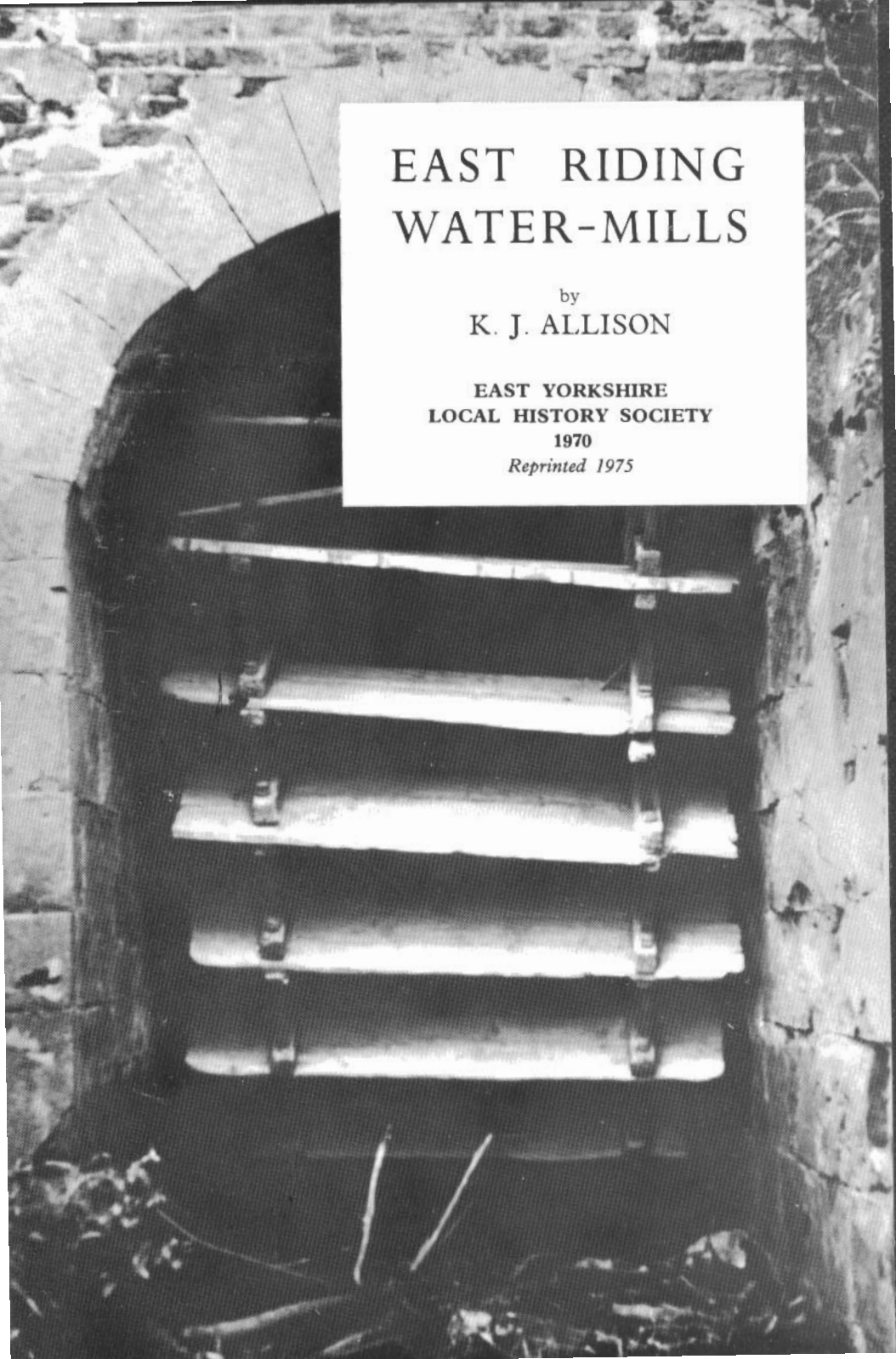

EAST RIDING WATER-MILLS

by

K. J. ALLISON

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Cover Illustration: One of the water-wheels at Sutton upon Derwent mill

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Editor, Victoria History of the East Riding of Yorkshire

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Preface

During 1967 and 1968 a survey of the water-mills in the riding was undertaken by a group of members of the East Yorkshire Local History Society and the East Riding Archaeological Society. The sites of all the mills that still existed in 1850 were visited and standard record sheets were completed; in addition, many photographs were taken, some measured drawings were made, and detailed reports were prepared for those mills which still retained much of their machinery. Further information was collected from documentary sources in the East Riding and Public Record Offices, and from books, newspapers, and maps.

The full survey is available for consultation, but an attempt is made in this booklet to present some of the results. A general historical account of water-mills in the riding is given in Section I; the results of the survey are analysed and discussed in Section II; and Section III comprises a gazetteer of mills with brief details of each.

The members who took part in the survey were: Mr. and Mrs. R. T. Addy, Dr. K. J. Allison, Mr. and Mrs. R. A. Bellingham, Mr. and Mrs. K. R. Bradfield, Mr. and Mrs. R. C. Bygott, Mr. M. Charlesworth, Mrs. J. D. Dawes, Miss M. Holt, Mr. M. Jenkins, Mr. R. Jessop, Mr. and Mrs. E. S. Laurisch, Mrs. E. M. Moore, Mr. J. M. N. Moss, Mr. D. R. J. Neave, Mr. E. J. Putnam, Mr. J. S. Stanley, Mr. and Mrs. R. E. Thistleton, and Mr. H. S. Welburn. Most of the photographs were taken by Mr. Moss and Mr. Thistleton, and the drawings and detailed reports were prepared by Mr. Thistleton.

We are greatly indebted to the owners and occupants of mills who kindly gave permission for visits to be made and who provided valuable information and advice. Thanks are also due to Professor R. B. Pugh, general editor of the Victoria County History, for permission to draw freely upon material collected for a forthcoming volume of the History, and to Dr. Jennifer Tann and Mr. K. H. Rogers, who kindly read and commented upon the manuscript of this booklet.

I

Water-mills in the East Riding

The Middle Ages

It is possible that water-mills were introduced into this country by the Romans, but the first known reference to such a mill comes much later, in the 8th century. A water-mill in Kent is recorded in the year 762 and others are known from the 9th century. Their use became widespread during the centuries of Anglo-Saxon and Scandinavian settlement, and it seems likely that by the Norman Conquest water-mills had largely replaced both hand-mills and horse-mills in some parts of England. Well over 5,000 water-mills are recorded in the Domesday Survey in 1086, more than 100 of them in Yorkshire.[1]

Running water had obvious advantages as a source of power for grinding corn. Some hand-milling was, nevertheless, still practised long after 1086, and horse-mills are recorded in the East Riding, as elsewhere, for many centuries. Some of these examples of horse-driven corn mills will be noticed later. The dominant position of the water-mill was, moreover, challenged as early as the 12th century by the windmill. It is often said that the firsr known documentary reference to a windmill in England is to a mill in Suffolk in 1191, but an even earlier example is recorded in the East Riding—at Weedley —in 1185.[2] Windmills subsequently became common in some parts of the riding, but in others it was many years, as will be seen, before they usurped the position of the water-mill.

For the East Riding, then, the story of water-mills begins in 1086. The number of mills mentioned in Domesday Book is 42, but there may have been others that went unrecorded. These mills were situated in at least 30 villages; it is impossible to be more precise because some of the mills occur in composite entries which cover several villages. There are, for example, three mills in the composite entry for Welton, Ellerker, Walkington, Hunsley and Yokefleet, and they may have been in one or more of those places. In most of the villages concerned there was only a single mill, but in a few cases there were two, three or even four—two in Easthorpe, for instance, three in Beverley, and four in Newbald. Finally, in addition to the 42 mills that were in use there were also two mill sites mentioned in Domesday—sites that were still valuable, for a wheel could readily be constructed to use the head of water which had been created there.[3]

[1] R. Bennett and J. Elton, *A History of Corn Milling*, vol. ii (1899) p. 97; R. Lennard, *Rural England*, 1086-1135 (1959), p. 278; H. C. Darby and I. Maxwell, *The Domesday Geography of Northern England* (1962), pp. 72, 150, 222.

[2] Bennett and Elton, *Corn Milling*, vol. ii, p. 235; B. A. Lees, *Records of the Templars* (1935), p. 131.

[3] Darby and Maxwell, *Domesday Geog. N. Eng.*, pp. 221-2; F. W. Brooks, *Domesday Book and the East Riding* (E. Yorks. Loc. Hist. Ser. 21) (1966), p. 35.

Domesday mills are generally regarded as having been distinct buildings, so that a place like Beverley would have had mills at three separate sites. It is possible, however, that the Domesday commissioners used the term 'mill' to describe not the building but the pair of grinding stones inside it. If this were true, the number of East Riding water-mills might be reduced to as few as 30, and several of them would have contained two or more pairs of stones. For the Domesday Survey this interpretation is only a possibility, but it will be seen later that other medieval records certainly did refer to several 'mills' in a single building.

Despite the uncertainty about the exact location of Domesday mills caused by composite entries, these early water-mills were clearly concentrated on the faster and more reliable streams in the riding. Most of the mills lay in two arcs on either side of the Wolds: one around and below the north- and west-facing escarpment, where the streams moved swiftly towards the Vale of York and the Vale of Pickering, and the other on the lower slopes of the Wolds to the south and east, where the chalk streams flowed towards the River Hull. The distribution of Domesday mills is, in fact, very similar to that of the mills that survived in 1850.[4] For two or three centuries after 1086, however, it seems likely that water-mills became more widely distributed over the East Riding. Even a small or relatively slow-moving stream could be adapted to drive a water-wheel, and there were mills high on the Wolds and on the Plain of Holderness. In the 14th century, for example, there was a water-mill at Wharram Percy on a small stream which, like many others on the High Wolds, may have been highly variable in its flow. The gradual abandonment of mill sites in such areas as this was no doubt partly the result of the increasing popularity of windmills, but some sites probably proved to have been simply badly chosen. Most of the water-mills that survived into modern times were, therefore, those which enjoyed the natural advantage of a good stream. In one case, that of Foston on the Wolds, it has been suggested that the advantage was not natural but man-made. There was a mill at Foston in 1086 and it is possible that it used a head of water that was created by the deliberate diversion of Kelk Beck during the period of Danish settlement.[5] Given a good stream, successfully adapted to drive a wheel, the same mill sites often remained in use for centuries, the mills themselves being rebuilt whenever necessary.

Medieval records make it clear that water-mills were normally the property of lords of the manor, and indeed they alone had the means to establish mills and successfully maintain them. It was, in the first place, an expensive business to adapt a stream and to build and constantly refurbish a water-mill. Again, only lords of the manor

[4] Compare the map in Darby and Maxwell (p. 223) with Figure 1 below.

[5] June A. Sheppard, 'A Danish River Diversion', *Yorks. Archaeological Journal*, vol. xl, pp. 58-66.

had the legal right to draw water from the streams. And it was the same landlords who were able to command sufficient supplies of corn to justify the building of a mill and to make it profitable. Large quantities of corn were ground for the manorial household, and lords of the manor were able to oblige their tenants to take their corn to the lord's mill and to pay for the privilege of having it ground.[6]

Not all mills, of course, were kept in hand as part of the manorial demesne and operated by millers who were servants of the manor. Many were let out to tenants, a practice which became increasingly common during the Middle Ages, and eventually some were separated from the manor and sold. Nor were all mills owned by lay landlords, fot many were given, like other manorial property, to religious houses; Meaux Abbey, for example, came to possess a number of East Riding water-mills. But when mills were let, sold or granted away, they were rarely separated from the all-important water rights or from the obligation of tenants to take their corn to be ground. Water rights and tenants' obligations are two constantly recurring themes in the story of East Riding water-mills throughout the Middle Ages, and beyond.

These manorial rights were never embodied in any statute law, but they hardened into a strict manorial custom. Lords of the manor had the sole right to build mills; they were able to prevent other mills from being built; they compelled corn to be ground on the manor and not to be taken to other mills in the neighbourhood; and they tried, with varying degrees of success, to prevent the use of hand-mills in tenants' houses. The custom was known as 'mill soke', and tenants who owed 'suit of mill' were obliged to pay toll, or 'multure', for the grinding of their corn.

There are several early examples of the operation of mill soke in the East Riding. Two water-mills at Lockington and another ar Birdsall, for instance, were given to Meaux Abbey by Sir Peter Mauley in 1235-49; with them went the suit of 22 bovates of land and 9 cottages at Lockington, and of 16 bovates and 15 cottages at Birdsall, and in each case the tenants were bound to pay one-sixteenth of their corn in multure. Gifts of a mill at Warter to Warter Priory and of a mill at Thorpe le Street to Swine Priory, both in the later 12th century, were similarly accompanied by the right to take multure.[7] In 1343 suir was owed to the mill at Kirkburn by the villeins of Tibthorpe, but the lord of the manor of Tibthorpe was alleged to have stopped them from carrying it out. No reason for his action is recorded, but it is possible that he was trying to establish a mill of his own in Tibthorpe. At Skerne the water-mill belonged to Watton Priory and suit was owed to it by the tenants of Meaux

[6] 'The Advent and Triumph of the Watermill', in *Land and Work in Medieval Europe:* selected papers by Marc Bloch, translated by J. E. Anderson (1967), pp. 150-2.

[7] *Early Yorks. Charters*, vols. xi (1963), p. 193; xii (1965), p. 112.

Abbey's land in the village, who paid multure at a twentieth measure. An attempt was made by the abbey in 1310-39 to build a windmill at Skerne, but the priory successfully invoked its mill soke and the windmill was removed.[8] A 12th-century grant by the owner of Stamford Bridge mills serves as a reminder that a lord of the manor could, and sometimes did, excuse his tenants from suit of mill or from paying multure.[9]

Tenants were bound to take their corn to the manorial mill, but once there it not surprisingly yielded precedence to corn from the manor-house. The lord expected his corn to be ground first, and tenants' corn already in the hopper would be removed to make way for it, a privilege sometimes referred to as grinding 'hopper-free'. The lord, moreover, did not expect to pay multure: he was 'toll-free' as well. Only one East Riding example has been found to illustrate these aspects of manorial custom. At Wilberfoss the water-mill belonged to the local priory, and no doubt the inhabitants of the village owed suit to it. But corn from the manorial demesne was excused from the paymenr of multure and in 1276 Simon de Wilberfoss was seeking a renewal of this exemption from a reluctant prioress.[10]

The theme of water righrs may be taken up from other early references, concerning the water-mills at Wharram le Street and Scorborough. At Wharram it was again Meaux Abbey which held the mills—two water-mills and the sites of two others—in this case on lease from the lord of the manor. Together with the mills Meaux had the right to 'all the course of water descending . . . under the mills, to make a pond three feet high'. That was in 1235-49. A grant of the mills at Scorborough, at a similar date, gave the same kind of assurance about the water supply; not only was suit of mill included in the grant, bur so was 'the free flow of water both to and from rhe mills'.[11] Legal right to water was one thing, but an adequate supply from the stream was another, and this no manbrial custom could ensure. Meaux Abbey is unlikely to have experienced difficulties at either Birdsall or Lockington, one just below the Wolds escarpment and the other on the eastern slopes of the Wolds, and it is significant that mills at both these sites survived even into the 20th century. Elsewhere, however, on the High Wolds and in Holderness, Meaux was less fortunate. Despite the grant of water at Wharram, the mills were not a complete success and by 1286-1310 the abbey was paying a reduced rent for them; water shortage may well have been the reason. At Dringhoe and at the site of the abbey itself it certainly

[8] *Chron. de Melsa* (Rolls Ser.), vol. i (1866), p. 317; vol. ii (1867), pp. 60, 305; vol. iii (1868), p. 32; *Year Book*, 17-18 *Edw. III* (Rolls Ser.) (1903), pp. 279, 333, 365.

[9] *Early Yorks. Charters*, vol. xi (1963), p. 23.

[10] *Monastic Notes*, i (Yorks. Archaeological Soc. Record Series 17) (1895), p. 226.

[11] *Chron. de Melsa*, vol. ii, p. 62; *Percy Chartulary* (Surtees Society 117) (1911), p. 65.

was the reason. In 1235-49 Meaux complained that the water-mill at Dringhoe was decayed because water was diverted from it in summer and because the flow did not increase in winter, as it had done in the past. A little later, new mills had to be built on the River Hull because the water-mill at the abbey suffered from lack of water. And Meaux experienced similar difficulties with its mills at Newland, on the opposite bank of the River Hull.[12]

The building of mills close together also created difficulties. At Little Kelk, for example, mills belonging to Bridlington Priory and those of another proprietor stood close together, and the priory received the other owner's assurance, in the late 12th century, that he would build no more mills on the intervening stretch of the stream.[13] In such cases the raising of the water level at one mill might easily so reduce the head of water at the next mill upstream that the wheel there could not turn; the wheel was put 'into back-water'. The working of the next mill downstream was likely to be hindered as well.

The possession of water rights, nature permitting, ensured to the mill-owner an adequate supply to drive his wheel, but it also brought him into conflict with the owners of land beside the streams. To provide a head of water at the mill site it was necessary to embank the streams, and if sufficient means were not provided to carry the overflow past the mill there was a constant danger of flooding. It is clear that, especially in winter, the danger was not always avoided. The mills built by Meaux Abbey in 1249-69 on the River Hull, for example, resulted in the flooding of adjoining land, and flood-gates had to be provided to prevent it. And two centuries later a miller at Newland, working for the lord of one of the manors in Cottingham, was fined in the manorial court for allowing the water in his dam to overflow. For the miller himself, moreover, a surfeit of water might be as damaging as a shortage, and the miller at Nafferton in 1257 was fortunate in that the lord of the manor agreed to allow him compensation if the mill 'be burnt or drowned'.[14]

The situation at Nafferton raises the question of responsibility for the upkeep and repair of mills. It was normally the case that the lord of the manor, as owner of the mill, maintained the actual structure and that the miller, as tenant, kept in it repair—often receiving timber from his landlord when necessary. The owner was sometimes also responsible for repairing flood damage, as he appears to have been in some degree at Nafferton, and perhaps also war damage, a factor which would have been of significance in those parts of Yorkshire ravaged by Scottish raids in the Middle Ages. There is, however, little medieval evidence from the East Riding

[12] *Chron. de Melsa*, vol. i, pp. 227, 313, 371; vol. ii, pp. 49-50, 82-4, 224.

[13] *Bridlington Chartulary*, ed. W. T. Lancaster (1912), pp. 164-5.

[14] *Chron. de Melsa*, vol. ii, pp. 82-4; *Percy Chartulary*, p. 42; Cottingham Local History Society, *Journal*, vol. i, no. 3, p. 12.

concerning the repair of water-mills, only the arrangements at Lockington throwing any light on the matter. Tenants who owed labour services to the lord of the manor might be obliged to carry out work at mills, and so it was at Lockington in 1235–49: not only did they owe suit to Meaux's mill but they also had to clean out the mill pond once a year.[15]

From the 16th to the mid-19th Centuries

During the Middle Ages it seems likely that the owners and occupiers of water-mills were normally able to uphold their water rights and to maintain the customary mill soke, even if unwilling tenants had sometimes to be taken to court. With the decline of the manor in the later Middle Ages, however, and the gradual weakening of manorial customs of all kinds, the observance of mill soke became increasingly irksome and increasingly resisted. The leasing and sale of mills, separated from their manors, made resistance easier, and the suppression of the East Riding monasteries in the 1530s contributed to the decay of the old order. A number of water-mills remained in the possession of religious houses right up to the Dissolution—Meaux Abbey, for example, still had Lockington and Birdsall mills in 1535[16]—but after being seized by the Crown the mills were repeatedly let and eventually sold. Mill soke would be included in the leases and sales, but a manorial custom carried less weight once the manor was no longer a force in the village.

Soke rights were certainly still attached to the mills that were being let and sold during these centuries. It was so, for example, at Nafferton. The manor, with the water-mill, had in the Middle Ages belonged to the Percy family, but in 1537 the Percy estates in Yorkshire passed to the Crown. In 1544 Nafferton manor was granted to Matthew, Earl of Lenox, and his wife, but it returned to the Crown when their grandson became James I. The estate was subsequently split up and the mill was let separately from the manor in 1602 and again in 1607, before being sold outright in 1610; and each time the mill soke and multure belonging to the mill were explicitly mentioned. Similarly at Great Kelk, in the 17th and 18th centuries, the water-mill was let with 'the soke, multure and toll'.[17]

Examples are not lacking of the continued use of other medieval milling customs. Lords of the manor might, for instance, still agree to maintain the mill buildings for their tenants. The lord of Settrington manor let the water-mill there in 1600 and in doing so he agreed to provide mill-stones when they were required, as well as materials

[15] *Chron. de Melsa*, vol. ii, p. 60.

[16] *Valor Ecclesiasticus*, vol. v. (1825), p. 108.

[17] Public Record Office, C 66/1576, m. 8; 1736, m. 21; 1821, m. 1; East Riding Record Office, DDSQ (2), box 1.

for the repair of the mill. And when Great Kelk mill was let in 1701, by an owner who was no longer the lord of the manor, the miller was obliged to repair the mill, mill-house and watercourses, but the owner still bound himself to supply the 'great timber' that was needed. Again, landlords might still expect the inhabitants of a village to provide labour for work on the watercourses of a mill. At Cottingham, South Mill belonged to the manor of Cottingham Westmoreland, which in 1628 was in the hands of the Crown; the mill was suffering from the neglected state of the beck which supplied it with warer, and in that year the inhabitants of various parts of the village were held to be responsible for cleaning different sections of the beck.[18]

Medieval lords of the manor had expected precedence for the grinding of their corn, and this custom, too, was not entirely abandoned. At Nafferton in the 17th century the occupants of the manorial demesne still had their corn ground first— 'next to the hopper', it was said—followed by the freeholders, then the tenants and finally by strangers from outside the village.[19]

In these centuries, then, villagers still owed suit to mills and still had to pay multure for the millers' work. No doubt the payment of multure in kind—a proportion of the corn—was often replaced by payment in money, as at Beverley in 1625, where the water-millers would accept 2d. a bushel for grinding as an alternative to payment in kind. But more and more, as time went on, tenants were unwilling suitors at the mills. Nafferton again well illustrates events. After the water-mill had been sold by the Crown it came into the possession of Thomas and John Pearson in 1630; two years later the new owners were obliged to seek redress in the Court of Exchequer against Nafferton people who ignored the mill soke and took their corn instead to the water-mills at Wansford, Ruston Parva and Little Kelk. The Pearsons were presumably successful, for in 1679 Sir Matthew Pearson was bringing a similar lawsuit against twelve inhabitants of Nafferton. We are not told why suit of mill was withheld here. The mill-owners, it was said, were obliged to provide a 'competent' miller, but he may have been inefficient or perhaps exorbitant in his charges for multure. There was certainly an abundance of competition from other mills in the area.[20]

Rival millers also found the old customs increasingly irksome. A Cottingham man, for example, built a horse-mill to grind corn and malt, but manorial custom was too strong for him, the stronger no doubt for the Crown's ownership of the manor, and in 1639 the exclusive soke right of South Mill was upheld. In other cases the competition was from windmills. At Beverley in 1625 Sir Michael

[18] *Survey of Settrington* (Yorks. Arch. Soc. Rec. Ser. 126) (1962), pp. 100-3; E.R.R.O., DDSQ (2), box 1; P.R.O., E 178/5752.

[19] P.R.O., E 134/8 Chas. I East./1.

[20] P.R.O., E 134/1 Chas. I Trin./1; E 134/8 Chas. I East./1; E 134/31 Chas. II Mich./20.

Wharton, who owned the three water-mills in the town, took to court three men who had 'some years' previously built Westwood windmill. Wharton alleged that competition from the windmill had left the water-millers short of work and forced them to let much of their water go; and he maintained that the water-mills could more than cope with the needs of householders and bakers in the town, even when Westwood mill and another windmill at Molescroft were not working. Witnesses for the defendants thought otherwise. Beverley people, it was stated, could not rely on the water-mills and had to go elsewhere to get their corn ground. One witness said he had known ten horse-mills and two windmills used by the inhabitants of the town, though he admitted that the horse-mills had gone out of use a few years earlier. In addition to the still-existing windmills at Westwood and Molescroft, he remembered others at Leconfield, Weel and Thearne, as well as a mill—perhaps the water-mill—at Watton, all of which had sometime been used by Beverley people. The position was worsened, in the opinion of the same witness, by the fact that tenants at Thearne, Weel and Woodmansey all owed suit at the Beverley water-mills and put an extra strain on their grinding capacity.[21]

Whatever truth the court may have found among the assertions of rival witnesses, two things are clear: the old custom of mill soke was weakening in Beverley in the 17th century, and windmills were providing strong competition to the ancient water-mills of the manor. As another witness, a local millwright, put it: 'if they be suffered to build windmills as they have already begun, they may as well pull up the plaintiff's [water-] mills'. There was clearly, too, still some grinding done at horse-mills; there are other references to such mills at Hedon in 1576, for example, and at North Dalton in 1599.[22]

While the battle to maintain rights of mill soke was slowly being lost in the 16th and 17th centuries, water-mill owners and their lessees were also finding it increasingly difficult to maintain their water rights. More and more they seem to have been in conflict with the owners of adjoining land, with drainage interests, and with highway authorities, as well as with fellow water-millers using the same streams. The build-up of water in mill dam or race always brought a threat of flooding to the adjoining land. When a new mill was built at Driffield about 1580, its weir so raised the river level that nearby meadows were flooded; water from the dam at Walbut Mill, at Thornton, overflowed into the Foulney River, which was already heavily burdened with drainage water, and the miller was ordered by the commissioners of sewers in 1664 to construct an overflow channel round the mill; at Beverley in 1711 water over-

[21] Cottingham L.H.S. *Journal*, vol. i, no. 3, p. 10; P.R.O., E 134/1 Chas. I Trin./1.

[22] P.R.O., E 134/1 Chas. I East./3; E.R.R.O., DDHA/19/88; DDLA/19/64.

flowing the mill dam was said to have damaged the adjoining highway and to have run into the common land called Figham; and at Cottingham in the early 18th century the miller of South Mill was obliged to repair the tail-race to prevent flooding.[23] Differences between miller and miller were also involved in the late-16th-century dispute at Driffield: water held back by the new mill's weir was alleged to have put the water-wheel 'into back-water' at the old-established Bell Mills, a little way upstream. Water was indeed a ubiquitous problem. It also found its way into the complicated dispute between Sir Michael Wharton and the windmill builders at Beverley, though like all else in that dispute it brought disagreement from the witnesses. For Wharton it was alleged that his water-mills suffered from the neglect of Beverley Beck by the inhabitants; for his opponents it was said that the water-mills were out of action at different times of the year on account of water shortage—or conversely because of flooding.

The water-miller might have to keep a constant watch on the level of his water and the state of his watercourses, but it is unlikely that difficulties over water rights were alone responsible for the closure of many mills during this period. His right to use water could not be denied and, so long as the water-mill had a function to fulfil, those rights were indeed protected. If the water supply was temporarily withdrawn from a mill, for example, the miller might expect compensation: at Cottingham, in 1700, it was provided that if South Mill stood idle for six days while the beck was cleaned out, then 6*s.* 8*d.* would be paid to the miller. And if the miller himself needed to repair his race or dam he might expect assistance: at Foston on the Wolds, when the open fields were enclosed in 1780, it was provided that the miller might divert the beck into a drainage ditch, for 'reasonable periods', whenever he needed to repair the mill or scour the beck.[24]

These, then, were some of the difficulties which faced water-millers in the 16th, 17th and 18th centuries. Some mills were certainly forced to close by the decay of mill soke, by competition from other types of corn mill, or by recurrent difficulties over water supplies, and often it must have been a combination of these circumstances which brought the water-wheel to a standstill. It was simply not economic to continue.

In other cases mills were closed by a process of rationalisation: when two or more mills came into the possession of one owner, it might well have been to his advantage to keep only the more efficient of them in operation. This seems to have happened on the estates of

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[23] P.R.O., E 178/2594; E 134/23 Eliz. East./13; June A. Sheppard, *The Draining of the Marshlands of S. Holderness and the Vale of York* (E. Yorks. Loc. Hist. Ser. 20) (1966), p. 17; *Beverley Minute Books, 1707-1835* (Y.A.S. Rec. Ser. 122) (1958), p. 4; Cottingham L.H.S. *Journal*, vol. i, no. 28, pp. 95-6.

[24] Registry of Deeds, Beverley, BB/212/25; Cottingham L.H.S. *Journal*, vol. i, no. 28, p. 96.

the St. Quintin family, which centred on the village of Harpham. By the 18th century the St. Quintins had acquired the water-mills at Ruston Parva, Lowthorpe, Little Kelk, Great Kelk and Foston on the Wolds, all on a six-mile stretch of the same stream. These mills most probably lacked sufficient custom for all of them to be run economically, especially in view of the proximity of other mills at Nafferton and Wansford. This same group of mills had, as we have seen, already been involved in damaging competition as early as the 17th century. The St. Quintins allowed the two Kelk mills to decay: that at Little Kelk between 1695 and 1744, and that at Great Kelk between 1764 and 1842. The other three were retained, and at least two of them were improved. Ruston Parva mill had only one pair of stones in 1796, but it was then recommended that a more powerful wheel should be installed to run two pairs of srones, and the mill was rebuilr on these lines about 1800. Sir William St. Quintin had acquired Foston mill in 1792, and between September that year and September 1796 he spent over £1,500 on its repair and improvement. Ruston, Lowthorpe and Foston mills all continued to be used into rhe 20th century.[25]

It is impossible accurately to chart the decline in water-mill numbers over these centuries because at no point can a comprehensive list of mills be compiled. By the later 18th century, however, maps of the riding begin to show water-mills, though even then there can be no certainty that all the existing mills were marked. In 1772 Thomas Jefferys showed about 50 water-mills on his maps, and in 1787 John Tuke marked 40. Many earlier mills had apparently ceased to exist by this time, among them those at Barmston, Bessingby, Dringhoe, Harpham, Harswell, Kelleythorpe, Kilham, Kilnwick, Kirkburn, Lund, Newland (in Cottingham), Scorborough, South Cave, Sunderlandwick, Thorpe le Street, Wawne, Wharram, Wilberfoss and Wold Newton. Others could certainly be added to this list.

Only with the appearance of the first edition of the Ordnance Survey six-inch map in the 1850s can a complete and reliable list of water-mills be compiled. Several of the mills shown on the late-18th-century maps had gone in the meantime—those recorded by Jefferys at Beeford, Givendale, Londesborough, Market Weighton and Warter, and one of each pair of mills at Beverley and Winteringham, all no longer existed in 1850. There were one or two other mills, moreover, not marked by Jefferys or Tuke, which are known to have been working in the early 19th century, but which had also gone out of operation by 1850; such were the mill at Bishop Wilton and a second mill at Watton. The evidence of the Ordnance Survey maps is not quite exhausted. At Thornthorpe and Nunburnholme the surveyors marked the sites of water-mills, and at Riccall and

[25] E.R.R.O., DDSQ (2), box 1; Registry of Deeds, Beverley, S/77/186; Borthwick Institute of Historical Research, York, R. XIII. 177L.

South Skirlaugh they recorded a 'Water-mill Bridge': no more is known about mills at any of these places.

It is clear that there had been many casualties in the fight for survival, but nearly 60 water-mills were still standing, and presumably working, when the first Ordnance Survey maps were drawn. It is of interest to notice that there were as many as 150 windmills in the riding at that time.[26]

From 1850 to the Present Day

During the second half of the 19th century the number of water-mills remaining at work fell until there were fewer than 50 in 1900. Thereafter the pace of closure quickened. Another dozen had gone out of use by the end of the First World War, and some 18 more by the end of the Second. Fewer than 20 were still working in the later 1940s and most of these came to a standstill before 1967. Four remained at work in that year, but two were powered solely by electricity and were producing animal feed, and a third had been rebuilt as a modern factory mill, powered by electricity and a turbine. The fourth, Low Beck Mill at Norton, was the last of the small country water-mills to survive, though even here the water-wheel was used only to operate the sack hoist and the stones were driven by electricity. Commercial work had already ceased at this mill, and even private milling was given up during the course of 1967. Low Beck Mill still stands as the most complete monument of the water-corn-milling industry in the riding.

The chronology of this decline is necessarily only vague, for it is impossible to pin-point the demise of most mills. In a few cases a precise date is known, but usually we have to rely on the uncertain evidence of directories and local inhabitants' memories. The date when a miller is last recorded in a directory is useful evidence, but it must be borne in mind that out-of-date information is often repeated in one or more editions of a directory. The common description of a man as 'farmer and miller' shows that many mills ceased to provide a full-time occupation for a miller. But a mill might continue to be privately or occasionally used for some years when even a part-time miller is not recorded.

The causes of the decline of water-mills are not far to seek.[27] The development of the modern flour-milling industry has left little room for the small country mill, whether it be powered by water or wind. There are perhaps three main reasons for the inability of such mills to compete with larger, more strategically-placed, mills: the use of more reliable sources of power, the use of rollers in place of mill-stones, and the milling of imported wheat. Less important, but

[26] See Figure 1.

[27] Discussed in H. D. Watts, 'The Industrial Geography of East Yorks.', Hull Univ. M.A. thesis (1964), pp. 77-80.

still significant in certain cases, were continuing difficulties over water arrangements. At Nafferton in 1875, for example, the miller was entreating a landowner to help clean out Nafferton Beck; and at Bridlington in 1870 a miller was in trouble with the local government board because the impounding of water at the mill prevented the free flow of sewage to the sea.[28]

The introduction of steam, oil or gas engines, and later of electricity, to drive corn mills presented a challenge which many water-millers could not meet, either because of the expense involved or because of technical difficulties in carrying out such a conversion. Only about a dozen East Riding water-mills had steam installed to supplement water-power—two at Cottingham, three at Driffield, two at Pocklington, and one each at Foston, Nafferton, Norton and Wansford. It may be noted that one Cottingham mill was not concerned with corn, and that the Nafferton mill was primarily a malting by this time. These dozen were hardly a representative group of small, remote, country mills, and it is clear that proximity to water and rail communications was an important factor in determining which mills should be modernised.

Roller-grinding was the second main reason for the decline of country mills, for it produced a fine white flour which stones could rarely equal. Rollers were introduced into Hull by Joseph Rank, who equipped one mill with them in 1885 and a second in 1891. To the expense and difficulty of making such improvements may no doubt be added the conservatism of the country miller, and rollers are known to have been installed in only four water-mills. Significantly, these were again at Driffield (two), Foston and Pocklington. In 1903 it was possible for an observer to write: 'I know of ten water-mills within a twenty mile radius of Hull and only three of these have roller plants'.[29]

The increasing reliance on imported wheat led to the concentration of milling in the ports or in inland towns, like Leeds, to which the wheat was forwarded after import. At first the growing industry in Hull used numerous windmills. Their number later decreased, but the technical transformation wrought by steam power and rollers led to a great increase in output. Few country mills could handle imported corn, though Bell Mills at Driffield—with the aid of the River Hull and Driffield Canal—certainly did so. The use of imported corn, which was 'hard' compared with home-grown grain, and the installation of rollers were often closely connected, for such corn could not be satisfactorily ground by stones.

The growth of modern milling in towns like Hull, Leeds and York condemned the water-mills of the East Riding to gradual extinction. Competition was also provided by several mills in the riding which

[28] E.R.R.O., DDSY/101/79; L.G.B. Minutes, notebook in Bridlington Public Library, p. 68.

[29] Watts, 'Industrial Geography', p. 78.

were purpose-built to use steam power and later equipped with rollers and electricity. Events at Nafferton well illustrate this aspect of the story. The combined corn mill and malting there was rebuilt in 1840 and had a large water-wheel, which was later supplemented by a steam engine. At nearby Wansford the water-mill also had the advantage of steam as an additional source of power. By the end of the century, however, both these mills had ceased to produce flour and there is little doubt that competition from Station Mills at Nafferton was a crucial factor. A completely new steam-powered mill was built near Nafferton station about 1860 and it was replaced by a larger steam mill, built on the site in 1878 by Mathias Nornabell, who had previously worked the Wansford mill. In 1890 the stones at Station Mills were replaced by rollers and this has continued to the present day as a successful flour mill.[30]

While the advantage of their location enabled a handful of water-mills to participate for a time in the modernisation of the industry, most country mills clearly could not take up the challenge. In a few cases their working lives were lengthened by the use of oil, gas or electricity for power, and in one or two mills a turbine was installed in place of the less efficient water-wheel. Temporary expedients might also be adopted, such as the practice of fitting an outside pulley to take a belt drive from a portable and sometimes casually-hired traction engine; this was done, for example, at Wintringham mill. Few country mills, however, could maintain a sufficiently large-scale business to enable them to survive. In the 20th century it was only the business supplied by local farmers and the dwindling local demand for flour which kept most small mills going. When flour could no longer be economically ground, some water-mills turned exclusively to producing animal feed, but the use of tractors by farmers to mill their own feed helped to make even this uneconomic. Both millers and farmers, moreover, were unable to cope with the complicated mixtures needed for the increasingly sophisticated types of animal feed. Thus the modern flour-milling and feed-manufacturing industries eventually made the country water-mill obsolete. At Wintringham and Sherburn two former water-mills, producing feed with electric power, have survived, and Bell Mills at Driffield provide the sole success story in the field of flour-milling.

Bell Mills have been continually improved and modernised to enable them to compete effectively with modern mills in Hull and elsewhere. The mills were at first powered by two water-wheels and one of these was used until 1937, but the second wheel was replaced by a turbine in 1893. For long the traditional stones were used for grinding—grey stones for barley and maize, to make animal feed, and French stones for flour and wheat meal. In 1882, however, the first rollers were installed and when the plant was again enlarged in 1890 the stones were used only for feed. A dynamo was installed to

[30] Watts, 'Industrial Geography', p. 95.

light the mills by electricity in 1886, and an engine and boiler were provided for steam power in 1893. A larger boiler was installed in 1903 and the mill was again remodelled in 1904. A further remodelling was finished in 1921 and a new engine was acquired in 1928. More improvements followed in the 1930s, when fresh warehouses and a silo were built, and by 1938 the up-to-date mills were powered by water, steam and electricity, and were producing flour from both locally-grown wheat and grain imported along the Driffield Canal. The complete destruction of the mills by fire in 1949 did not deter E. B. Bradshaw & Sons Ltd. from continuing the business, and the mills were rebuilt in the 1950s with power provided by a turbine working in parallel with a 750 h.p. electric motor.[31]

Early Mill Buildings and their Uses

Information about early mill buildings in the riding has proved hard to come by, but some consideration must be given to such matters as their size and milling capacity, and the uses to which water-mills were put. The first medieval mills were no doubt mostly small buildings, powered by a single water-wheel and containing only one pair of mill-stones. Until the 13th century water-wheels were probably mainly of the undershot type, with paddles, but in the 14th century more powerful breast-shot and overshot wheels, with buckets, may have been coming into use, here as elsewhere in England. Nothing certain can be said about the East Riding. The only explicit mention of wheels is uninformative: in 1218-19 two men were killed by the water-wheels at Wold Newton and Foston mills.[32]

As gearing improved, the power generated by a water-wheel could more readily be transmitted to more than one pair of mill-stones. At Little Kelk in the 12th century, for example, the mill significantly called Twagrind contained 'two mills under one roof'. Clearly the word 'mill' was used in such instances to describe the unit of machinery, and not the building, and these multiple mills may lie behind many references to several 'mills' at one place. Mills that were used for fulling cloth might also be multiple: thus a new fulling mill built at Driffield about 1575 was described as 'two walk mills' (the alternative name walk mill recalls the much earlier practice of fulling cloth by treading it underfoot). Some multiple mills, moreover, were used for both these purposes: the water-wheel might drive stocks for fulling cloth, as well as stones for grinding corn.[33]

[31] *A Model Country Mill* (1921 and 1938 edns.), and information kindly supplied by Mr. A. E. Bradshaw.

[32] *Chron. de Melsa*, vol. ii, p. 62; *Rolls of Justices in Eyre for Yorks.* (Selden Soc. 56) (1937), pp. 353-4.

[33] *Bridlington Chartulary*, pp. 164, 167; Jennifer Tann, 'Multiple Mills', *Medieval Archaeology*, vol. xi, pp. 253-5; P.R.O., E 178/2594; E 134/23 Eliz. East./13.

Stamford Bridge was probably a multiple mill from an early date. Domesday Book records a single mill at Catton in 1086 and this may have been at Stamford, which was part of Catton manor. But by 1258-9 there were said to be seven mills on the mill-pond at Stamford, and it is improbable that there were seven separate buildings. The mills were used for both corn and cloth. A new fulling mill there is mentioned in 1331, and by 1586 there were 'four water corn mills and two fulling mills . . . called Stamford Bridge mills'. Such large mills as these may already have had two water-wheels, and the mills at Stamford Bridge which survived into the 1950s had two wheels and seven pairs of stones. Two water-wheels must have been rare in East Riding mills; only four mills are known to have had them, and the earliest reference is in 1796, when there were two wheels at Foston.[34]

Fulling mills were not common in the East Riding, for after the decline of the industry at Beverley in the 13th century this was never among the country's more important cloth-making areas. In addition to those at Stamford Bridge and Driffield already mentioned, fulling mills are recorded at Harpham in 1476, Little Kelk in 1484, Foston in 1565 and later, Wansford in 1687, and Watton—the site of an old fulling mill—in 1771. Kelk, Driffield and Foston each had two or three fulling mills and were presumably all multiple mills.[35]

A final example of a multiple mill is that at Nafferton, which was converted from a single mill in the 17th century. Its primary purpose was the familiar one of grinding corn, but in 1632 the miller used it for grinding malt on one day each week. Soon after that, however, the mill was converted into two: one for flour, the other for 'shelling oats and grinding malt'.[36]

The grinding of corn for flour, animal feed, or malt and the fulling of cloth do not quite exhaust the uses to which East Riding watermills were put. In the 18th and early 19th centuries several mills were used for paper-making, though again this was not one of the more important areas in the country for the industry. A paper mill at Driffield is mentioned as early as 1736, and Bell Mills there were used for paper-making as early as 1754 and again in the 1820s. A paper mill at Cottingham is mentioned in 1730, though it was still being called the 'new' paper mill in 1755; it had been built on the site of the old corn mill known as South Mill. Another paper mill was that at Goodmanham, described in 1813 as new-built, though it may—like the Cottingham mill—have already been up for some

[34] *Yorks. Inquisitions*, i (Y.A.S. Rec. Ser. 12) (1892), p. 71; *Percy Chartulary*, p. 169; P.R.O., E 134/28 Eliz. Trin./13; Yorks. Arch. Soc. (Leeds), MS. 709b.

[35] E.R.R.O., DDWB/12/8; DDRI/33/1; DDSY/68/29; *Yorks. Fines*, i (Y.A.S. Rec. Ser. 2) (1887), p. 305; East Riding Antiquarian Society, *Transactions*, vol. xxi, p. 40.

[36] P.R.O., E 134/8 Chas. I East./1; E 134/31 Chas. II Mich./20.

years. Finally, the name of Paper Mill at North Cave, together with the fact that a paper-maker is known to have worked in the village, leaves little doubt that this, too, was for a time used for paper-making.

South Mill at Cottingham, after being rebuilt as a paper mill, was put to yet another use in the late 18th and early 19th centuries when snuff was made for the gentlemen of Hull. Although the mill was later to be used for making some kind of cloth and bagging for the seed-crushing industry in Hull, it is the name Snuff Mill that has stuck.

With regard to the manufacture of cloth, interest centres chiefly upon the mills at Boynton, Driffield and Wansford. The fulling mills already mentioned were concerned solely with the finishing of cloth made on looms in weavers' houses, but in the second half of the 18th century mills were built at these three places to accommodate looms and workpeople. The woollen manufactory at Boynton was built by Sir George Strickland before 1770 to provide work for unemployed farm workers in nearby villages. It stands on the Gypsey Race, well away from Boynton village and the approach to Strickland's mansion. The building contained looms and had space for women and children to spin; probably only the finishing processes were powered by the water-wheel. It is not known whether the venture enjoyed a temporary success, but the manufactory seems to have ceased operation by 1812.[37] At Driffield, Bell Mills were rebuilt in 1792 as a cloth and carpet manufactory. Here it seems that both spinning and finishing may have been water-powered. Again the venture was comparatively short-lived. The mill had two water-wheels and by the 1820s they were being put to various uses—corn-milling, flax-spinning and paper-making.

The Wansford manufactory also had a short life, but in this case much more is known about its operation. An old-established fulling mill on the River Hull was bought by Sir Christopher Sykes in 1787, and in the following year he let it to three men—including John Boyes, senior—so that they might establish a manufactory there. By 1790 the buildings were apparently ready: they included a dyehouse, a cotton and worsted mill, a counting-house, and combing and weaving shops. The manufactory was certainly in operation by 1792-3, when worsted yarn was being spun and made into carpeting. The business was handicapped by lack of capital and by the insufficiency of the available water power, and it ran at a loss for the first five years. From 1797 until 1803 it made an annual profit, no doubt partly because the water supply had been improved in 1795, but the installation of cotton machinery in 1804 resulted in a heavy loss. John Boyes, junior, then ran the mill at a profit until 1815, but he nevertheless became bankrupt in 1816. Goods and equipment seized to recover rent due to Sykes included woad, carding engines,

[37] A. Young, *A Six Months Tour Through the North of Eng.*, vol. ii (1770), pp. 7-8.

spinning 'billies', 26 carpet looms, and about 1,500 yards of carpeting. Arrangements were made in 1817 for the Sykes family to finance Boyes' further operation of the manufactory, and it was still at work in 1823. It is not known how much longer the business survived, but in 1833 Sykes let the mill to a corn-miller[38] and it was later used for crushing bone for fertilisers, as well as for milling corn.

A final use for water-mills was to provide power to operate saws. It is unlikely that any mills were built expressly for this purpose, but after its demise as a woollen manufactory the building at Boynton seems to have been used as the Strickland estate saw-mill and for nothing else. Several corn mills, however, had an outside saw-bench, powered by the water-wheel, and several mills—Seampston is one—were described as for 'corn and wood' in 1850.

[38] E.R.R.O., DDSY/68/89, 93-96, 99-100, 106-11, 115, 119-20, 139, 144, 146-8; E. Baines, *Dir. Yorks.* (1823), vol. ii, p. 397.

II

The Survey

The working group formed by the two societies began its survey of water-mills and mill sites in 1967 and this may be regarded as the operative date throughout, although some individual reports were not completed until 1968. All 59 mills which still existed in 1850 were investigated and the results are briefly set out in the gazetteer in Section III of this booklet. In the present section an attempt is made to analyse the results and to provide a general description of the mills as they remained in 1967.

Condition

It was found that as many as 21 of the mills had been completely demolished, but some details could often be retrieved even at these sites—more particularly relating to the water arrangements. Where the mill has gone rhe miller's house may still remain, and at least 30 mill-houses are, in fact, still occupied, mostly as farmhouses. A further 26 mills have been wholly or partially gutted of their machinery and equipment and put to a variety of other uses: many are used for storage, several for the rearing of stock, and a few as garages, dwellings or workshops. One was being converted into a restaurant in 1967. In all of these cases the nature of the building is, of course, still apparent, and some of the mills also contain certain items of machinery or equipment. Of the remaining mills, 9 are disused or derelict, but these still contain much of their machinery and equipment; several are, indeed, more or less complete. This leaves 3 mills which are still at work, all modernised; 2 are powered by electricity, and one by electricity and water (a turbine). The condirion of the 38 surviving mills may be summarised as follows:

farm stores	10
othcr stores	3
piggeries	3
chicken house	1
workshops	2
garages	2
restaurant	1
dwellings	4
disused	5
derelict	4
still worked	3

The amount of information which could still be recorded was much greater than these rather depressing figures might suggest. Ir may be noted here that no complete mill has been preserved and that the working mills have been modernised; unless one of the disused or derelict mills is deliberately preserved, only patrons of the

Plate 1

SCAMPSTON. A typical small mill. Showing the sluice (centre) in front of the wheel-house.

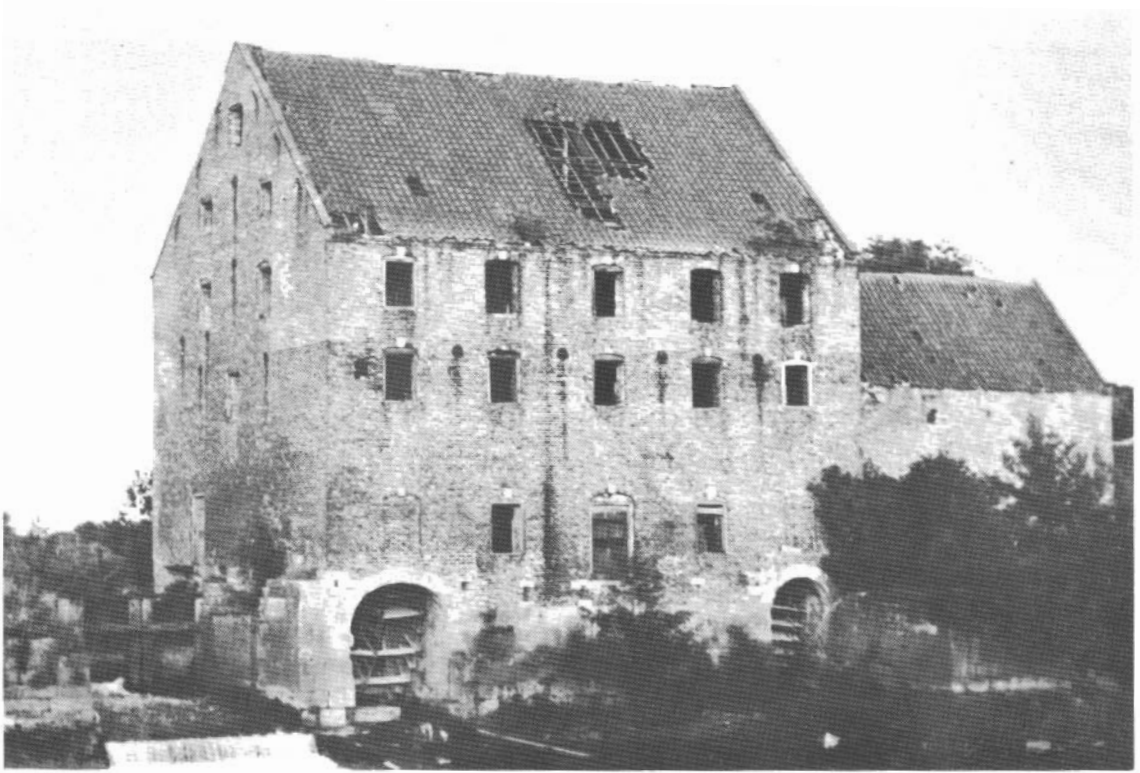

Plate 2

SUTTON UPON DERWENT. One of the larger mills. Showing the two water-wheels.

Stamford Bridge restaurant—with water-wheel and gearing adding atmosphere to their meals—will be able to enjoy the prospect of a traditional, if comparatively modern, water-mill in the riding. At present the most complete and interesting survivors are at Howsham, Leppington, Norton (Low Beck Mill), Pocklington (Devonshire Mill), Ruston Parva, Scampston, Sherburn (Low Mill), and Welton (High Mill).

Building Construction

Most of the 38 mills which still stand are small, unpretentious, buildings, purely functional in design (see Plate 1). It is not always quite clear whether the buildings once had lofts, but the probable number of floors may be summarised as follows:

1 storey	1	3 storeys plus 2 lofts	1
1 storey plus loft	4	4 storeys	2
2 storeys	3	4 storeys plus loft	2
2 storeys plus loft	12	5 storeys	3
3 storeys	3	5 storeys plus loft	1
3 storeys plus loft	5	6 storeys	1

Three working floors was thus the most common arrangement, and in a typical small mill the ground floor accommodated the gearing, the first floor carried the stones, and corn was fed to the stones from the third floor or loft. If the stones were over-driven (this is explained later) they might stand on a platform on the ground floor, and then two working floors sufficed. This latter arrangement is well-illustrated at Scampston; the more usual position of the stones may be seen at Ruston Parva or at Devonshire Mill, Pocklington, though both of these had extra floors as well. The mills with more than three floors had ample room for storage above the working floors, and as might be expected they are mostly mills situated near to water or rail transport, or near to Hull or York—mills which, as we have seen, were able to take part in the modernisation of the industry in the 19th and 20th centuries. There are examples of such large mills at Bridlington, Driffield, Pocklington, Sutton upon Derwent (see Plate 2), and Welton.

Whether large or small, the mills are mostly built of brick with pantile roofs, the ubiquitous building materials over so much of the riding. Chalk from the Wolds is used in one or two mills, but the most significant departure from brick building is found on or near the outcrop of limestone which extends from around Norton, in the north, to Brough, on the Humber. In villages like North Cave and Birdsall, for example, some of the mills are naturally in the local tradition of stone construction. Most of these chalk or stone mills have varying amounts of brickwork incorporated in them, either as dressings at corners and around window and door openings, or as

patching and reconstruction of the earlier fabric. The materials of the 38 surviving buildings are as follows:

brick with tiles	17	stone and brick with tiles	8
brick (roofs uncertain)	2	stone and brick (roof uncertain)	1
brick with slates	6	chalk and brick with tiles	1
stone with tiles	2	chalk, stone and brick with tiles	1

Timber is rarely used externally, and the weatherboarded lucarnes so common in East Anglian mills are almost unknown here; there is, however, a timber lucarne—a projection from an upper floor through which sacks were hoisted—at Devonshire Mill, Pocklington, and there were other examples at the now-demolished Lowthorpe mill and King's Mill, Driffield. The internal construction is usually of timber, but Sutton on Derwent is an interesting exception for here the first and second floors are supported by iron columns. Timber normally suffices even for the heavy framework, called the 'hursting', which supports the grindstones, though at High Mill, Sherburn, iron is used.

With few exceptions East Riding mills are purely functional in design, their plainness unrelieved by any decorative features beyond an eaves course of projecting bricks. Window openings are simple, though in a few cases they may have an arched head or even a stone sill. Where decorative features are used it is usually in the larger mills, such as that at Sutton on Derwent: the dressings here include a non-functional key-block in the arched head of every window. To the unsophisticated appearance of the majority of mills there are only two really noteworthy exceptions—the 18th-century buildings at Boynton and Howsham. Boynton mill, built as a woollen manufactory, no doubt owes its architectural treatment to its location near Sir George Strickland's parkland. It consists of a central block with two lower wings, and all these sections have half-hipped roofs. The walls contain large, circular, openings which presumably admitted light to the working floor, though they are now bricked-up. Howsham is a much greater surprise, a veritable Gothic 'folly' in the grounds of Howsham Hall (see Plate 3). It may have been designed by the well-known northern architect, John Carr. The building is square with a pyramidal roof, and it is faced with good stone ashlar over a brick lining. Each of the three chief elevations has an ogee-headed recess rising through both floors, two of the recesses containing doors and the third a tall mullioned window. On either side of the recesses are pointed ground-floor 'windows', with hoodmoulds, and quatrefoil openings on the first floor; most of these, however, are blanks, plastered and painted to suggest glazing. Any suspicion that this was no working mill is soon dispelled by the water-wheel and machinery that still survive in the fire-blackened and derelict interior.

Few of the buildings can be dated with any certainty, but most of them were probably put up during the 18th century or the first half

of the 19th. If any is earlier, it may be Low Beck Mill, Norton. In a dozen cases there is evidence for a precise date, but since it is usually in the form of a date-stone on the building it must be treated with some caution, as the stones may have been re-used. These dates are all between about 1750 and 1850, with the exception of 1873 at one of the Bridlington mills and 1951/5 at the new Bell Mills, Driffield.

Water-wheels and Water Supply

There are four main types of water-wheel—undershot, breast-shot (low, middle or high), pitch-back and overshot—the names indicating the point on the wheel at which the water was fed to it. If the wheel be regarded as a clock face, with the water coming to it from the right, then the undershot wheel is fed at about 5 o'clock, the breast-shot at between 2 and 4 o'clock, and the pitch-back at about 12.30 or 1 o'clock. In each case the wheel is made to rotate in a clockwise direction. The overshot wheel is fed at 11 or 11.30, and in this case the wheel turns in an anti-clockwise direction.

The undershot wheel is fitted with paddles and it is turned by the momentum of the water striking the paddles. The other three types are fitted with buckets, and power is provided largely by the weight of water in the buckets. The efficiency of the various types of wheel depends on the 'head' of water available, that is to say the difference in level between the water feeding the wheel and that leaving it. Pitch-back and overshot wheels need the greatest head of water and they are the most efficient, for a larger number of buckets is filled at one time. Overshot wheels are probably the most efficient of all because the forward momentum of the water supplements its weight in the buckets. The greater the head of water, moreover, the larger the wheel and the more numerous the buckets which can be fitted.

The head of water available was thus a key factor in the location of mills. In hilly districts it was comparatively easy to find suitable locations, but in flatter areas it was often necessary to divert the water of a stream along a race for a considerable distance in order to obtain the necessary difference in level between race and stream to provide a head of water. The race at Wintringham, for example, is over half a mile long. The volume of water available was also crucial. If the natural flow of the stream did not supply sufficient water to work the mill continuously, it might be necessary to construct dams in which large quantities of water were impounded. It was common practice, too, to stop the flow of water of a stream at nightfall by sluices to ensure that the dam was full for the morrow's work.

Most East Riding mills were placed either on the steeper slopes along and below the northern and western escarpments of the Wolds, or on the gentler eastern slopes. In these areas the necessary head of

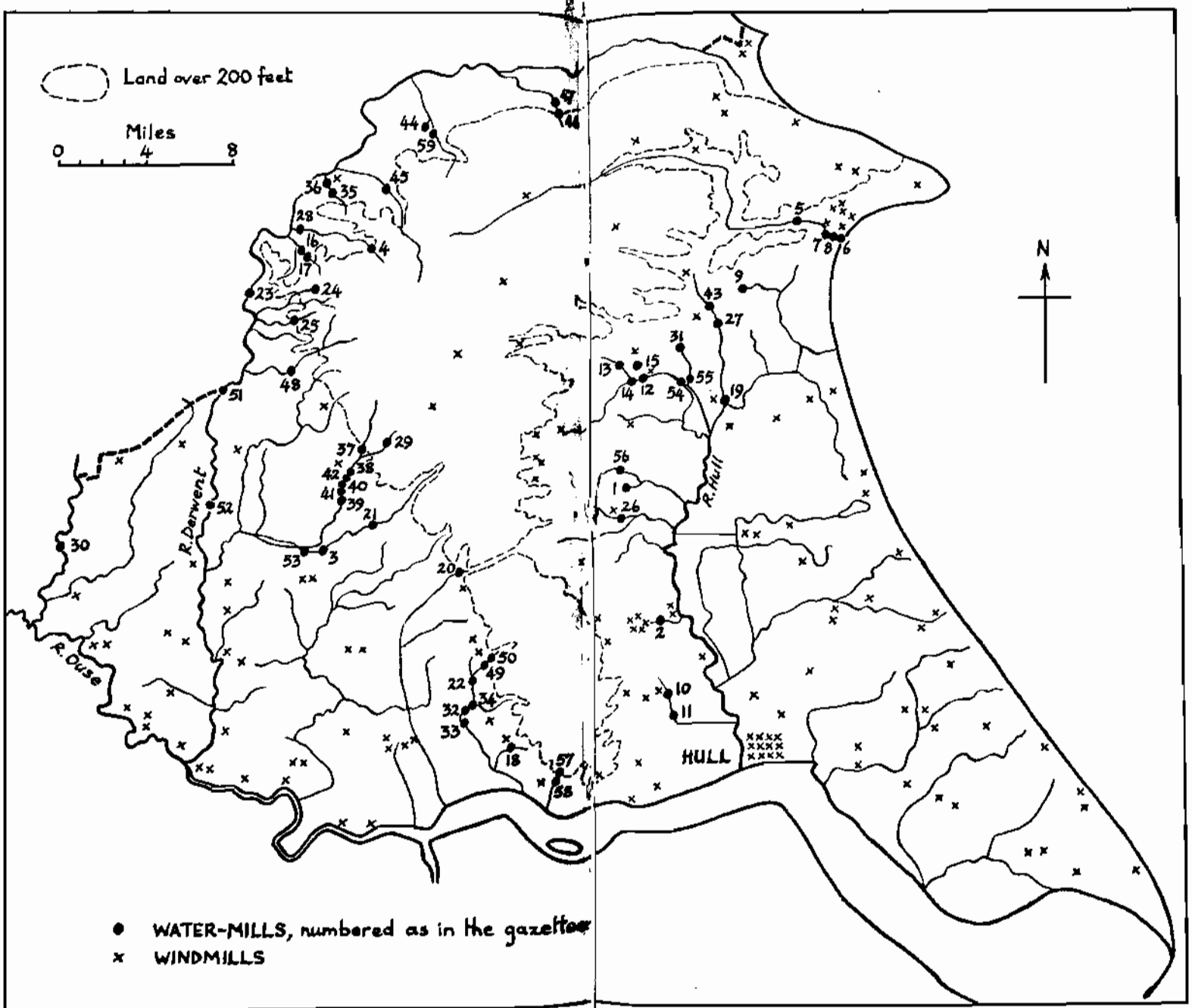

Figure 1. Water-mills and Windmills in the East Riding in 1850.

water could be created with varying degrees of ease. There were, however, a few mills in the Vale of York, including several on the Derwent and Ouse where heads of water were formed by weirs built across the rivers. The character of the local countryside determined not only the sites of mills but also to a considerable extent the type of wheel used. It would seem that the gentle topography of the riding led to a prevalence of undershot wheels: on the evidence of surviving wheels and local information it is possible to suggest that there were about 20 undershot wheels, some 8 breast-shot, and about 10 overshot or pitch-back. In the remaining cases no definite evidence is available.

Some mention must be made here of the improved type of water-wheel invented by a French engineer, J. V. Ponceler. This wheel was fitted with curved paddles, or vanes, which were inclined towards the incoming water. The water flowed upwards round the curve of the vane, thus imparting momentum to the wheel, and further energy was derived from the same water as it subsequently fell back into the vanes. These wheels had a greater efficiency than any of the older types, and several were installed in English mills in the late 19th century. Although wheels with curved vanes survive at both Howsham and Stamford Bridge, they appear to be so constructed that they could not have been driven on the principle associated with genuine Poncelet wheels.

There are thirteen surviving wheels in the East Riding, two of them in the mill at Sutton on Derwent (see Plate 2), and two turbines also remain, one of them still in use at Bell Mills, Driffield. In addition, part of the wheel remains at Leppington. The wheels are highly variable in construction and a brief description of each is therefore given here.

BESWICK

Breast-shot; all iron; diameter 15 ft.; width 4 ft. 2 ins.
Axle round; diameter 6½ ins.
Hub plates—none as such.
Arms T-shaped in section; 6 on each side.
Shroud plates, 10 ins. wide, in place of rims.
Buckets with curved fronts; 48 in number.

This is only half of the original wheel, which was twice as wide and had a third set of arms.

HOWSHAM

Undershot; all iron; diameter 14 ft. 8 ins.; width 5 ft. 5 ins.
Axle round with 4 ribs; diameter 9 ins.
Hub plates circular; diameter 3 ft. 1 in.
Arms T-shaped; 6 on each side.
Shroud plates, 2 ft. 3 ins. wide.
Paddles in form of curved vanes; 30 in number.

LEPPINGTON

Overshot; all iron (rims and buckets missing); diameter about 16 ft.; width 4 ft. 6 ins.
Axle round; diameter 8 ins.
Hub plates circular.
Arms—8 on each side.

NAFFERTON

High breast-shot; mainly iron; diameter about 13 ft.; width 12 ft.
Axle 6-sided; 1 ft. 2 ins. face to face.
Hub plates 6-sided.
Arms T-shaped; 4 sets of 6, each set linked by circular brace.
Wooden shroud.
Buckets.
(Access to the whcel is very difficult)

NORTON, LOW MILL

Undershot; iron and wood; diameter 14 ft.; width 3 ft. 8 ins.
Axle round wirh 4 ribs; diameter about 8 ins.
Hub plare 6-sided; iron and wood.
Arms cruciform; a single row of 6 in cenrre of axle, with 2 braces to each arm.
Rims.
Paddles and slotted sole of wooden boards.

POCKLINGTON, DEVONSHIRE MILL

Breast-shot; mainly iron; diameter 14 ft.; width 7 ft.
Axle round; diameter 8 ins. But octagonal, 10 ins. face to face, at the hub plates.
Hub plates circular; diameter 3 ft. 6 ins.
Arms T-shaped; 6 on each side.
Shroud plates, 1 ft. wide.
Buckets V-shaped; they and continuous sole boards of wood.
'Watkinson, Pocklington' cast on one arm.

RUSTON PARVA (see Plate 4)

High undershot; iron and wood; diameter 16 ft.; width 5 ft. 6 ins.
Axle round with 4 ribs; diameter 6½ ins.
Hub plates have projections to hold the arms.
Arms of wood; 6 on each side.
Rims.
Paddles and slotted sole of wooden boards.

SCAMPSTON

High breast-shot; iron and wood; diameter 12 ft.; width 6 ft.
Axle cruciform; diameter 1 ft. 1 in. at outer hub; 11 ins. at waist; 1 ft. 4 ins. at inner hub.
Hub plates circular; diameter of outer plate 2 ft. 9 ins., of inner plate 3 ft. 3 ins.
Arms of wood; 6 on each side, alternating with 6 round iron spokes.

Shroud plates, 1 ft. wide.
Buckets and sole of wooden boards.
'T. Hodgson Nafferton 1897' cast on one shroud plate.

SHERBURN, LOW MILL

Overshot or pitch-back; iron and wood; diameter 17 ft. 6 ins.; width 2 ft. 6 ins.
Axle square; 6½ ins. face to face.
Hub plates 16-sided; 2 ft. 11 ins. face to face.
Arms of wood; 8 on each side; 4 pairs of diagonally-placed braces between the 2 sets of arms.
Shroud plates.
Buckets and sole of wooden boards.

SKIRPENBECK

Pirch-back; iron and wood; diameter 13 ft. 6 ins.; width 4 ft.
Axle of wood; round; diameter 1 ft. 6 ins.
Hub plates circular.
Arms of wood; 6 on each side, each set linked by circular brace and rhis linked to 6 wooden cross-pieces running from hub to hub.
Wooden shroud, 1 ft. 1 in. wide.
Buckets and sole of wooden boards.

STAMFORD BRIDGE

Undershot; mainly iron; diameter 16 ft.; width 7 ft.
Axle round.
Hub plates have projections to hold the arms.
Arms of wood; 8 on each side.
Shroud plates.
Paddles in form of curved vanes.
Made by Hawkswell of Yarm on Tees in 1921.

SUTTON UPON DERWENT

(1) (see cover illustration) Undershot; iron and wood; diameter about 19 ft.; width 5 ft. 6 ins.
Axle cruciform; diameter about 1 ft. 2 ins.
Hub plates octagonal, with projections to hold arms.
Arms of wood; 8 on each side.
Rims of wood.
Paddles of wood.

(2) Undershot; mainly iron; diameter about 20 ft.; width 7 ft. 6 ins.
Axle cruciform, tapering asymmetrically towards the ends.
Hub plates circular, cast in one piece wirh the arms.
Arms T-shaped; one pair on each side of wheel, the pairs set at right-angles to each other; also 4 round spokes on each side.
Rims skeletal, with slots to take paddle boards.
Paddles of wood.
Mechanism at outer side of wheel enabled position of wheel to be adjusted.

(Access to both wheels is very difficult)

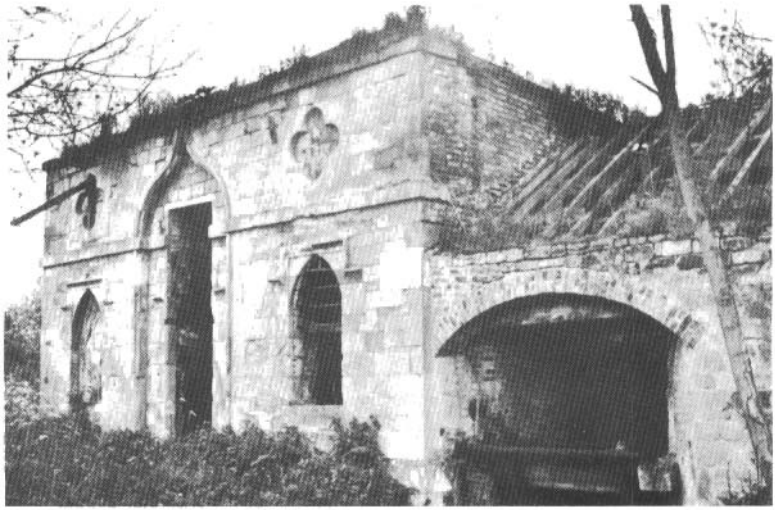

Plate 3

HOWSHAM. The 'Gothic' mill. Showing the sluice and wheel-house (right).

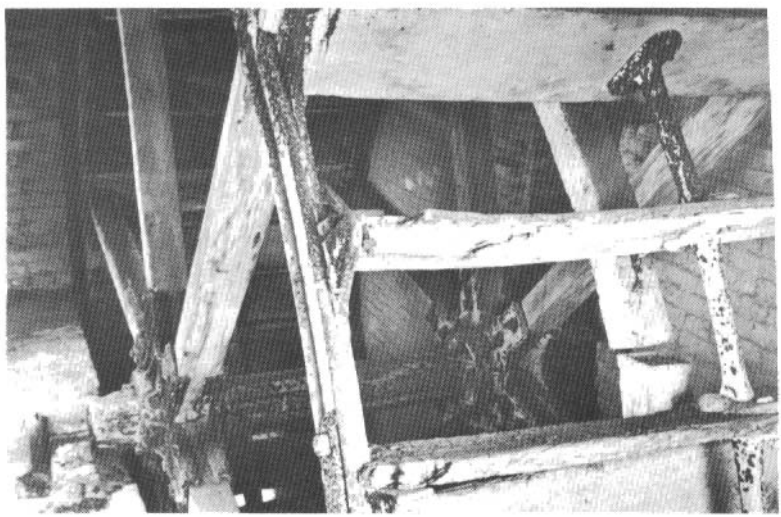

Plate 4

RUSTON PARVA (Bracey Bridge Mill). The water-wheel. Three paddles are shown in the foreground, where the sole boards are missing.

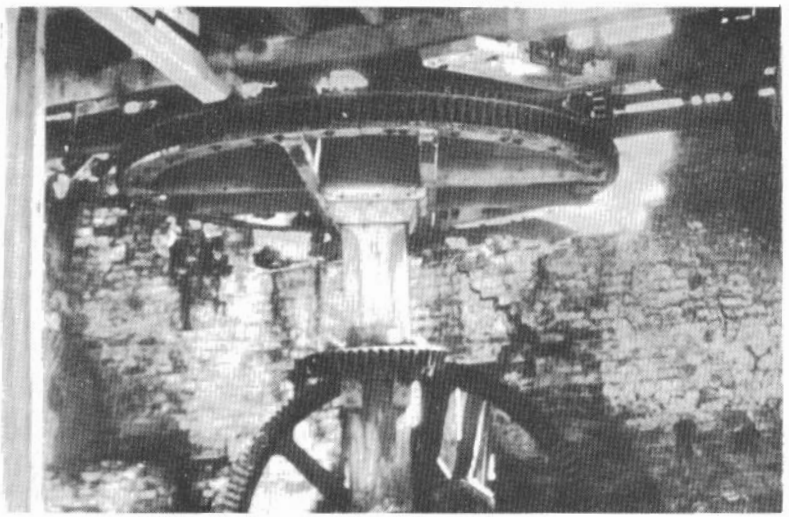

Plate 5

SHERBURN (Low Mill). The gearing. The stone nuts are missing. A secondary drive (right) is taken from cogs set on top of the spur wheel.

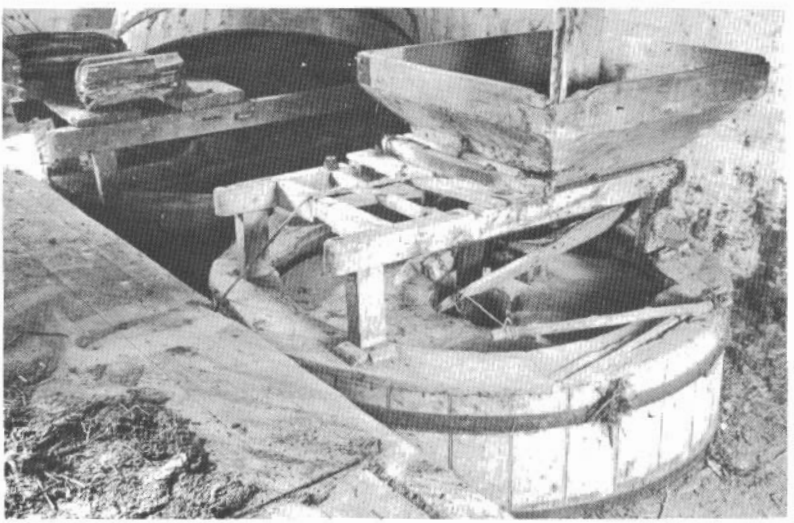

Plate 6

RUSTON PARVA (Bracey Bridge Mill). A pair of stones and the wooden furniture. The stones were under-driven.

WELTON, HIGH MILL

High breast-shot; mainly iron; diameter 34 ft. 6 ins.; width 3 ft. 6 ins.
Axle of steel, inserted in 1934; square; 7 ins. face to face.
Hub plates eircular; diameter 3 ft.
Arms of wood; 16 on eaeh side; a diagonally-plaeed braee between each pair of arms, also of wood.
Shroud plates, 10 ins. wide; teeth around the rim of one set of shroud plates provided the drive to the gearing.
Buckets, with eurved fronts; about 80 in number.

The water feed to the wheel at Welton was of a most unusual kind whieh deserves special mention. Water was led from the dam, over 100 yards away, along a culvert ro a large tank, and from there it was siphoned along a pipe into the wheel-house. There, rhe pipe led to a tank mounted high above the wheel, and from the tank the water fell into the buckets of the wheel. It was thus possible for the wheel to be high breasr-shor, despire the relatively small head of water available at the mill.

All of the surviving wheels are housed inside the mills, and there is indeed no indication that any East Riding mill had an external wheel of the kind common, for example, in the West Country. Most wheels were housed in the body of the mills, but some were in wheel-houses built against the end of the main building.

Most of the mills were situated on very small streams which are either ealled simply 'Mill Beek' or named after rhe village; these names often vary along the eourse of a stream as it passes through different townships. Only four mills srand on larger rivers: Naburn, on the River Ouse, and Sramford Bridge, Sutton and Howsham, on the Derwent. The derailed arrangement of the water-feed from the stream to the mill was highly variable and no precise classification is possible. Surviving evidence on the ground, however, together wirh the evidence of maps where the topography is now much-altered, suggests that ar least 34 mills stood on the stream itself and at least 16 on races leading off from the stream.

In more than 30 cases the stream or the race was banked-up to form a dam. Sometimes the dam is little more than a pronounced widening of the stream or race, but elsewhere it may be a roughly eircular, oval or triangular expanse of water. The largest dam was the extensive 'reservoir' for the carpet manufactory at Wansford, and at Seampston the mill was served by two connected dams. In several eases water was carried from the dam into the mill along a cast-iron pentrough, a good surviving example being that at Wintringham. The space under the pentrough and between the mill wall and the dam served ro avoid dampness in the building and to provide a passage-way.

Some means was always needed to divert surplus water away from the water-wheel. In many cases an overflow channel was constructed, though if the mill stood on a race the stream itself served this purpose. In only three or four cases is it clear that a by-pass was provided alongside the wheel: a particularly good surviving example of this arrangement is at Beswick, where a pair of sluices, side by side, admitted water to the wheel or to the by-pass. When the 'used' water flowed out from the water-wheel it sometimes formed a wide pond, as, for example, at both High and Paper Mills, North Cave. It should be noted that the word 'pond' is never used for the reservoir of water above the mill, which in the East Riding was always called a dam.

The water arrangements at the three mills on the River Derwent were complicated by the fact that the river was also used as a navigation. In each case, the river level was raised by an artificial weir and a race led from above the weir to the mill. The weir made it necessary for a cut for boats to be made around the mill site, and each cut was provided with a lock. Ill-feeling between millers and the navigation interest must often have arisen, as it did at Stamford Bridge in 1844; the agent for the Derwent Navigation then complained that the miller drew off too much water and worked the mill each day for more than the agreed number of hours.[39]

The arrangements at Naburn were more unusual. Here, the river level was raised by a weir and again a cut, with locks, enabled boats to by-pass the obstruction. The mill stood on the small island formed by river and cut; water was taken from the cut above the locks and after turning the water-wheel it was discharged into the river below the weir. The tidal character of the Ouse up to this point further complicated the situation at Naburn. At high tide there was not a sufficient head of water to work the mill, which was consequently out of action for a period each day.

Gearing

The traditional pattern of gearing, by which power was transmitted from the water-wheel to the grinding stones, was essentially simple; it is shown in diagrammatic form in Figure 2. On the same shaft or axle as the water-wheel was a 'pit wheel', which drove a 'wallower' on an upright shaft. Also on the upright shaft was a 'great spur wheel', and from this the drive to the stones was through 'stone nuts'—one for each pair of stones. Sometimes the wallower and the great spur wheel were widely spaced on the shaft—as in the diagram—and then the drive to the stones was taken downwards;

[39] B. F. Duckham, *The Navigable Rivers of Yorks.* (1964), p. 35.

such stones were 'over-driven', or 'over-drift'. In other cases the wallower and the great spur wheel were close together and the drive was taken upwards; the stones were then 'under-driven'. At the top of the upright shaft there was often a crown wheel, from which power was taken to operare the sack hoist or to drive such machines as flour-dressers and oat-crushers.

Part or all of the gearing survives in ren East Riding mills. In eight cases it is of the traditional pattern—at Howsham, Leppington, Low Beck Mill, Norton, Devonshire Mill, Pocklington, Scampston, High Mill, Sherburn, Low Mill, Sherburn (see Plate 5), and Stamford Bridge. The two mills with unusual drives are Ruston Parva and Welton. In seven of these mills rhe stones were under-driven, but ar Scampston, Low Mill, Sherburn, and Welron, they were over-driven.

Ruston Parva is exceptional in that there was no upright shaft. The drive from the pir wheel was to two small wallowers, each set on a horizontal shaft. On these shafts were three great spur wheels, each of which drove a stone nut. One consequence of this arrangement was that the three pairs of stones stood in a line across the mill; with the traditional pattern of gearing rhree pairs of stones would always stand in a circle above the great spur wheel. All the gearing survives at Ruston.

At Welton rhe gearing departed even more radically from the traditional pattern, for here the water-wheel shaft did not carry a pit wheel. Instead, power was transmitted from the water-wheel to a pit wheel set above it, by means of teeth attached to the rim of the water-wheel. The pit wheel shaft runs into the mill at second-floor level and carried a second pit wheel, and this drove a wallower, a great spur wheel and stone nuts in the usual way. A further feature of interest at Welton is that a third pit wheel was later fitted to the shaft to take the drive supplied by an engine installed in a lean-to building against the side of the mill. This engine supplemented rather than replaced the water-wheel. All the gearing except the first pit wheel survives at Welton.

Access to the gearing is difficult at Ruston Parva, and it is not always easy elsewhere, but some general observations on the construction of the wheels and shafts may be made. The pit wheels and wallowers are usually made of iron and the great spur wheels of wood: this is the case, for example, at Devonshire Mill, Pocklington, at Scampston, and at Low Mill, Sherburn. At these three mills, the great spur wheels have iron teeth, or 'cogs', which were perhaps fitted to replace the original wooden cogs. At Howsham, Ruston Parva, High Mill, Sherburn, and Welton, however, the great spur wheels are entirely of iron. Few stone nuts survive, but these are of the iron cage type with wooden teeth. The crown wheel at Howsham is of wood with iron spokes, and that at Scampston of iron.

Key to Figure 2.

A A *water-wheel* (overshot) is fixed on to

B the *wheel axle*, which also carries and turns

C the *pit wheel*. This wheel drives

D the *wallower*, which is fixed on to and turns

E the *upright shaft*. This shaft carries and turns

F the *great spur wheel*, which drives

G the *stone nut*. The nut is mounted on and turns

H the *quant*. This has a yoke in the eye of, and turns

I the *runner stone*, which is supported by

J a *spindle*. The spindle has its foot-bearing in

K the *bridging box* and another bearing in the eye of

L the *bed stone*, which is stationary. The screws in the sides of the bridging box adjust the spindle foot-bearing so that the runner stone will run 'true'. The box sits on

M the *bridge tree*. This is adjusted for height by

N the *tentering screw*, so regulating the clearance between the stones and thus the fineness of grinding. Grain fed into

O the *hopper* (which is supported by the horse—omitted in the diagram for the sake of clarity) runs down through the throat of the hopper into

P the *shoe*. This is pivoted at its rear end. One of its jaws is held against the square quant by a string attached to

Q the *willow*. This is a springy piece of wood fixed on top of the tun (T). The turning of the quant thus causes the shoe to vibrate. The flow of grain from the hopper is regulated by raising or lowering the jaws, which are suspended from the horse by

R the *crook string*. This string is adjusted by

S the *twist peg*. The grain, shaken into the eye of the runner stone, emerges from between the stones at their edges as flour or meal and falls into

T the *tun* and so out through

U the *chute* into bags etc.

V The *upright shaft extension* drives, via a pair of bevel gears

W the *hoist drive shafts*. Each of these carries

X a *belt pulley*. The belt hangs slack until the cord to

Y the *hoist lever* is pulled; then the bearing carrying the upper drive shaft is raised so that the belt is tightened and transmits the drive from the lower to the upper shaft and so to

Z the *winch barrel* and chain.

Note: the arrangement of mill gearing is very varied. In the diagram the stones are over-driven. If they had been under-driven a 'damsel' would have been fitted to do the work of the quant in shaking the shoe. The bevel gears at the top of the upright shaft extension are sometimes replaced by a crown wheel.

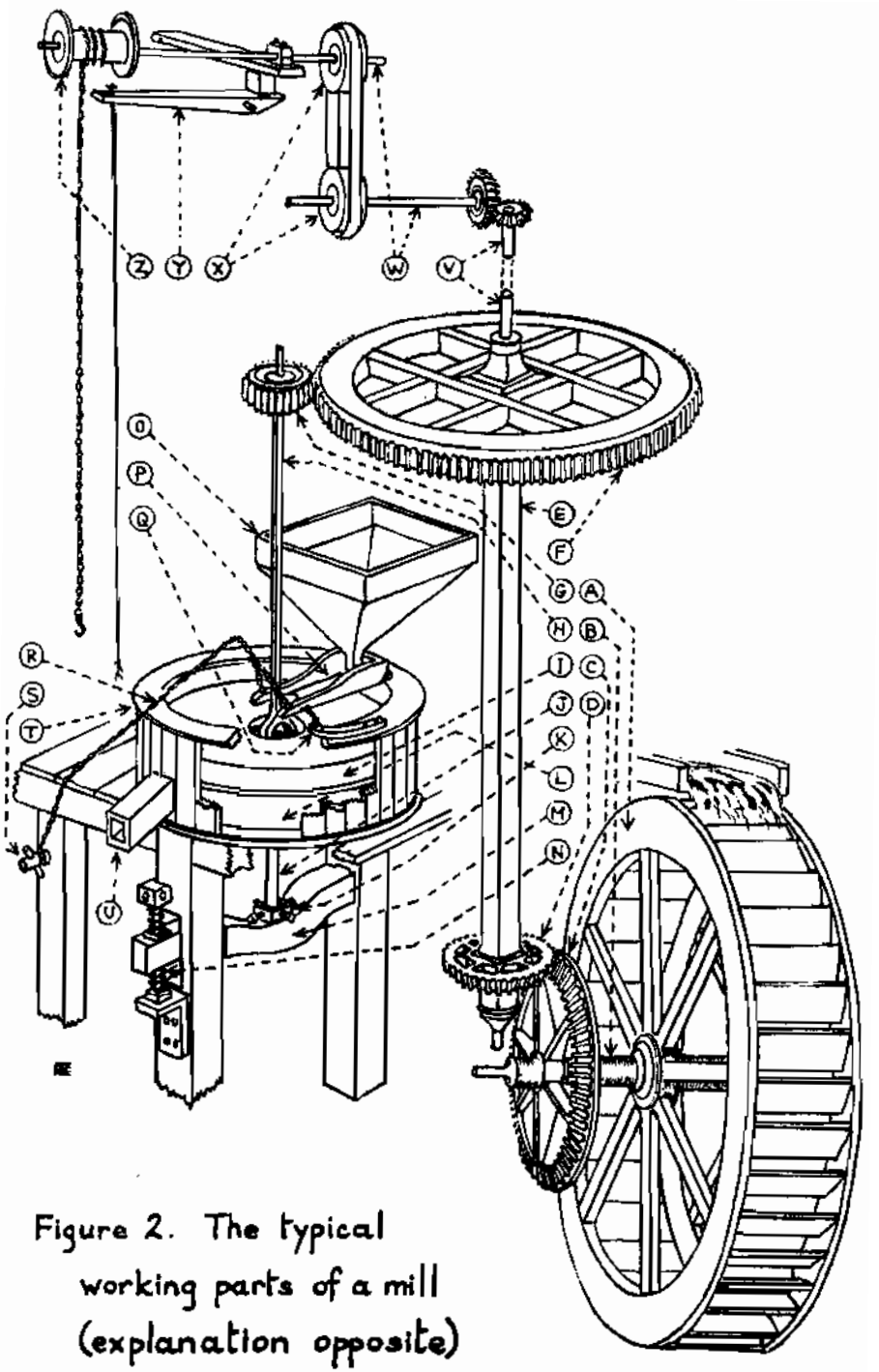

Figure 2. The typical working parts of a mill (explanation opposite)

The upright shafts are very variable in construction. That at Howsham is wooden for the bottom 4 feet, and then of iron to the top. At Leppington, Scampston, and Devonshire Mill, Pocklington, the shafts are entirely of wood, and those at High Mill, Sherburn, and Welton are entirely of iron. The size of shafts is equally variable. At one extreme, the Sherburn High shaft is only about 5 ins. in diameter. At Howsham, the wooden part of the shaft is square with round ends about 1 ft. 10 ins. in diameter, and the iron part is about 5 ins. The Devonshire Mill, Pocklington, shaft is octagonal at the base, 11½ ins. from face to face, and square, with 1 ft. sides, where it is clasped by the arms of the great spur wheel; higher up, the shaft becomes octagonal again, and then round. The Scampston shaft is 1 ft. 4 ins. square.

Stones

Single stones or a pair, sometimes more, survive *in situ* at only a dozen mills, but whole and broken stones are frequently to be seen lying around the mills, set into the floors, used as doorsteps, or deployed ornamentally in gardens. Most of them are either Peak (grey) stones, made of millstone grit from the Pennines, or French (burr) stones, made of quartzite quarried in the Paris Basin. The former are made in one piece, while the latter are composed of segments, set in plaster of Paris and bound with iron bands. Cologne (blue) stones, made from lava quarried in the Rhine Valley, are rare in the East Riding. A few may be seen at windmills, for example at Yokefleet, but only one has been found at a water-mill: this is a broken stone lying near High Mill, South Newbald. Blue stones are mentioned in 18th-century accounts for repair work at Skirpenbeck mill, and there were formerly two pairs at High Mill, Sherburn.

The stones are highly variable in size. A few examples are those at Low Mill, Sherburn, 3 ft. 6 ins. in diameter, at High Mill, Sherburn, 3 ft. 9 ins. and 4 ft. 5 ins., and at Scampston, 4 ft. At Howsham six stones range from 4 ft. 2 ins. to 4 ft. 5 ins. in diameter, and from 3 ins. to 1 ft. in thickness. Continual wear and repeated dressing naturally reduced the thickness of the stones.

From surviving evidence and from local information it is possible to say that most mills ran either 2 or 3 pairs of stones, but there were 4 pairs at Devonshire Mill, Pocklington, and 7 at Stamford Bridge. At Sutton upon Derwent there were 10, of which 7 were in the mill itself and 3 in the adjoining building to which power was taken by a shaft. Both Stamford Bridge and Sutton had 2 water-wheels to drive the stones.

Makers' names are cast on the iron collars of the stones at only four mills—Ruston Parva, Sutton upon Derwent, High Mill, North Cave, and Clock Mill, Pocklington. In all cases the firm is Childs, of Hull and Leeds.

Some or most of the wooden furniture used around the stones remains at fewer than ten mills; it is most complete at Scampston, Ruston Parva, Low Beck Mill, Norton, and Devonshire Mill, Pocklington.

The stones (see Figure 2 and Plate 6) were surrounded by a round wooden box, or 'tun', to retain the flour or meal as it emerged from between the stones, and chutes were provided to carry the product down to be bagged. Standing on top of the tun was a wooden framework called a 'horse'. This supported a hopper, into which grain was fed down chutes from the floor above. The hopper, usually about 2 ft. 6 ins. square at the top, tapered towards the bottom and ended in a throat about 3 ins. across. Immediately below the throat of the hopper was a wooden trough called a 'shoe', along which the grain ran into the centre, or 'eye', of the upper or 'runner' stone. The shoe was pivoted at its rear end on the top of the tun and its front end was suspended from the horse by a cord. The front end also had two arms, one extending on either side of the square shaft, or quant, which drove the runner stone.

To ensure a gradual and regular supply of grain into the stones, the shoe was made to vibrate from side to side. One arm of the shoe was held in contact with the shaft by a string stretching from the other arm to a springy piece of wood, called a 'willow', fixed to the top of the tun. The rotation of the square shaft constantly nudged the shoe, causing the required vibration.

It was vital that the supply of grain into the stones should be constantly maintained, in order that the stones should never be allowed to run free, or 'race'. If this happened the stones would be damaged by grinding each other, and the vibration set up might also endanger the fabric of the mill. There was, moreover, the risk of fire due to the sparking of the stones inside the tun. Mrs. Anderson, of Beswick, remembers an occasion when their mill 'got away' in this fashion because of lack of grain and the vibration was so great that it seemed that the mill would collapse. And Mr. Cundill, formerly of Scampston, recalls an instance when a local water-mill got away and a runner stone jumped off its spindle and shot out of the doorway, breaking in two in the process.

An alarm system was often fitted to warn the miller that the grain in the hopper was running low. Such a system rarely remains, but at Devonshire Mill, Pocklington, it is still to be seen. A wooden flap was hinged to the side of the hopper, some 8 ins. above the throat. The flap was held down, against the pull of a weighted string, by the grain in the hopper. If the grain dwindled to danger point it was insufficient to hold down the flap; the flap was, therefore, pulled by its weighted string and this operated a warning bell. Millers displayed great ingenuity in inventing such devices. There was, for example, a different and very simple system at Scampston. A steel spring was bolted to the shoe and allowed to project up through the throat of the hopper, where it carried a bell. The bell could not ring

so long as it was buried in grain, but as the level of the grain fell the bell was uncovered and was vibrated by the movement of the shoe.

At Devonshire Mill, again, there is a heavy hand-operated windlass near the door of the lucarne which may have been used for raising heavy objects, such as stones, into the mill, and also by means of eye-bolts and blocks in the rafters to lift the stones when they needed dressing. There are also two large wooden wedges used to support the stones when they were moved for dressing, and a pick used for the actual dressing. A straight wooden 'staff' was smeared with 'raddle' (a red paste) and passed over the surface of the stones, leaving red marks to show any raised areas which needed to be dressed down; this staff is still present, together with the steel proof staff against which it was checked. A wooden corn shovel completes the interesting collection of implements still remaining at this mill. There are also many tools and implements at Low Beck Mill, Norton.

Sack Hoists and Machines

It was common for sack hoists and machines to be powered by a drive taken from the crown wheel at the top of the upright shaft, and several examples may still be seen in East Riding mills. The sack hoists were normally in the roof of the mills and, in the general absence of projecting lucarnes in the riding, sacks were raised and lowered through trap doors in the floors. Machines were usually placed on the first floor of the mill.

Sack hoists survive in six mills. At least four of them are of the 'slack belt' type, in which the shaft of the hoist can be adjusted to tighten the belt and so bring it into operation. Particularly good examples are at High Mill, Sherburn, and Welton. The hoist at Scampston, however, has a friction drive; here, two discs on the shaft of the hoist can be brought together to set the hoist in motion.

Most of the machines that remain were used for crushing or grinding corn, beans, or animal cake, and for dressing flour. There are flour-dressers at Leppington and Nafferton, a 'kibbler' for corn and beans at Low Beck Mill, Norton, an oat-roller at Ruston Parva and another (now dismantled) at Scampston, and a dresser, what appears to be a cake-crusher, and another machine of uncertain purpose at Howsham. At Welton there are two machines, one of which was used for rolling oats. A dynamo for generating electricity was also operated at Ruston Parva and the drive to it still exists.

Several of these machines are of interest for the unusual way in which they were driven. At Scampston, for example, the sack hoist was driven in the normal way from the crown wheel, but a drive taken from the spur wheel operated the oat-roller and also a saw bench outside the mill. At Ruston Parva the whole gearing was of an unusual type (see above), with no upright shaft and crown wheel, and here the oat-roller was driven from one of the horizontal

shafts and the sack hoist from the shaft which carried the water-wheel and pit wheel. And at Howsham there was a complicated system of two drives from the crown wheel, with a third drive taken from one of the others.

Three of the machines are cast with their makers' names: the roller ar Ruston Parva is by A. F. Fish, of Malton, a dresser at Howsham by W. Pindar, of York, and the probable cake-crusher at Howsham by Harrison McGregor & Co. Ltd., of Leigh (Lancs).

Millwrights

The names of the makers of several of the surviving water-wheels have already been mentioned, and a few other referenees to millwrights will be found in the gazetteer. This meagre information shows that some water-wheels, gearing and mill-stones were made by local millwrights and stone-makers, such as Boyd and Childs, both of Hull, Alton and Harker, both of Driffield, Fish and Derwent Foundry, both of Malton, Hodgson, of Nafferton, and Watkinson, of Pocklington. Some mill owners went further afield for their equipment—to Hewes & Wren, of Manchester, Porteus, of Leeds, and Hawkswell, of Yarm. Once installed, some of the wheels and machinery were no doubr maintained and repaired by local craftsmen, as at Rusron Parva where the wooden arms of rhe water-wheel were renewed by the estate joiner in 1921.

A more comprehensive discussion of the millwrights responsible for East Riding warer-mills is at presenr impossible. Millwrights' names may be obtained without difficulty from directories, but many firms were no doubt chiefly concerned with windmills or with providing machinery and stones for sream-driven corn mills, seed-crushing mills and whiting works. Only rhe business records of millers and millwrights, of which no examples have yet come to light, are likely to give a fuller picture of the manufacture of water-mill machinery.

III

Gazetteer

This list includes all the mills which existed about 1850 and are shown on the Ordnance Survey six-inch map (first edition). Details of the present state of the mills refer to 1967-8, when the survey was carried out. The list is in alphabetical order of towns and villages, and the numbering is the same as on the sketch-map.

The name of the town or village, and the distinctive name of the mill where applicable, are followed by the nature of the mill in 1850 (usually corn), by the name of the stream, and by the National Grid reference.

The first paragraph gives any known historical information (the mere mention of a mill at a particular date is not noted). The date when a miller is last mentioned is taken from directories: those chiefly used are for 1823 (Baines), 1840 (White), 1872, 1879, 1889 (all Kelly), 1892 (Bulmer), 1893, 1897, 1901, 1905, 1909, 1913, 1921, 1925, 1929, 1933 and 1937 (all Kelly). The date when a mill was last worked usually relies on local information.

The second paragraph gives details of the mill building in 1967-8 and notes which parts of the machinery (if any) survive. The type of water-wheel used and the number of pairs of stones driven are mentioned whenever possible, together with an indication of which wheels were fed from dams.

1. BESWICK (corn). On Beswick Mill Beck. 015488.

A miller is mentioned in 1937, but the mill was not worked commercially after about 1925.

The brick and tile building, of 2 storeys and a loft, is used as a farm store and the mill-house is still occupied. There were 3 pairs of stones. The breast-shot wheel survives; it was fed from a dam. The main upright shaft, of iron, is lying outside the mill.

2. BEVERLEY (corn). On Mill Dam Beck. 047391.

When offered for sale, together with a windmill, in 1822 it contained 4 pairs of stones, a cylinder, a bolting machine, and a corn-screen; both mills had plenty of storage space, and there was a drying kiln and a dwelling house; further information was obtainable from the Hull millwrights G. and W. Boyd (*Hull Advertiser*, 1 Feb. 1822). A miller is last mentioned in 1879.

It has been demolished.

3. BIELBY (corn). On Bielby Beck. 787440.

Some of its corn was brought up a cut from the nearby Pocklington Canal. A miller is mentioned in 1937 and it ceased to be used about 1940.

The brick and tile building, of 3 storeys, is used for storage by the occupants of the adjoining mill-house. The machinery was removed about 20 years ago but some of the wooden furniture remains. The wheel, which was probably undershot, was fed from a dam (now dry). At least 1 stone remains.

4. BIRDSALL (corn). On Birdsall Mill Beck. 823664.

A miller is last mentioned in 1897. It was used before the Second World War as a saw-mill.

The stone and tile building, of 3 storeys and a loft, is used as a farm store by the occupants of the adjoining mill-house. It probably had 3 pairs of stones and the wheel, which was either overshot or pitch-back, was fed from a dam (now dry). One stone remains.

5. BOYNTON (not shown in 1850). On Gypsey Race. 141679.

It was built as a woollen manufactory before 1770 but had probably ceased to be so used by 1812. It was later used as the Boynton estate saw-mill, and in 1952-3 by a private timber company; it is not known when water power was last used.

The chalk, brick and tile building, of 2 storeys (probably once with a loft), is now used as a piggery. A small, circular, building near by, and another now demolished, were probably connected with the manufactory, perhaps as wool-drying houses.

6. BRIDLINGTON (corn). On Gypsey Race. 183667.

It was powered by steam as well as water by 1846. A miller is last mentioned in 1872, and by 1882 it was a steam-powered saw-mill. It was later known as the Victoria Saw Mills, and it may have been worked by electricity by 1890, when it supplied power to light the sea-front parade.

The present brick building, of 3 storeys and a loft, was perhaps built in 1873 (date on tie-rod heads). It is used as workshops. The wheel was fed from a dam (now filled in).

7. BRIDLINGTON, ANTI (later MEDFORTH'S) MILL (corn). On Gypsey Race. 176668.

It was an 'anti-monopoly' mill for a period, operated co-operatively to combat the excessive charges made by other millers. It was worked in conjunction with a nearby windmill. A corn miller (Robert Medforth) is last mentioned in 1864, and the mill was used for making artificial manure in 1868. It is said to have been last used in 1904. Medforth & Hutchinson (later Medforth & Co.) ran it together with a nearby manure manufactory which had originated as a steam-driven bone mill.

The brick and tile building, of 4 storeys and a loft, is now used as a workshop; the mill-house is still occupied. It ran at least 2 pairs of stones and 2 stones remain (in position). The wheel was probably undershot.

8. BRIDLINGTON, SPRING or LOWSON'S MILL (corn). On Gypsey Race. 181668.

It was operated in conjunction with a nearby windmill, and it had steam power by 1889. A miller is last mentioned in 1913 and it went out of use during the First World War.

The cement-rendered brick and tile building, of 4 storeys, is used for storage and as a garage. The wheel was probably undershot.

9. BURTON AGNES (not indicated in 1850, but corn). On Mill Beck. 105630.

A miller is last mentioned in 1840 and it was called Old Mill in 1850, when it may already have been disused.

It has been demolished. The wheel was fed from a dam (the 'village pond'). A nearby house, perhaps the mill-house, bears the dare '1769'.

10. COTTINGHAM, NORTH MILL (corn). On Mill Beck. 047334.

A windmill was built next to it soon after 1813 and steam power was later used as well. It was bought by Hull Corporation in 1879 in connection with rhe waterworks upstream, and these works may have affected its water supply. A miller is last mentioned in 1897 and it was demolished in 1900. Illustrations (e.g. in *Hull Daily Mail*, 28 Mar. 1956) show a small 2-storied water-mill, with a tall tower windmill next to it.

11. COTTINGHAM, SNUFF MILL (worsted). On Mill Beck. 050323.

A corn mill, usually called South Mill, was replaced by a newly-built paper mill in the early 18th cenrury. Snuff was made there in the late 18th and early 19th centuries. It was called a worsted mill in 1855 and oil-press bagging for Hull was made until it became disused about 1900. Towards the end it also used steam power.

It has been demolished, but the adjoining mill-house is still occupied.

12. DRIFFIELD, WALK (later ALBION) MILL (corn). On The Beck. 027574.

Walk Mill was built in the late 18th or early 19th century as a wood-turning mill to make spindles, bobbins, etc. (C. T. Holderness, *Some Driffield Incidents 117 years Ago*, pp. 53-54). Albion Mill was built near by as a steam-driven corn mill in 1847, but soon after that date Walk Mill was acquired by the firm and the two mills were run in conjunetion with one anorher under the name Albion Mill (H. D. Watts, 'Industrial Geog. of Rural E. Yorks'., Hull Univ. M.A. thesis, 1964, p. 91). A miller is last mentioned in 1901, when water as well as steam was still said to be used.

The brick and slate building, of 4 storeys, is partly derelict and is disused; the adjoining mill-house was occupied until 1967. The wheel was probably undershot.

13. DRIFFIELD, BELL MILLS (bone and corn). On Driffield Trout Stream. 030566.

An old-established corn mill was rebuilt in 1792 as a textile and carpet manufactory. By 1823 it was used for corn-milling, paper-making and flax-spinning. This was a 4-storied brick building. It had 2 breast-shot wheels: one was replaced by a turbine in 1893, the other (made by Hewes & Wren of Manchester) was used until 1937. Steam power was also installed in 1893. There were 3 pairs of stones, but rollers were installed in 1882 and the stones were used only for animal feed after 1890. In 1938 the mill was powered by water

(turbine), steam and electricity. It was burnt down in 1949 (*A Model Country Mill*, 1921 and 1938 edns., and information kindly supplied by Mr. E. B. Bradshaw).

A modern brick mill, largely of 6 storeys, was built on the old site in the 1950s: the 1792 section was rebuilt in 1951, and an extension of 1934 was rebuilt in 1955 (stones on building). It is now powered by a turbine working in parallel with an electric motor. The old mill-house is still occupied.

14. DRIFFIELD, KING'S MILL (corn). On Driffield Beck. 015574.

It was burnt down in 1906. It was then a 4-storied building; by 1893 it used steam as well as water and had rollers.

The mill-house is still occupied. The wheel was fed from a dam.

15. DRIFFIELD, POUNDSWORTH MILLS (corn). On Driffield Trout Stream. 023563.

A miller is last mentioned in 1889.

It has been demolished. The wheel was probably undershot.

16. EDDLETHORPE, LOWER MILL (corn). On Mill Beck. 770665.

A miller is last mentioned in 1933 and it was last worked about 1945.

It has been demolished. The wheel was perhaps undershot and was fed from a dam.

17. EDDLETHORPE, OLD MILL (corn). On Mill Beck. 771661.

It was last worked about 1925. Millers are not separately mentioned and it may have been worked in conjunction with Lower Mill.

The brick and tile building, probably of 2 storeys and a loft, is much-altered and used as a store. It may have run 2 pairs of stones. The wheel was probably undershot.

18. ELLERKER, SPILMAN'S MILL (corn). On Ellerker Beck. 924297.

When offered for sale in 1816 it had 2 houses for dwellings and offices (*Hull Advertiser*, 10 Feb. 1816). It was operated in conjunction with a nearby windmill, which was demolished in 1913. A miller is last mentioned in 1893 and the water-mill may have gone out of use with the windmill.

The brick and tile building, of 2 storeys, is now used as a dwelling-house, and the mill-house is also occupied. The wheel may have been overshot.

19. FOSTON ON THE WOLDS (corn). On Foston Beck. 093548.

A new mill was built in or soon after 1747. In 1792-6 it was extensively repaired (E.R.R.O., DDSQ (2), box 1) and in 1796 it had 2 water-wheels, 4 pairs of stones, 2 flour cylinders, 4 bolting mills, 2 corn-screens, a fan and a corn-drying kiln (Y.A.S. MS. 709b). Boats were able to reach the mill from the River Hull. It used steam as well as water power by 1854, and it later had a turbine. It was burnt down about 1895-6. A small building was later put up on part of the site and a miller is mentioned in 1925 and 1929; grinding was by rollers.

The brick and tile building, of 2 storeys, is now put to farm uses. It still contains a turbine. The stump of a windmill stands a short distance away and may have been worked in conjunction with the water-mill. The mill-house is still occupied.

20. GOODMANHAM (corn). On Mill Beck. 884424.

When offered for sale in 1813 it was described as a new-built paper mill, with drying loft and store, containing an engine, a vat, and 2 presses (*Hull Advertiser*, 6 Feb. 1813). For sale again in 1818, it was described as a new-built wind and water corn mill, 'quite complete and capable of doing much business' (E.R.R.O., DDBV/55/27). Illustrations (in the church) show the mill-house, windmill and water-mill in one continuous range of buildings. A miller is last mentioned in 1913.

It has been demolished, though the much-altered mill-house is still occupied.

21. HAYTON (corn). On Hayton Beck. 822459.

A miller is last mentioned in 1933.

The brick and slate building, of 3 storeys, is used as a dwelling (with the adjoining mill-house). The wheel, which was probably breast-shot, was fed from a dam. Two stones remain.

22. HOTHAM (corn). On Hotham Beck. 895347.

A miller is last mentioned in 1872.

It has been demolished. The nearby mill-house is still occupied.

23. HOWSHAM (corn). On River Derwent. 730628.

A miller is mentioned in 1937 and it went out of use soon after the Second World War. It was subsequently burnt out and now stands derelict. There are dated graffiti, the oldest of 1760.

The building is of brick, faced with stone, and tile, and has 2 storeys and a loft (see Plate 3). There were 2 pairs of stones. The undershot wheel, which is still in position, was fed by a race from the Derwent. The river level is raised by a weir, and boats on the Derwent Navigation used a cut, with a lock, to by-pass the mill. Inside, much of the machinery collapsed during the fire, but the gearing survives, together with 4 whole and 2 broken stones. There is a dresser and 2 other machines, one possibly a cake-crusher.

24. LEAVENING (corn). On Leavening Beck. 783630.

A miller is last mentioned in 1913, but it is said to have been used until about 1960.

The stone and tile building, of 2 storeys and a loft, is now used as a garage by the occupants of the adjoining mill-house. It probably had 2 pairs of stones. The wheel, which was overshot or pitch-back, was fed from a dam (now dry). One stone remains.

25. LEPPINGTON (corn). On Leppington Beck. 766607.

A miller is mentioned in 1937 and it was used until about 1950.

The brick and tile building, of 2 storeys and a loft, is now used as a farm store by the occupants of the adjoining mill-house. It had

2 pairs of stones. The wheel, which was overshot, was fed from a dam (now dry). The axle and hubs of the wheel survive. Inside, the gearing remains, together with 3 stones (in position); there is also a corn-dresser. A saw-bench outside was powered by the water-wheel.

26. LOCKINGTON, BRYAN MILL (corn). On Bryan Mills Beck. 015463

When offered for sale in 1824 it was worked with a nearby windmill (*Hull Advertiser*, 23 Jan. 1824). The latest building on the site was erected in 1854. A miller is last mentioned in 1909 and it went out of use about 1920.

It was demolished in 1954 during road improvements, but the adjoining mill-house is still occupied. The wheel was overshot.

27. LOWTHORPE (corn). On Lowthorpe Beck. 087605.

The mill was described as 'lately re-edified' in 1642 (Y.A.S., MS. 709a). It is said to have been rebuilt in 1771. In 1796 it had 3 pairs of stones (Y.A.S., MS. 709b). A miller is mentioned in 1937 and it went out of use at about that time.

It has been demolished, but the adjoining mill-house is still occupied. The brick and tile mill was of 4 storeys, with a loft, and had a timber lucarne. The wheel, which was probably undershot, was made by Alton, of Driffield.

28. MENETHORP (corn). On Menethorp Beck. 770677.

A miller is last mentioned in 1872.

It has been demolished.

29. MILLINGTON (corn). On Millington Beck. 833520.

A miller is last mentioned in 1909, but it was used as a saw-mill in the 1920s.

It has been demolished and the adjoining mill-house is derelict. The wheel, which may have been breast-shot, was fed from a dam (now dry).

30. NABURN (corn). On River Ouse. 593445.

A mill was built in the late 18rh century, standing on an island between the river and the lock-cut; it was 3-storied and the wheel was fed from the cut, discharging into the river below the weir. Working hours were limited by the tides. In the 1860s it was used for grinding flint and Cornish stone for West Riding potteries, before reverting to corn-milling (W. Camidge, *Ouse Bridge to Naburn Lock*, 1890, pp. 486-90). It was burnt down in 1877 (*Eastern Counties Herald*, 28 June, 1877) but rebuilt. The new building was damaged by fire in 1913 but afterwards reconstructed, the wheel being replaced by a turbine. A miller is mentioned in 1937 and it went out of use about 1955. The mill was maintained by Porteus, of Leeds.

It has been demolished. One stone remains.

31. NAFFERTON (corn). On Nafferton Beck. 058589.

The mill was described as in 'great ruin' in 1606 (P.R.O., E 310/198/49). In 1819 it had 5 floors, 6 pairs of stones, machinery for shelling oats, a cylinder, a bolting mill, and a drying kiln

(E.R.R.O., DDX/24/21, p. 93). The latest mill on the site was built in 1840 (date on building) as a corn mill and malting. It was still a combined mill and malting in the 1890s but it was subsequently used solely as a malting and this remained in operation until 1966. Steam power was added in the 19th century and later electric power too, but for a period the water-wheel was used in cleaning the barley.

The brick and slate building, of 5 storeys, is now used for chicken-rearing. The breast-shot wheel survives; ir was fed from a dam. There is also a corn-dressing machine.

32. NORTH CAVE, HIGH MILL (corn). On North Cave Beck. 892327.

A miller is mentioned in 1937, though it is said to have gone out of use in the 1920s.

The brick and tile building, of 2 storeys, is now derelict; the adjoining mill-house is still occupied. The mill bears the date '1750' on a key-stone over the doorway. It had 2 pairs of stones. The wheel was undershot. Some wooden furniture and 2 whole stones (one in position) and 2 half stones remain.

33. NORTH CAVE, LOW MILL (corn). On North Cave Beck. 889318.

A miller is last mentioned in 1872.

It has been demolished, but the mill-house is still occupied. One stone remains.

34. NORTH CAVE, PAPER MILL (corn). On North Cave Beck. 894328.

As the name suggests, it was probably used for a short period for paper-making; a paper-maker is recorded in the village in 1823. A miller is last mentioned in 1925 and it is said to have gone out of use in 1937.

The brick, stone and tile building, of 2 storeys and a loft, is now used as a dwelling, together with the adjoining mill-house. The wheel was probably undershot.

35. NORTON, HIGH BECK MILL (corn). On Mill Beck. 793706.

Millers are not mentioned: it may usually have been run in conjunction with Low Beck Mill, Norton.

The brick, stone and tile building, of one storey and a loft, is now used as a store. The wheel, which was probably undershot, was fed from a dam now used—like that at Low Beck Mill—for breeding fish.

36. NORTON, LOW BECK MILL (corn). On Mill Beck. 791711.

A miller is mentioned in 1937 and it was worked commercially until 1967, when milling ceased.

The brick, limestone and tile building is of one storey with a loft. The undershot water-wheel (made by Anthony Fish, of Malton), which was fed from a dam, remains, together with the gearing and all the stones (in position); there is also a kibbling-mill. The mill ran 3 pairs of stones, all at one time driven by the wheel. By 1897 a steam engine was used to drive one pair of stones; it was replaced

in 1927 by electricity, again driving only one pair of stones, and the other 2 pairs went out of use. In its last years the mill used water power only for the sack hoist.

37. OWSTHORPE (corn). On Ridings Beck. 816512.

A miller is last mentioned in 1879. After 1887 and until about 1910 a farmer had a wooden building on the site to grind for his own use.

It has been demolished. The wheel, which was probably overshot, was fed from a dam (now dry).

38. POCKLINGTON, CLOCK MILL (corn). On Pocklington Beck. 807496.

The mill was rebuilt after being burnr down in 1805 (Borthwick Institute of Hisrorical Research, CCD Deanery Estates). A miller is last mentioned in 1879, but it was used for grinding corn until about 1920 and for making electriciry, probably with a turbine, until about 1937. Ir ran 2 pairs of stones.

The brick and slate building is of 2 storeys, a third having been removed; the nearby mill-house is still occupied. The mill is now used as a store. The wheel was fed from a dam (now dry). Three stones (2 in position) still remain.

39. POCKLINGTON, DEVONSHIRE MILL (corn). On Pocklington Beck. 801478.

There was apparently no mill here until the presenr building was erected on land bought for the purpose in 1808. It is not far from the head of Pocklington Canal, which was built under an Act of 1814-15. Water power at the mill was supplemenred by steam by 1893 and oil by 1905. A miller is mentioned in 1937 and the mill was worked until about 1947.

The brick and tile building, of 4 storeys and a loft, is now largely disused; the adjoining mill-house is still occupied. The mill has a wooden lucarne. It ran 4 pairs of stones. The breast-shot wheel remains, together with most of the gearing, 2 pairs of stones (in position), much of the wooden furniture and some implements.

40. POCKLINGTON, ENGLISH'S MILL (corn). On Pocklington Beck. 804491.

A miller is last mentioned in 1921.

It has been demolished. It is said to have been of 2 storeys and to have run 2 pairs of stones. The wheel was fed from a dam.

41. POCKLINGTON, LOW (later WHITE) MILL (corn). On Pocklington Beck. 799483.

A miller is mentioned in 1937. Water was supplemented by steam power by 1893, and by gas as well by 1913. The stones were replaced by rollers by 1892. Steam and rollers were probably installed in or soon after 1882.

The brick and slate building, partly of 5 storeys, is now used for drying grain and for storage. The nearby mill-house remains. The wheel was fed from a dam.

42. POCKLINGTON, ST. HELEN'S GATE MILL (corn). On Pocklington Beck. 806493.

Although a corn mill in 1850, it was used as a saw-mill before the end of the century; it was still so used until after the Second World War, but no longer driven by the water-wheel.

The adjoining mill-house is still occupied and the mill is used for storage. It is a brick and tile building of 2 storeys and a loft. The wheel was fed from a dam (now dry).

43. RUSTON PARVA, BRACEY BRIDGE MILL (corn). On Lowthorpe Beck. 079619.

It was much out of repair in 1796, when it was recommended that a larger wheel be insralled so that 2 instead of one pair of stones could be worked (Y.A.S. MS. 709b). It is said to have been rebuilt in 1806 (J. J. Sheahan and T. Whellan, *A History of York and the East Riding*, vol. ii (1856), p. 489). A miller is last mentioned in 1925, but it was worked until about 1942.

The brick and rile building, of 3 storeys and a loft, is now used for storage and is partly derelict. The adjoining mill-house is srill occupied. The undershot water-wheel survives (see Plate 4), together with the gearing, 3 pairs of stones (in position), and 4 other stones and the wooden furniture (see Plate 6); there is also an oat-roller. The wheel was fed from a dam.

44. SCAMPSTON (corn and wood). On Scampston Beck. 867744.

A miller is last mentioned in 1933 but it was not worked commercially after about 1925.

The brick and tile building, of one storey and a loft (see Plate 1), is not used; rhe adjoining mill-house is still occupied. The breast-shot wheel survives, together with the gearing, 3 pairs of stones (in position), and the wooden furniture. A dismantled oat-roller and the drive for a saw also remain. The wheel was fed from 2 dams.

Dates of building and alteration are suggested by 2 srones; a barn has a date-stone for 1777, and a stone with the date 1776 (the last figure difficult to read) has been inverted and ineorporated in the wheel-house; this second stone has been recut with the date 1898 (the third figure difficult to read) and the wheel itself bears the date 1897.

45. SETTRINGTON (corn). On Settrington Beck. 837704.

A miller is last mènrioned in 1933 and it went out of use during the Second World War.

The brick, limestone and tile building is of 2 storeys and a loft; it bears the date 1790. It is now partly used as living accommodation, together with the adjoining mill-house. The wheel, which was fed from a dam (now dry), was supplemented by oil power by 1925.

46. SHERBURN, HIGH MILL (corn). On East Beck. 963763.

A miller is last mentioned in 1913, but corn was ground until the 1930s and the mill now produces animal feed using electric power.

The brick and slate building is of 3 storeys and a loft. The adjoining mill-house is still occupied. The gearing survives, together with 2 stones. The wheel was pitch-back and was fed from a dam.

The mill and mill-house carry 4 date-stones: 2 for 1842, one 1843 and one 1851. One inscription reads 'reconstructed with new machinery and water courses 1842 MDL'.

47. SHERBURN, LOW MILL (corn). On East Beck. 963767.

A separate miller is last mentioned in 1892, but it may have been later worked together with Sherburn High Mill.

The brick, stone and tile building, of one storey and a loft, is now derelict; the nearby mill-house is still occupied. The mill ran 2 pairs of stones. The wheel, which was overshot or pitch-back, survives, together with the gearing and one stone (see Plate 5).

48. SKIRPENBECK, HAYBRIDGE MILL (corn). On Skirpen Beck. 760571.

There are surviving accounts of repair work in 1744-5 and 1751-3; there were apparently then 3 pairs of stones (E.R.R.O., DDDA/4/68). A miller is mentioned in 1937 and it was worked until about 1945.

The brick and tile building, of 2 storeys and a loft, is now used for farm purposes; the nearby mill-house is still occupied. The mill worked only one pair of stones. The pitch-back wheel survives, together with one stone (in position) and one broken stone. The wheel was fed from a dam (now dry).

49. SOUTH NEWBALD, LOWER MILL (corn). On Newbald Beck. 908358.

A miller is mentioned in 1937 and it was used until 1953. It and the adjoining mill-house were demolished in 1954 and a new house built on the site. The mill was a 2-storied building of limestone and tile (photograph in the possession of the owners). When offered for sale in 1858 it had 3 pairs of stones (E.R.R.O., DDJ/12/13).

The wheel was fed from a dam. Six stones remain.

50. SOUTH NEWBALD, UPPER MILL (corn). On Newbald Beck. 910361.

Millers are not mentioned, but it may have been worked in conjunction with Lower Mill.

The brick and limestone (now iron-roofed) building of one storey is now used as a pig-sty. The wheel was fed from a dam. One broken stone remains.

51. STAMFORD BRIDGE (corn). On River Derwent. 713556.

A miller is mentioned in 1937 and it was worked until 1964.

The brick and tile building, of 5 storeys and a loft, was being converted into an hotel and restaurant in 1967. It formerly had 2 wheels and 7 pairs of stones. One wheel apparently became disused in the 19th century and it was removed during the conversion, but some of the gearing belonging to it survives; it worked 4 pairs of stones. The other wheel remains, together with the gearing; it once

worked 3 pairs of stones, but latterly only 2, which remain (in position). The surviving wheel is undershot. The wheels were fed by a race from above a weir across the river. Boats using the Derwent Navigation used a cut and lock to by-pass the mill.

52. SUTTON UPON DERWENT (corn). On River Derwent. 704474.

A miller is mentioned in 1937 and it was used until 1960.

The brick and tile building with stone dressings is of 3 storeys and 2 loft floors; it is now derelict (see Plate 2). Iron columns support the first and second floors. It had 7 pairs of stones, 4 driven from one wheel and 3 from another, together with 3 more pairs in a nearby building, to which power was supplied by a shaft drive. The 2 undershot wheels survive, together with the hubs of both pit wheels. There are 14 stones remaining, some of them in position. The wheels were fed by a race from above a weir across the river. Boats using the Derwent Navigation used a cut and lock to by-pass the mill. Two subsidiary buildings stand near by—one a drying kiln, rhe orher containing stones (see above).

53. THORNTON, WALBUT (or WARBUTT) MILL (corn). On The Beck. 772441.

A miller is last mentioned in 1901.

The brick and tile building, of 2 storeys and a loft, is now used as a pig-sty and farm store, together with the adjoining mill-house. It had 3 pairs of stones. The wheel was probably undershot.

54. WANSPORD (corn and bone). On River Hull. 063561.

In 1790 a large new cotton and worsted mill was completed next to a small existing fulling mill. The chief product was carpets, and the manufactory remained in operation until at least 1823. The building was let to a corn miller in 1833 and, as a corn and bone mill, it was used until the 1890s; a miller is last mentioned in 1893. The fulling mill had been fed by a race from the river, but after 1790 both it and the manufactory used a large dam constructed between the river and the Driffield Canal. By 1856 steam was used to supplement water power, and it is said that the iron water-wheel was made by Mr. Harker, of Driffield (J. J. Sheahan and T. Whellan, *A History of York and the East Riding*, vol. ii, p. 487).

Both mills have been demolished and the dam is dry. A building surviving on the canal bank may be a warehouse used by the miller in the later 19th century. The outline of a building measuring about 80 ft. by 30 ft. was visible in the scorched grass in 1967, and a picture of the manufactory suggests that it had 3 storeys (*The Dalesman*, May 1966).

55. WANSFORD (corn). On Nafferton Beck. 065562.

A miller is last mentioned in 1929, but it is said to have ceased to be worked about 1920.

The brick and tile building, of 2 storeys and a loft, is now used as a farm store and the adjoining mill-house is still occupied. The mill probably had 2 pairs of stones. The wheel was undershot. One stone remains.

56. WATTON (corn). On Watton Beck. 016498.

A miller is last mentioned in 1879.

It has been demolished, but the mill-house is still occupied.

57. WELTON, HIGH MILL (corn). On Pool Beck. 961277.

A miller is last mentioned in 1937 and it was worked by water power until 1946 and by electricity until 1966. From about 1904 onwards water power was supplemented by a paraffin engine, and from about 1914 onwards by a gas engine.

The brick and tile building, of 5 storeys, is now unused and the nearby mill-house unoccupied. The mill ran 3 pairs of stones. The breast-shot wheel survives, together with much of the gearing and a dozen stones. The wheel was fed from a dam; a second dam fed an earlier mill at the site. The wheel-house bears the date 1861, the year when the top 2 storeys were added to the mill, the large wheel installed, and the peculiar warer arrangements adopted. (Much information has been kindly supplied by Mr. E. Ling, of Welton).

58. WELTON, LOW MILL (not described in 1850, but corn). On Pool Beck. 958273.

Millers are not mentioned, bur at least in the early 19th century it was worked rogether with High Mill (E.R.R.O., DDHB/52/72). It was demolished soon after 1900.

59. WINTRINGHAM, LINTON MILL (corn). On Wintringham Beck. 872742.

A miller is mentioned in 1937 and it was worked by water until about 1950. The mill now produces animal feed and is powered by electricity. As a corn mill it ran 2 pairs of stones.

The chalk, stone, brick and tile building is of 3 storeys and a loft. The adjoining mill-house is still occupied. The wheel, which was overshot, was fed from a dam (now dry). Two stones (one in position) survive, together with the pentrough (made by Derwent Foundry, Malton).

Bibliography

The specialist literature on water-mills is not extensive, although there are, of course, many books and articles which contain some information on the subject. The best general accounts of mills and corn-milling are:

R. Bennett and J. Elton, *History of Corn Milling* (3 vols., 1898-1900), especially vol. 2 (Watermills and Windmills) and vol. 3 (Feudal Laws and Customs).

A History of Technology, ed. C. Singer, E. J. Holmyard, A. R. Hall, and T. I. Williams, vol. 4 (1958), chap. 7.

A recent book devoted to water-mills in this country, providing a useful introduction to the subject, is:

L. Sysons, *British Watermills* (1965).

Among the pamphlets which have been issued by the Society for the Protection of Ancient Buildings are:

P. N. Wilson, *Water Mills: an Introduction* (1956).

R. Wailes, *Tide Mills* (1956 and 1957).

R. A. Pelham, *Fulling Mills* (1958).

A. H. Shorter, *Water Paper Mills in England* (1966).

D. Luckhurst, *Monastic Watermills* (no date).

Articles devoted to water-mills in individual counties are:

J. Addison and R. Wailes, 'Dorset Watermills', Newcomen Society, *Transactions*, vol. xxxv, with an addendum in vol. xxxvi.

R. Wailes, 'Suffolk Watermills', Newcomen Soc., *Trans.*, vol. xxxvii.

Information relating to water-mills in the East Riding has been collected from a variety of manuscript and printed sources, and some indication of these is given in the footnotes in this booklet.

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