently holding water (***10***). The geology varies here, going from alluvium to clay and additional water may have been available from a natural spring, as this area is reputed to have them. The 1847 estate map mentioned above shows it as a large rectilinear pond, so it probably was part of the overall system.

Moor Pond, held a lot of water and large embankments on its west and south sides helped to prevent it from overflowing and flooding the valley down to Old Mill and the millpond of Wark Mill. As a precaution, a drainage ditch still runs below and alongside the west embankment (***34***); this could be supplied with water from the sluice at the smaller pond or could hold overflow water from the main pond. Water could also be diverted into a stone drain at the south-west corner of Pond Wood (***20***) and channeled down towards another small holding area below Wark Mill (***15***), which has been reinstated as a pond in recent years. It can also be surmised that higher up Moor Pond there may have existed another channel running downhill to the mill pond at Wark Mill, providing surplus water at times of drought (an alignment is suggested in Fig. 11).

From the south-west corner of Moor Pond water was also delivered somehow to a high level leat that ran from above Papplewick Lane to Grange Mill to the south. At this crossing point there is a curious cylindrical brick feature which may be part of a siphoning system, transferring water across the road (***19***, pers. comm. Lee Scudder); there is no other evidence to suggest a timber of cast iron viaduct crossed here. The brick feature appears as a well on the 1880 map, although this is a strange position to find one.

This leat (***21***), formed between two embankments and running well above the level of the river, eventually helped power the 40 foot diameter mill-wheel there. These embankments today start running in a sinuous course through a wooded area and stop where another sluice (***35***) may have controlled its flow to a lower level (***22***); this lower area, close to Grange Cottages, now shows signs of disturbance. From the woods a straighter leat can be followed, although much of its east bank has been destroyed in the gardens through which it passes (***28***). How this part of the system worked is uncertain. The straighter leat to the south may also have been joined or been initially part of the earlier arrangement from the dam at Walk Mill. A lower pond also existed to the east (***23***), since infilled with rubbish, and now the haunt of bottle collectors. Both this and the pond above Moor Pond (***10***) may be later additional reservoirs.

The whole system had numerous control points (sluice gates), extensive storage capacity (perhaps augmented by springs), drains and leats of varying size. There was allowance for both storing water for times of shortage and for dealing with excess. The latter may have been deemed important due to the shenanigans of William, 5th Lord Byron at Newstead Abbey. He adversely affected Robinson's water supply by damming up ornamental lakes in his grounds and is reputed to have then released large amounts of water in an attempt to damage the mills downstream. A court case brought by Robinson in 1785 centred on proving the existence of and unrestricted use of ancient water rights, and the result went in his favour. Despite this ruling though the dispute over water continued for another 5 years and partly resulted in Robinson having two steam engines installed, one at Lower Mill, the other at New Mill, to guarantee power supplies. The problems with Lord Byron may also have had an influence on the design of the water system.

Although Robinson is remembered as being the first cotton manufacturer to install a rotative steam engine in 1786, it was a measure for expedience sake. Two engines were only intended to make up a deficiency in the natural (and cost-free) power source of water and as a precautionary measure against the actions of a rival. This general attitude towards engines being merely supplementary to water power was one commonly held well into the 19th century (Tann, 75).

D. RECOMMENDATIONS

This report is Stage 1 of a two-part study and will be followed by further site survey of the earthworks and ponds mentioned above for a detailed record that should contribute to a better understanding of their history, and aid their subsequent management and site presentation. Although much of the system appears on current plans, the area below Papplewick Lane, in particular, still needs to be recorded in detail and compared to earlier representation on Ordnance Survey maps. In addition, selected positions along the whole system need clarification – such as the former small control pond above Moor Pond, which may once have had three sluices. For instance, by using probes it may be possible to determine the position and extent of stonework around this enclosed area. Figure 11 shows the areas of particular interest with asterixes and most of these have already been referred to in the descriptive text; some are outside the immediate study area but are important parts of the overall picture. Further work should also help address the question of whether different phases of construction may have occurred and whether they can be identified.

At Stage 2 the survey will involve taking measurements by EDM survey of the height and depth of surviving features and water levels, and recording these in contour plan with spot heights at a scale of 1:1250. By comparing this with former maps it will be possible to highlight points of historic interest not already identified, and instances of damage, loss and areas vulnerable to further deterioration. It should also be possible to recreate profiles of gradient along the length of the system, from Top Upper Dam to the end of the leat at Grange Mill. Also, profiles across the system at selected points would illustrate the varying height of the system above river and river plain level. Although silting, erosion, subsidence and tree growth over the last 200 years will have affected the features concerned, it should still be possible to make a worthwhile estimate of former water levels and flows. The positions suggested for these profiles are labeled from A-A1 to D-D5. They are, as with much that is discussed here, open to further discussion and amendment.

Stage 2 will also include the compiling of a photographic record in colour print and digital form for an archival record. The plans and profiles will also be recorded in CAD form which will permit reproduction at differing scale and colour application. These formats will also assist site display and presentation (including written and internet applications). Finally, a full description and commentary will need to be written and this may be best included in a fuller amended edition of this current report.

E. ACKNOWLEDGEMENTS

The author would like to thank his colleague Eileen Appleton for her efforts in collecting the maps and documentary sources and Virginia Badderley, at the Sites and Monuments Record (at Nottinghamshire County Council), for contributing information. Thanks also to Lee Scudder at Greenwood Community Forest and Alison Fraser of Baker Shepherd Gillespie for drawing attention to various aspects of the site. Invaluable local assistance has been given by Mrs Bestow, Tim Hardstaff, Jim and Ruth Lee, Peter and Diane Welling, and in particular Roy Preston by providing a site tour around Grange Farm. Finally, thanks are due to Maureen Barker and the Steering Group of the Moor Pond Wood Project for providing the opportunity that has led to the author becoming better acquainted with Papplewick and its fascinating industrial archaeology.

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G. DOCUMENTARY SOURCES

Locations visited

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1802 Linby parish rate assessment. Nottinghamshire Archives PR 678

1812 Valuation of the Township of Papplewick in the County of Nottingham made for the purpose of regulating the parish rates. By me J Brown Pilcher Gate Nottingham 1812. Nottinghamshire Archives PR 708

c.1800 description of Robinson's cotton mill at Papplewick. Nottinghamshire Archives DD.4P 79/63

1841. Linby tithe award. Nottinghamshire Archives AT 81/1a

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MAPS

c.1593 part of Sherwood Forest. Duke of Rutland, private collection; reproduced in Butler 1953, opp. p.25

[1692] A Plott of the Lordship of Lynby, belonging to the Rt Worshipfull Sir William Stanhope, taken by Tobias Wildeboar, November 1692. Copied in 1801 by HH. Nottinghamshire Archives LI 1 S

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1841 Linby tithe map. Nottinghamshire Archives AT 81/1a

1880 Ordnance Survey 25" Nottinghamshire 33.5
1881 Ordnance Survey 25" Nottinghamshire 33.9
1887 Ordnance Survey 6" Nottinghamshire 33 NW
1887 Ordnance Survey 6" Nottinghamshire 33 SW
1900 Ordnance Survey 25" Nottinghamshire 33.5
1900 Ordnance Survey 25" Nottinghamshire 33.9
1900 Ordnance Survey 6" Nottinghamshire 33 NW
1901 Ordnance Survey 6" Nottinghamshire 33 SW
1915 Ordnance Survey 25" Nottinghamshire 33.5
1915 Ordnance Survey 25" Nottinghamshire 33.9
1920 Ordnance Survey 6" Nottinghamshire 33 NW
c.1930 Ordnance Survey 25" Nottinghamshire 33.9
1955 Ordnance Survey 1:10,000 SK 55 SW
1957 Ordnance Survey 1:2500 SK 5450
1961 Ordnance Survey 1:2500 SK 5451
1967 Ordnance Survey 1:10,000 SK 55 SW
1977 Ordnance Survey 1:2500 SK 5451
1980 Ordnance Survey 1:2500 SK 5450
1981 Ordnance Survey 1:2500 SK 5451
1983 Ordnance Survey 1:10,000 SK 55 SW
1991 Ordnance Survey 1:10,000 SK 55 SW
1983 Ordnance Survey 1:10000 SK 55

APPENDICES

Appendix I

1692 survey details DD 2052/1

"Land belonging to John Green at Mill

126	his Miclemore	5.0.04
146	his intak	9.1.29
145	dam meadow & homestead	2.0.17
159	his Butler Close	5.3.11
149	his Shiply flat	6.1.11
170	in Cungill	5.0.30

		33.3.22
		---

		a.r.p	
49	Burgess Leene Close	5.1.12	
50	The Furlong		21.2.18
51	Rob Brograves Leen Close	6.2.00	
52	New Meadow	20.3.00	
53	Washes Pingle	1.0.16	
132	Swinton's farthings	8.0.12	
133	Hodsons midle farthings	4.3.30	
134	Allcocks hemp pits	4.2.07	
135	Halls Old Close	4.1.11	
136	Hodsons nether farthings	5.2.18	
137	Allcocks picles	13.3.09	
138	Modlums hemp pits	4.0.15	
139	Tho Burgess little close	1.3.07	
140	Clerksons white leas	8.0.39	
141	Richesons Mill Close	1.3.0	
142	Clerksons 8 mens meadow	1.1.8	
143	Pages Mill Close	4.1.06	
144	Towsends Mill Close	3.2.23	
145	Greens dam meadow & homestead	2.0.17	
146	his Intake	9.1.29	
147	Adam peacocks tenter & close	4.3.06	
148	his lane close	1.2.20	
155	Richards's meadow	17.2.00	
156	Clerksons little long close	2.3.06	
157	Rob Greens Mill close	2.0.11	
158	Hodsons Mill close	3.2.27	
159	John Greens butler close	5.3.11	
160	Clerksons nether meadow	9.2.34	
161	Clerksons meadow & close	11.3.29	

Appendix II

1802 Linby parish rate assessment PR 678

Robinson James Esq. has total acreage 87.2.26		a.r.p
10	meadow	3.1.37
13	meadow	4.0.16
14	meadow	4.3.21
15	house, garden etc	3.3.35
16	meadow	4.3.33
17	Cow Close	7.3.13
18	Ten Acre	9.1.20
19	meadow	3.2.07
35	Corn Close	4.1.32
37	houses & gardens	1.0.02
38	Cotton Mill &c	4.0.03
39	paddock	2.0.16
40	paddock	0.2.31
41	part of Middle Dam	3.1.15
42	Horse pasture (Intakes)	6.2.32
43	Walk Mill Dam	2.1.36
44	Pickle Bottom	6.2.20
45	Pickle Bottom	2.1.34
56	Walk Mill	1.2.31
57	Stone pit	0.1.16
58	Meadow	4.2.09
107	part of Mill Dam	5.0.7

Appendix III

1812 Papplewick parish rate survey details PR 708

Map missing since at least 1843: notes written in the front of the survey book include: 'NB When John Brown died all his Plans were sold to Mr Campbell Land Surveyor, Nottingham - he went deranged and they are now in the hands of Mr Moses Wood.' 'The plan to which this valuation refers is now most probably in the possession of Mr Moses Wood, Park Street, Nottingham. May 1843.'

Jas Robinson has:

owner Miss Fountayne, out of lease
- Hooleys Farm 18a.1r.0p

owner Miss Fountayne, in lease
- Moor Dams 10.0.0
- Mill orchard 0.1.30
- Slaters meadow with Banks and Lower Mill Dam 20.0.0
- The Lower Mill
- Lodging Houses at the Lower Mill
- Smiths shops
- Mr Savile tenant: Barn & stable, garden 0.0.20
- Lower Mill houses (9 + 1 empty)
- Moor Row (5)
- New Row (6)
- Bakers Row (10)
- South Row (11)
- River side (1 + 1)

owner Duke of Portland
- The Forge Mill
- Mill Dams 2.2.0
- Forge Close 6.0.0
- Forge Mill houses (7 + 2)

owner Revd Luke Jackson
- part of the water 2.0.0
- Jacksons meadows 12.0.0
- houses at Lower Mill (9+3)

Appendix IV

Linby tithe detail AT 81/1a
Land owned by Andrew Montagu

				a.r.p
14	Wilson R F		meadow	2.2.04
15	"		garden including house	3.3.35
16	"	Meadow	meadow	4.3.33
17	"	Cow Close	pasture	7.3.13
18	"	Ten Acres	arable	9.1.23
19	"	Meadow	pasture	3.2.07
32	Wilson R F	Corn Close	arable	4.1.32
33	"	Butlers Close	arable	4.2.37
34	"	-	pasture	0.3.33
35	"	-	pasture	0.3.28
36	"	house & garden		1.0.02
37	"	**Old Mill**		4.0.03
38	"	paddock	pasture	2.0.16
39	"	paddock		0.2.31
40	"	**Mill Dam,** part of		3.1.15
41	"	Horse pasture	pasture	4.0.00
42	"	**Walk Mill Dam**		2.1.36
43	"	Pickle Bottom	pasture	6.2.20
44	"	Pickle Bottom	arable	5.0.26
45	Bradley Wm	Farthings	arable	2.2.20
46	Chadborn J	Nether Farthings	arable	3.3.10
47	Alcock J	Pickles	arable	8.0.14
48	"	Hemp Pit	arable	3.2.10
49	"	White leys	arable	8.2.14
50	Howitt Wm	Walk Mill Close	arable	6.0.12
51	"	Walk Mill Close	pasture	3.2.08
52	"	Walk Mill Close	meadow	3.0.24
53	Wilson R F	**Walk Mill**		1.2.31
54	"	Quarry		0.1.16
55	"	Meadow	arable	4.0.27
56	"	Little Meadow	pasture	0.1.22
57	Hall Wm	Two Acres	meadow	2.1.04
106	Alcock	Meadow	meadow	21.2.32
107	Wilson R F	part of **Mill Dam**		5.0.07
108	"	woodland		1.1.36
109	Wright T	Leen Close	pasture	6.1.28
111	Wilson R F	Furlongs	pasture	25.0.00
111a	"	woodland		5.0.16
113b	"	woodland		5.3.08
115a	"	woodland		7.2.28

Appendix V

Pre-C18th

Forest perambulations - Linby to mill on Leen

1540 Papplewick, 2 water mills and mill dam (Walker 1940, 231; Butler 1953, 45)

c.1593, map of Sherwood Forest (Duke of Rutland), mill shown on Leen (Butler 1953) - ? within study area?

1609 manor of Linby, former millponds (Walker 1940, 237)

1636 Papplewick 2 water mills (Walker 1940, 241)

1692 map (1801 copy) & survey (original) - dam; mill closes; building on Leen/Leenside (plot 145) - survey notes John Green at Mill has dam & homestead (plot 145).

Appendix VI

Description one of Robinson's mills [?Grange mill complex] DD.4P 79/63

"The Cotton mill near Papplewick where Mr Robinson now resides is upwards of one hundred feet long, & about 30 feet broad, six stories high...", description of rooms on each floor, notes also a separate carding mill. Notes products, prices, machines, number employed and wages.

"The water that works the mill is set or laid on by a watch, the works are to go round 18 or 19 times in a minute, if faster the shaking wou^{d} hinder the spinners from keeping up with their Ends, if much slower a loss of time in the work"

Appendix VII

Riley 1884

"The river Leen, or Lyn... for sixty years its stream was utilized as the motive power for several cotton mills erected by Mr Robinson under lease. Seventy acres were occupied as reservoirs and watercourses, and one of the largest wheels in England revolved in fearful majesty. It was a breast wheel of 44 feet in diameter. The late Duke of Sussex, when visiting Colonel Wildman, came to see this wheel in 1826. The mills had been successfully worked out but, by degrees Lancashire became the centre of the cotton manufacture, the facilities of steam superseded the cumbrous requirements of water power, and after the expiration of the leases in 1840 the mills were taken down, the watercourses gradually filled up, and Papplewick returned to its ancient condition of an agricultural village."

ILLUSTRATIONS

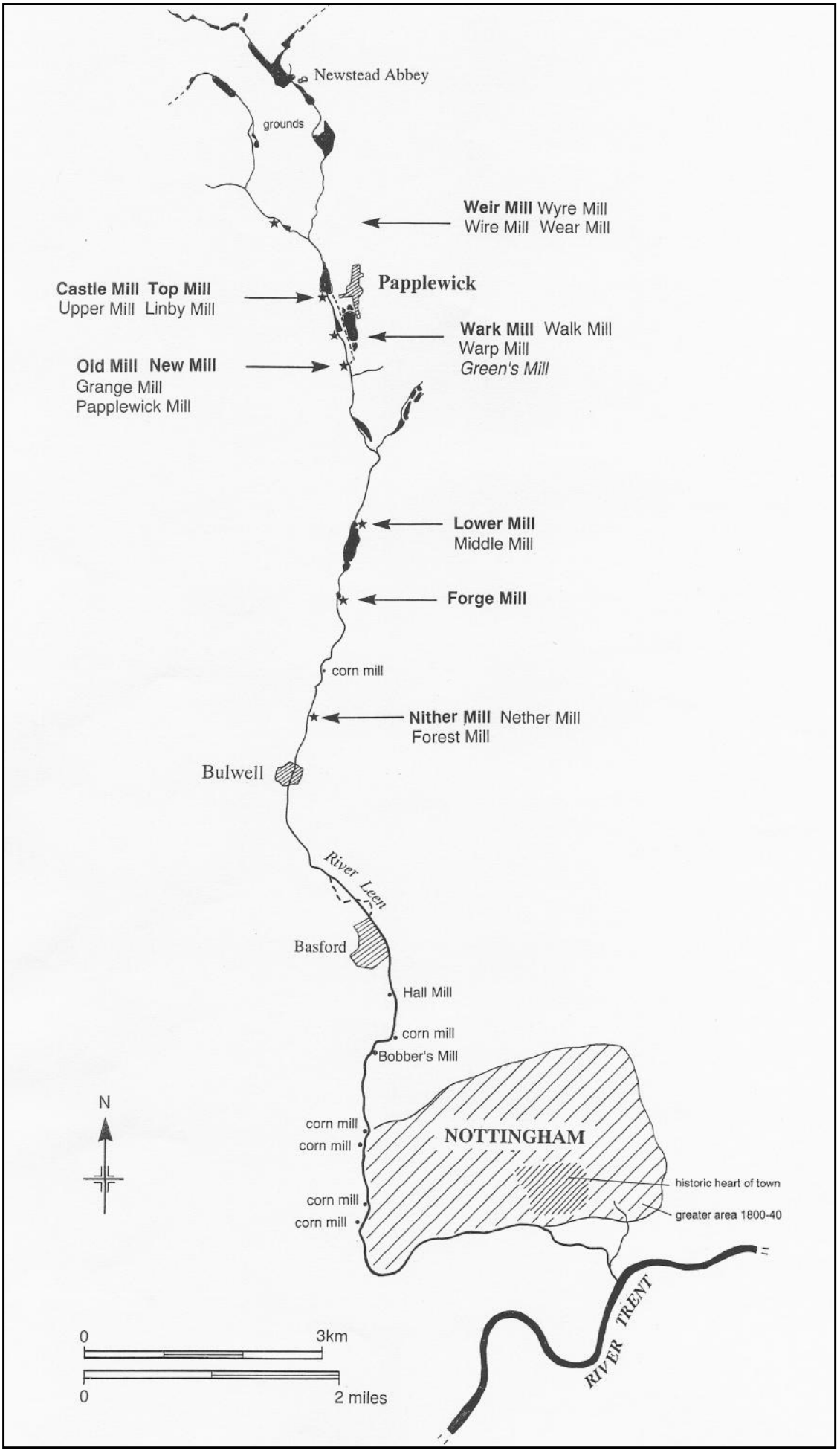

Fig. 1 A plan of the River Leen showing the relative positions of known mills and their varied titles, together with ponds, both past and present (shown in black). Not to scale.

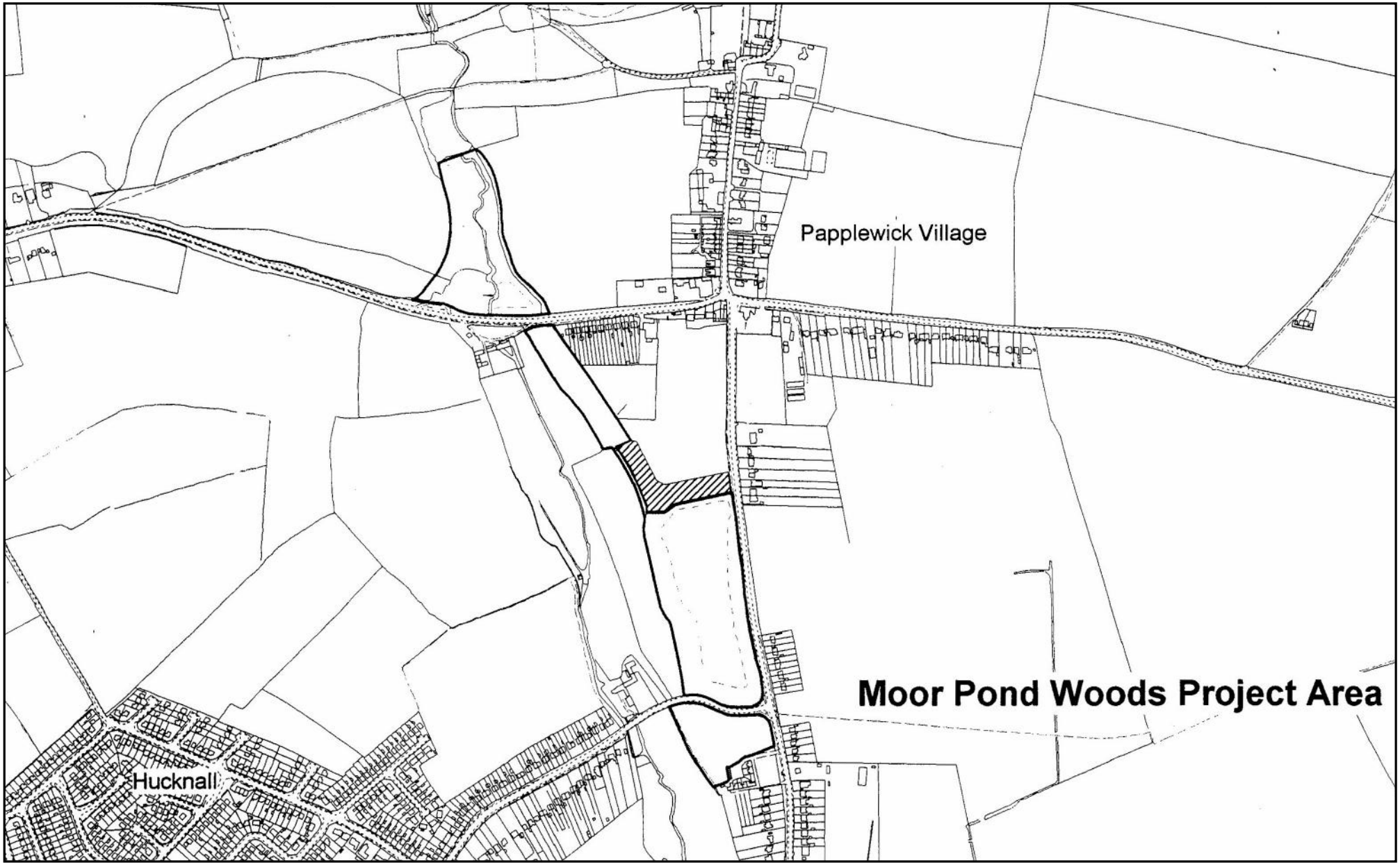

Fig. 2 The area covered by the Moor Pond Woods Project. Not to scale.

Fig. 3 Part of 'A Plott of the Lordship of Lynby...', dated to 1692 and copied in 1801, here showing the course of the River Leen (dashed lines) and John Green's mill (highlighted). Scale approx.1:5000.

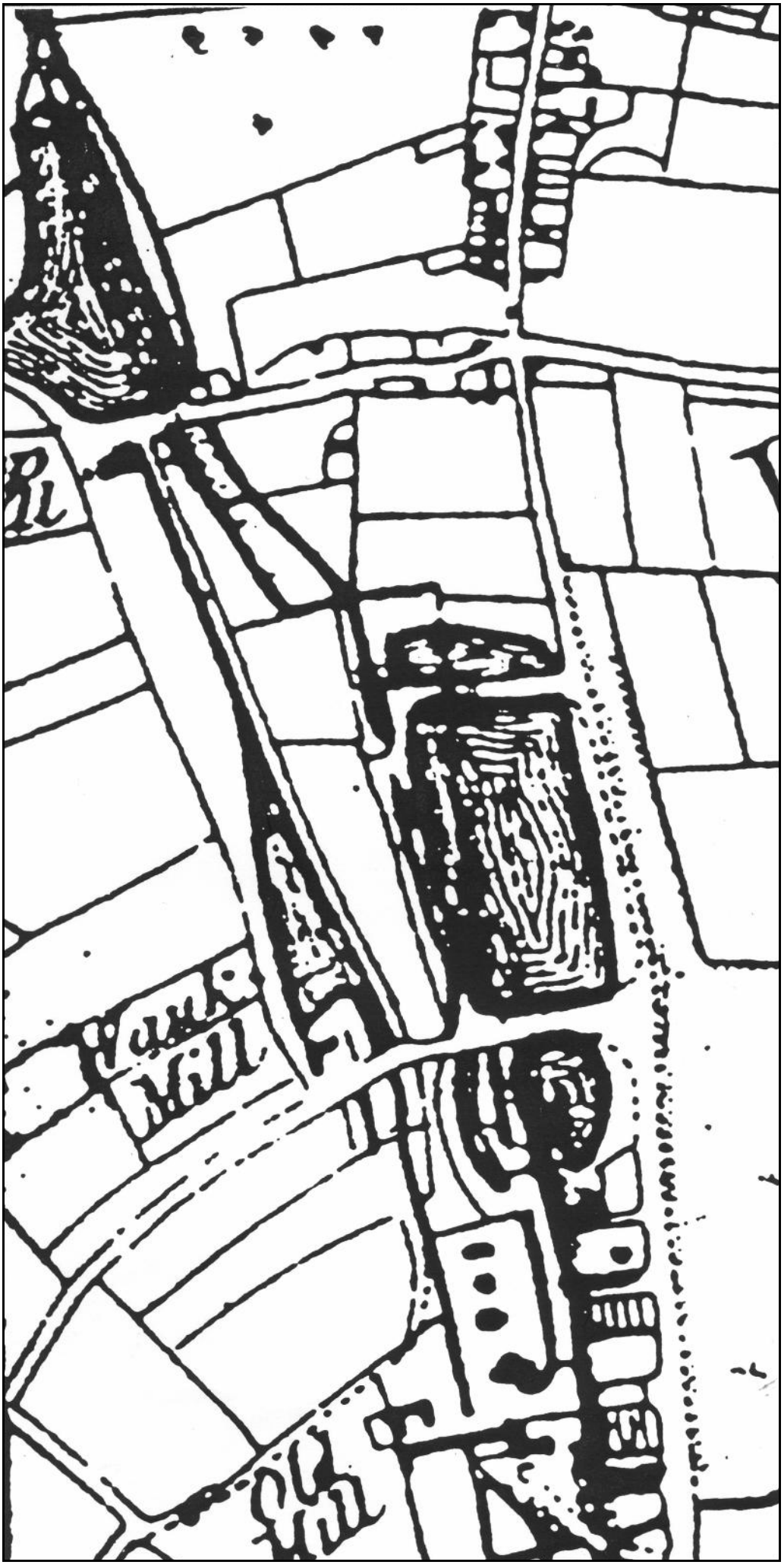

Fig. 4 Part of Sanderson's 'Map of the County Twenty Miles Round Mansfield', published in 1835, here showing the three mills and the associated water system to the west of Papplewick.
Scale approx. 1:5000.

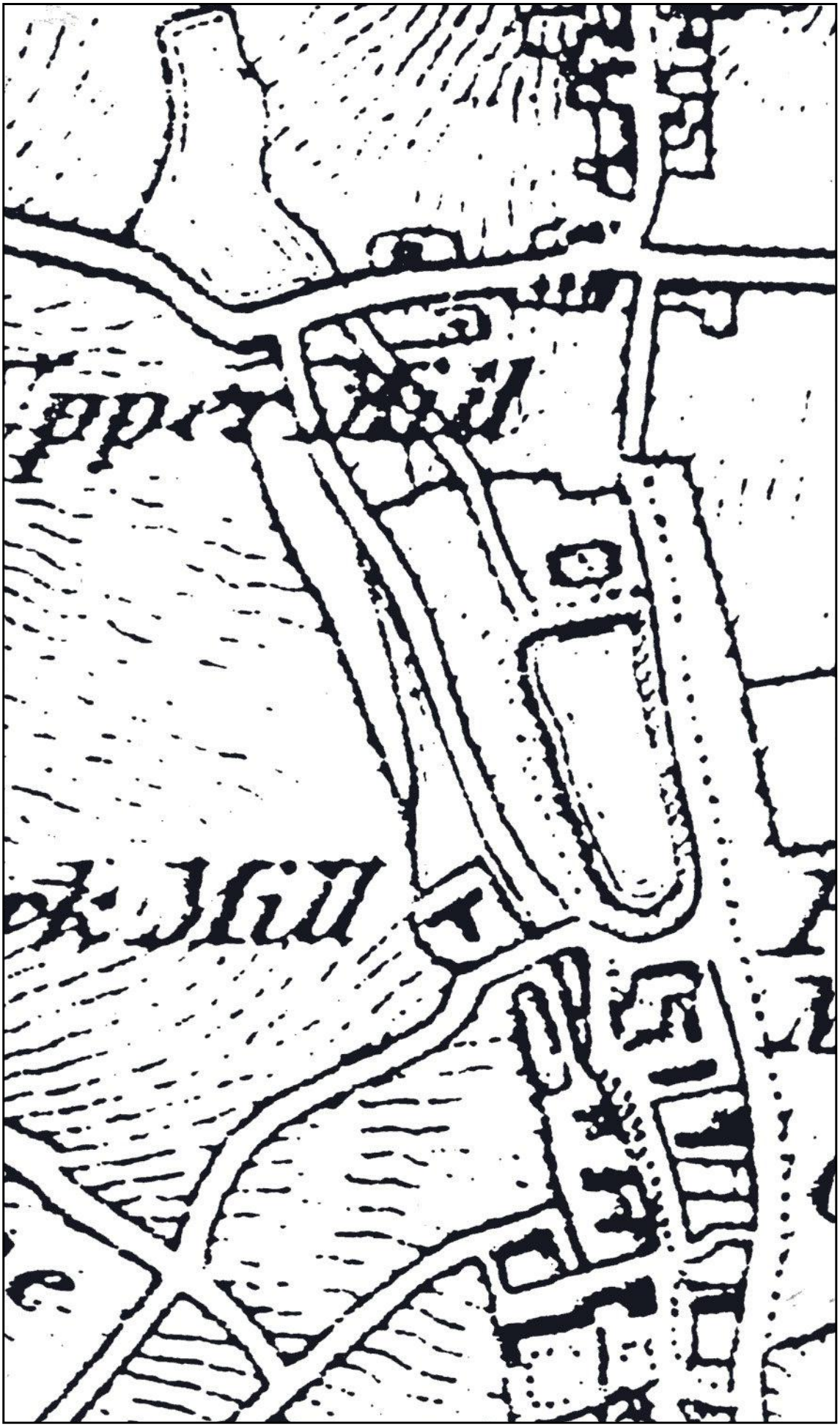

Fig. 5 The area to the west and south-west of Papplewick, as shown on the Ordnance Survey First Edition One Inch map surveyed between 1836-39. Scale 1:5000.

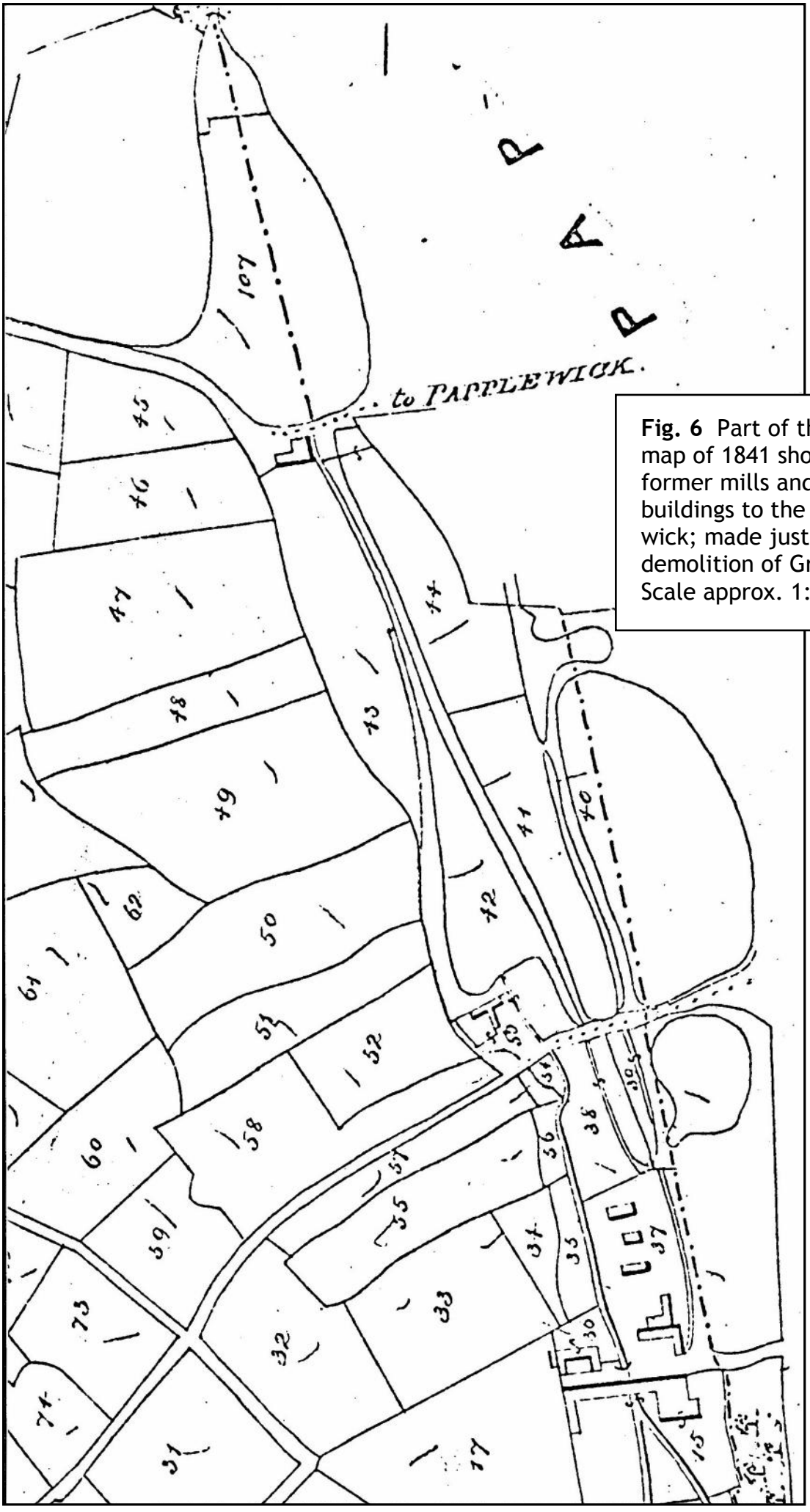

Fig. 6 Part of the Linby tithe map of 1841 showing clearly the former mills and their associated buildings to the west of Papplewick; made just prior to the demolition of Grange Mill. Scale approx. 1:5000.

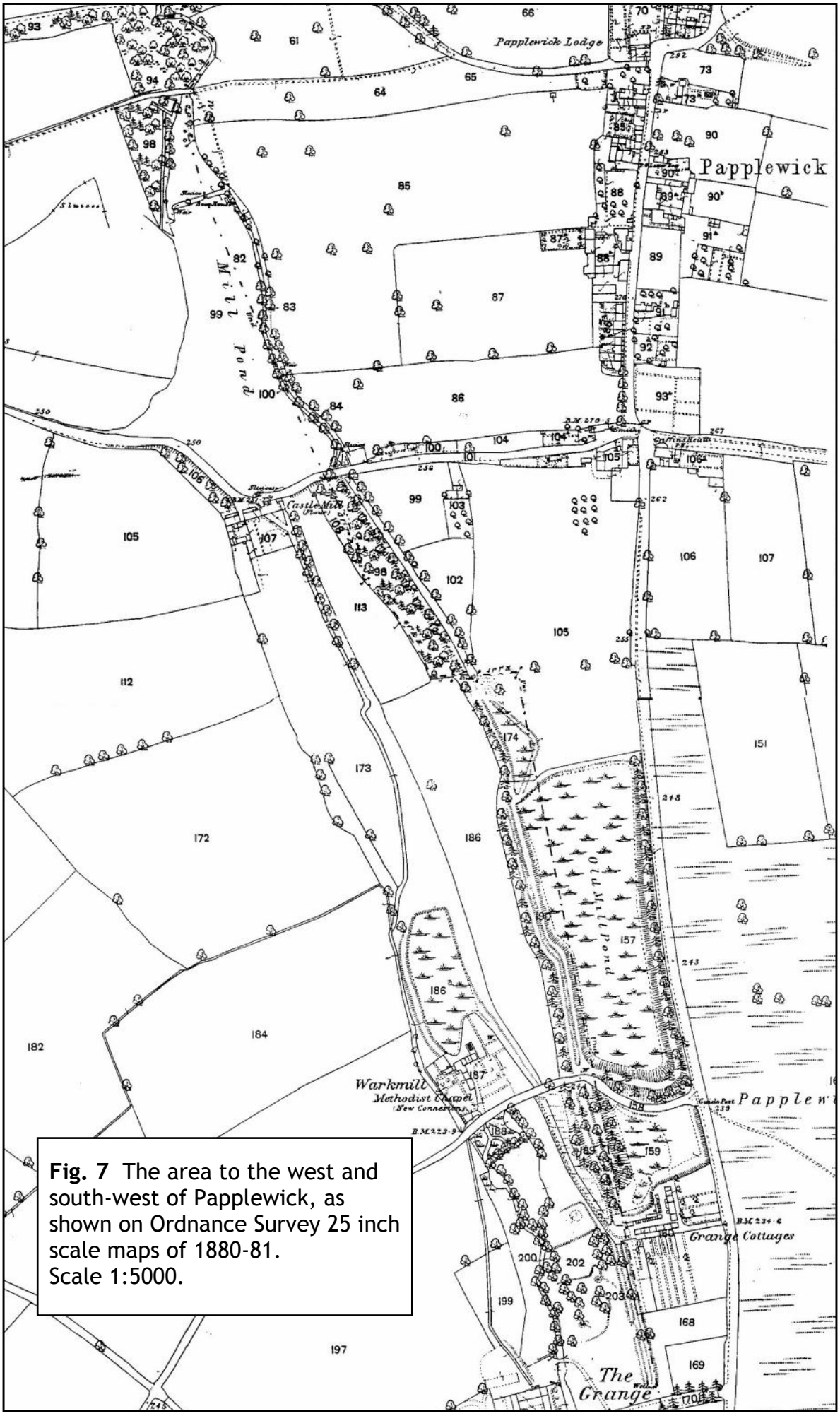

Fig. 7 The area to the west and south-west of Papplewick, as shown on Ordnance Survey 25 inch scale maps of 1880-81.
Scale 1:5000.

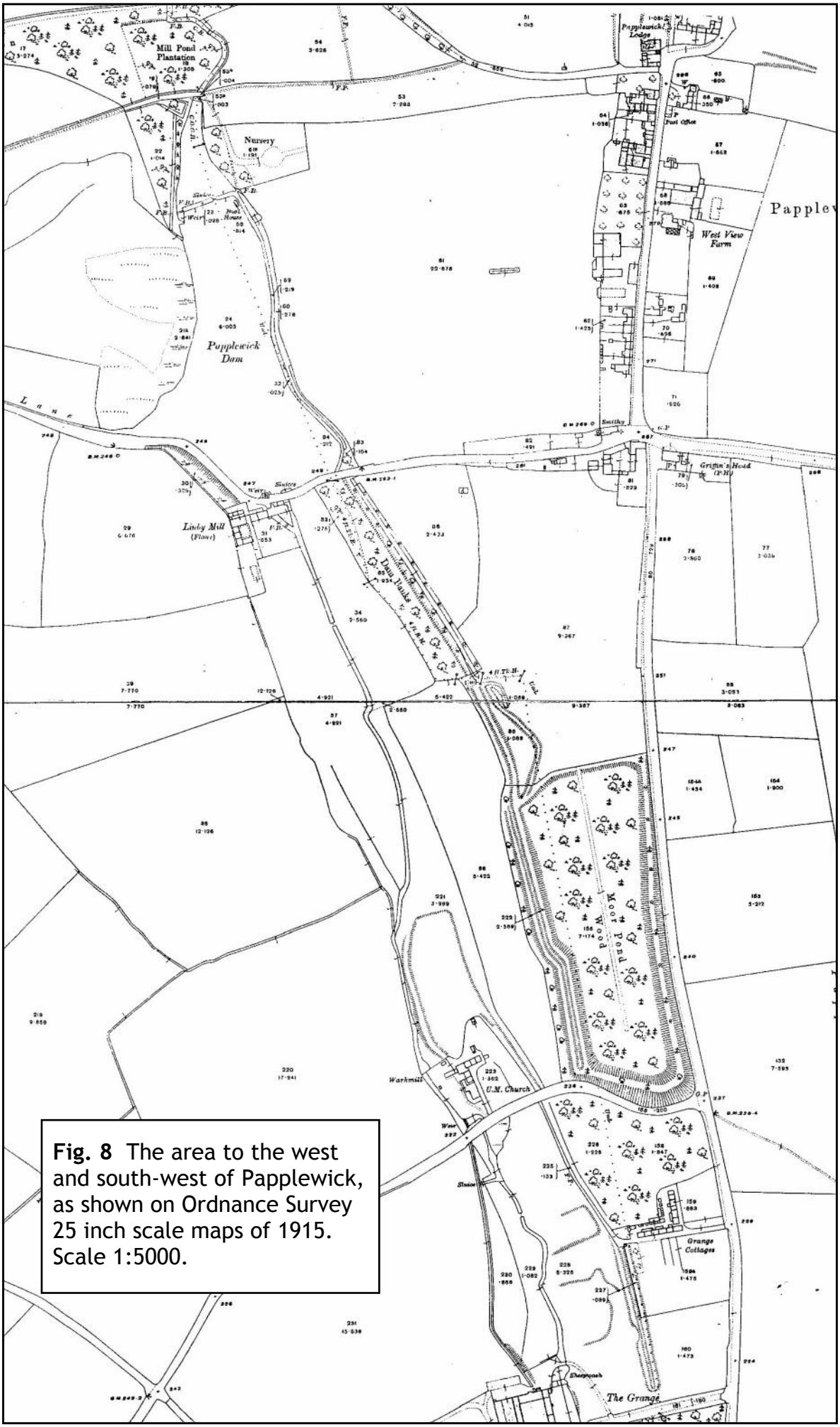

Fig. 8 The area to the west and south-west of Papplewick, as shown on Ordnance Survey 25 inch scale maps of 1915. Scale 1:5000.

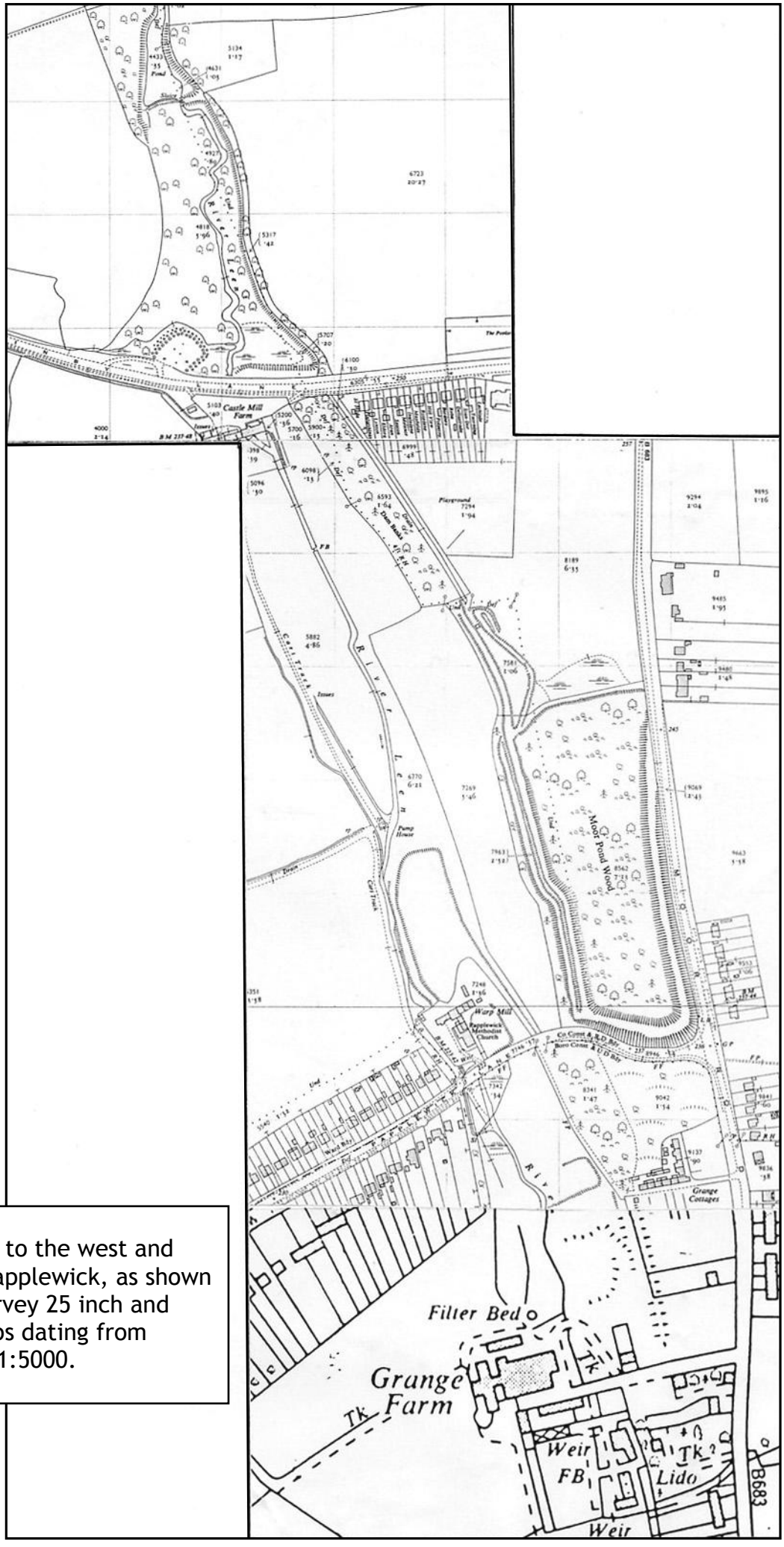

Fig. 9 The area to the west and south-west of Papplewick, as shown on Ordnance Survey 25 inch and 6 inch scale maps dating from 1957-67. Scale 1:5000.

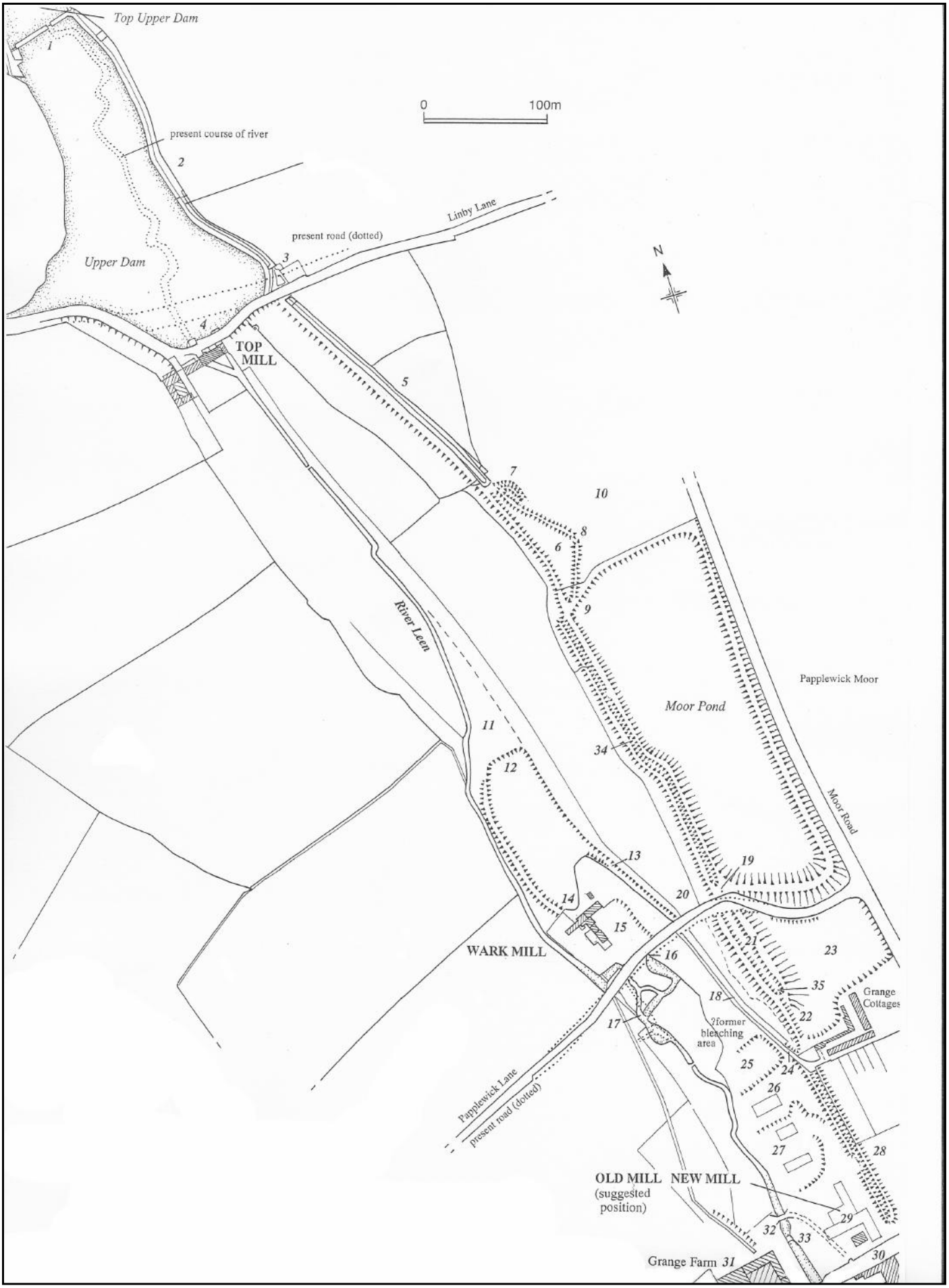

Fig. 10 A composite plan showing the course of the River Leen, the mills, mill ponds and associated banks and leats. Based on the Ordnance Survey plan of 1880-81, it also shows specific features and locations mentioned in text (numbered from ***1*** onwards), changes to the course of the roads and the likely former position of Grange Mill and associated buildings. Scale 1:2500, reduced to fit.

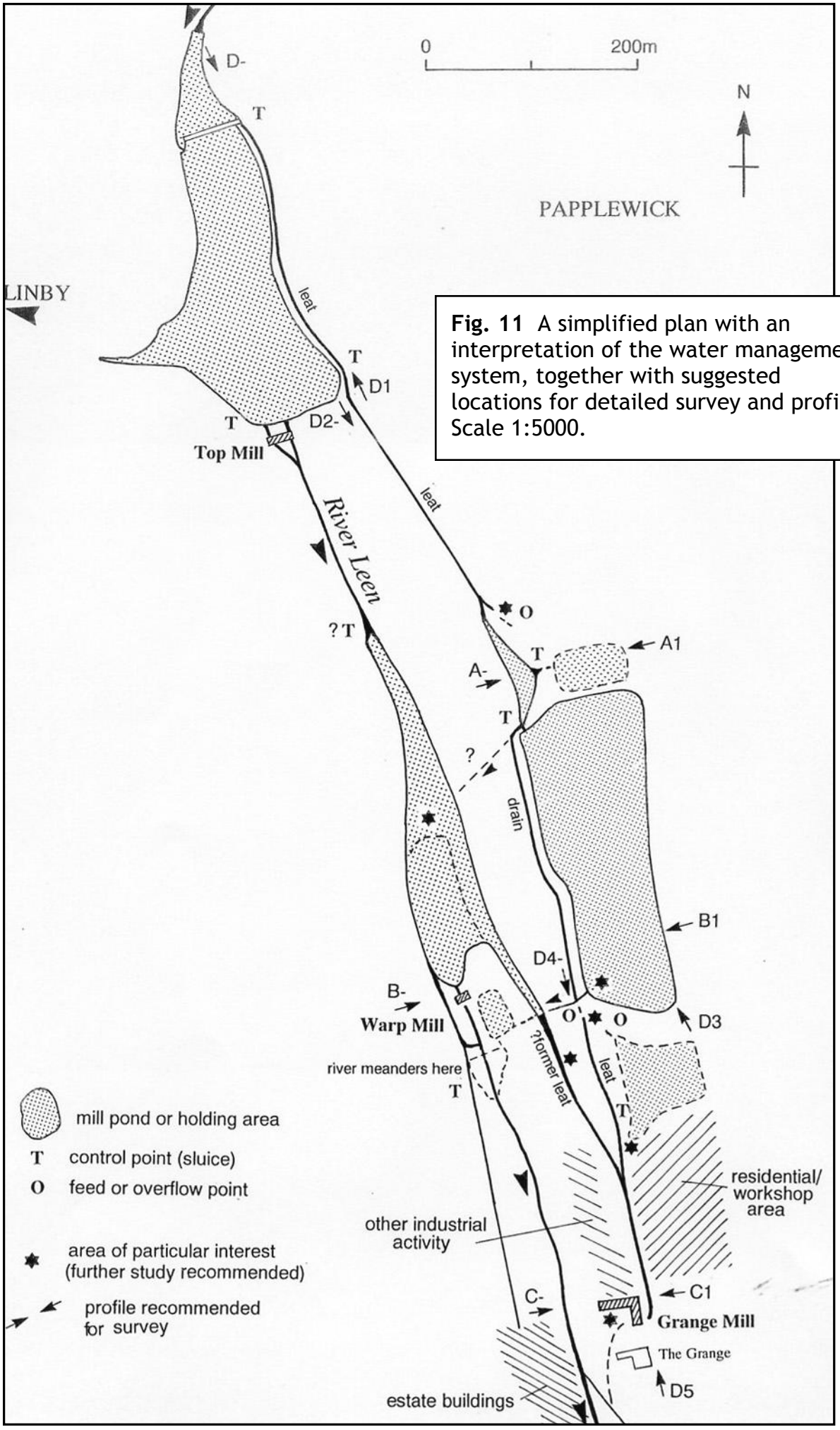

Fig. 11 A simplified plan with an interpretation of the water management system, together with suggested locations for detailed survey and profiles. Scale 1:5000.

Plate 1 A scenic view of Castle Mill and Papplewick Dam taken before the mill pond was drained in the 1940s.

Plate 2

Plate 3

Plate 4

Plates of features of the water system associated with former cotton mills at Papplewick's:
Plate 2: a pronounced double embankment that once carried a leat to Grange Mill view taken in woods north of Grange Cottages); **Plate 3:** the position of a stone-faced sluice (now buried) that controlled water from a small reservoir into the north-west corner of the former Moor Pond; **Plate 4:** stonework at a sharp corner turn of an overflow channel in woods south of Wark Mill.

Plate 5

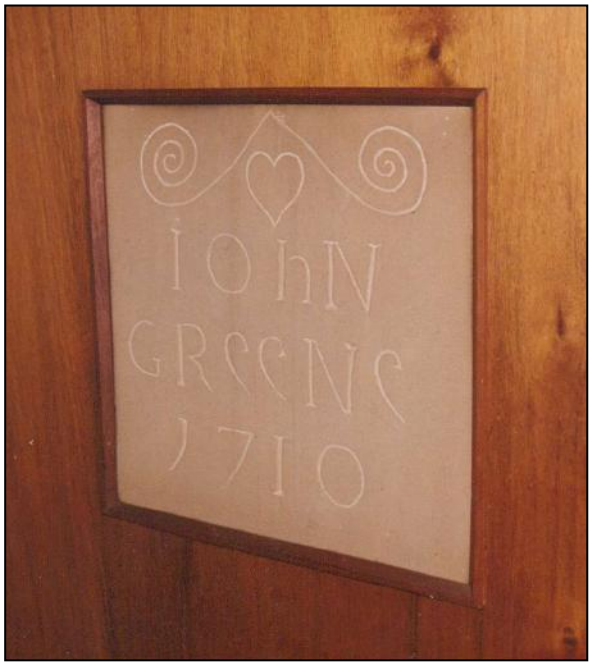

Plate 7

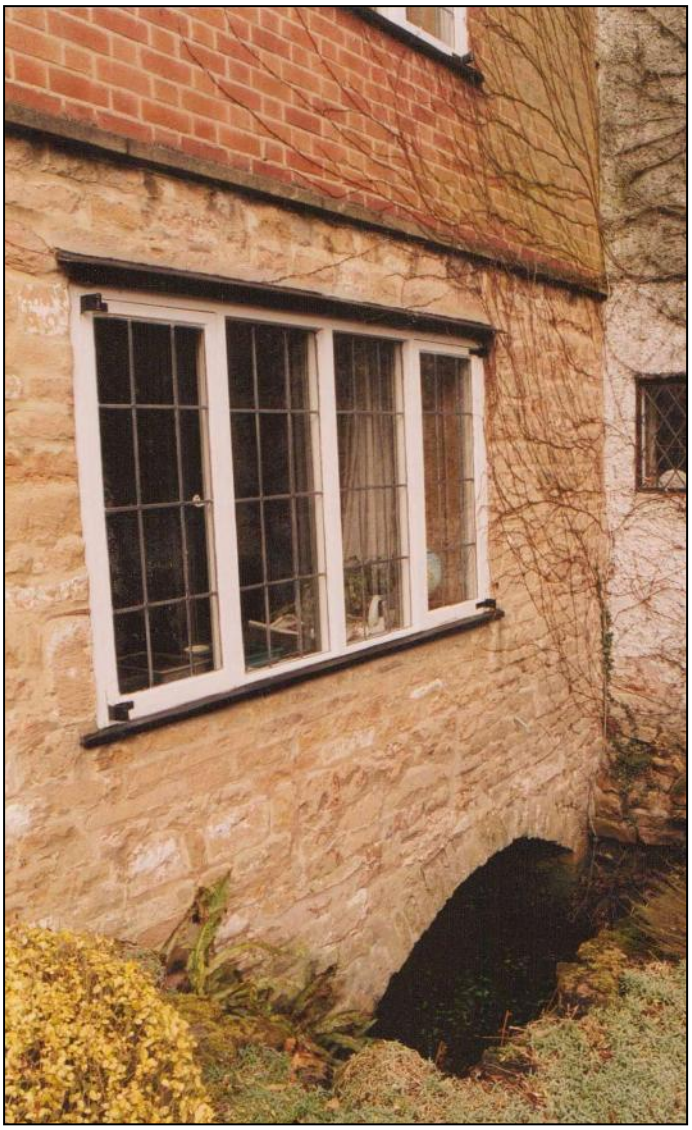

Plate 6

Plates of features at the former Wark Mill, Papplewick: Plate 5: stonework that once funnelled water from the pond north of the mill, to the mill's water-wheel; **Plate 6:** the arched top of the mill channel running beneath the present building; **Plate 7:** a date-stone for the former Green's Mill bearing the date 1710.

Plate 8

Plate 9

Plate 10

Plate 11

Plates showing the area of the former Grange Mill at Papplewick:
Plate 8: the height of the leat to the mill in relation to the lower land by the River Leen (left of the picture); **Plate 9:** the river with, to right, the position of the former mill, the leat earthworks and a row of workers' cottages; **Plate 10:** position of a sluice-gate and an off-shoot channel to the sheepdip; **Plate 11:** a distinctive bridge over the River Leen that once served the mill.