

The following chapter of the book describes the spread, particularly in Wiltshire, Dorset and Hampshire, of a new agricultural technology that, after about 1600, developed the watering of meadows. It deals with construction, operation (particularly on the Wessex chalkland), economics, and the substantial increase in the value of meadows when irrigated in this way.

In the book Dr Bettey's notes and references are consolidated with those of the other chapters; here they have been extracted to form a very full review of the material since the seventeenth century, the first since the work of Dr Eric Kerridge in the early 1950's. Most of the early material can be found in, variously, the Library of the Dorset Archaeological Society, Bristol University and the Institute of Agriculture at Reading.

THE DEVELOPMENT OF WATER MEADOWS IN THE SOUTHERN COUNTIES

JOSEPH BETTEY

University of Bristol

1. Introduction: The spread of a new agricultural technology

It was in the valleys of the chalk downlands in southern England that the practice of watering meadows through complex systems of hatches, sluices, channels and drains reached its fullest extent and became, for some three centuries after 1600, a vital element of the farming regime. The clear, fast-flowing chalk streams of Wiltshire, Dorset, Berkshire, Hampshire and Sussex, with their constant temperature, valuable nutrients and calcareous nature were ideally suited for watering meadows and for encouraging an early and abundant growth of grasses. (Cutting and Cummings, *this volume*). From chalklands the idea was to spread into neighbouring areas through the use of hillside or 'catch-work' meadows and to alluvial sites on non-chalk rivers. The remains of many thousands of acres of (now-disused) water meadows survive along most of the chalkland valleys as witness to the former importance of this remarkable farming method. This chapter will describe the origins of the system in the Wessex downlands, the manner in which the practice spread so rapidly, the costs and difficulties of creating efficient meadows, the profits and benefits to be derived from them, and the essential part they fulfilled in the farming system of the region.

The earliest references to full-scale and complex watering of riverside meadows by artificial means, as opposed to the use of naturally-occurring winter floods, are found early in the seventeenth century. The idea of creating meadows which could be watered at will through a system of hatches and channels was publicised by Rowland Vaughan in his book *The Most Approved and Long Experienced Water Workes*, which was published in 1610 and described Vaughan's work in the Golden Valley, Herefordshire. The Vaughans had family and business connections with the Herberts, Earls of Pembroke whose widespread Wiltshire lands included many chalkland manors, and Vaughan wrote a dedicatory letter to William, Earl of Pembroke. (Wood, 1897).

Although there is no direct evidence, it seems likely that it was this family connection that water meadows were first introduced into the southern chalklands. Certainly, the expensive business of installing the necessary hatches and channels, adapting riverside meadows with ridges and drains so that the water was evenly distributed and did not stagnate but was kept moving briskly over the surface, was actively encouraged by the Herberts and by other leading landowners. The heavy initial expense of creating a water meadow meant that, at first, it was essentially a *manorial* rather than an *individual* enterprise, and the earliest references are to be found in manorial records. The first evidence for a fully-developed system occurs in the manorial Court Book of Affpuddle, Dorset, where the landlord, Sir Edward Lawrence, was keenly interested in agricultural improvement. In 1605 there are references to ditches and channels being constructed in the meadows along the river Piddle, and in 1607 and 1608 complaints were made about the use of the water and disturbance to the ancient water course. In 1610, the year of publication of Vaughan's book, it was agreed at the Affpuddle manorial court that three men should be appointed to oversee watering of the meadows, that the tenants should pay for the work in proportion to their holdings of meadow land, and that no one should interrupt the work or interfere with the channels. (DRO, DFRA/M1; Brocklebank, 1968,22, 54-6).

The active encouragement and interest of the lord of the manor, as well as pressure from the wealthier freehold and leasehold tenants in persuading copyholders to embrace the new ideas, is also evident at Puddletown, Dorset. At the

manorial court held in October 1629 the lord, Henry Hastings, was present when 'a greate debate beinge theare had and questions moved by some of the tenants', it was agreed that one of the leaseholders, Richard Russell, and others should be allowed to continue with the work already started 'for the watering and Improvinge of their groundes in Broadmoor'. In this new and untried project, success was not assured, and the agreement contained a provision that '... yf yt shall appeare after the maine watercourse shalbe made throughe the said grounde thatt Improvement cannot be made upon some good part of Mr Woolfries groundes out of the same watercourse, ... that then the said Mr Russell shall fill in the said watercourse againe att his owne costes all alonge in Mr Woolfires ground ...'. Richard Russell was evidently prepared to accept the risk of failure of at least part of the scheme in his enthusiasm to press ahead with it. (DRO, D/PUD/H2, fols 5-7, 8-9v, 17-22v, 60-61v, 189; Bettey, 1977). Clearly the advantages of water meadows in providing early grass were quickly apparent to neighbouring manors along the Piddle and Frome rivers, and in his *Survey of Dorset* c1630 the local landowner, Thomas Gerard, wrote of the river Frome passing 'amongst most pleasant Meadows, maine of which of late yeares have been by Industrie soe made of barren Bogges'. (Gerard, 1980 edn.).

Other Dorset landowners were also active in promoting the creation of water meadows. At Warmwell on a tributary of the river Frome a water meadow was constructed during the 1630s at the instigation of the lord of the manor, John Trenchard, an active land speculator and money lender. Theophilus, earl of Suffolk also encouraged the tenants on his Lulworth estate in agricultural improvement, and during the 1630s water meadows were laid along the Frome at Burton, West Lulworth, Winfrith Newburgh and Bindon. (Bettey, 1977, 39-40). At Winfrith Newburgh in 1636 the Earl entered into an elaborate agreement with his tenants to share the costs 'in consideration the said Earle is pleased by way of watering ... to improve the Meadow called Winfrith Mead'. The agreement was signed by the Earl and 22 tenants. (DRO, D/WLC/E130).

Meanwhile, in south Wiltshire similar developments were taking place under the influence of the Earl of Pembroke. There are references to meadows called 'water mead', 'water close', and 'wet mead' in the court rolls of the Earl's manors of Chalke, Chilmark and Netherhampton during the 1620's, and in 1632 a detailed agreement for the creation of a water meadow was included in the court roll of Wylde. It is clear from this that the practice of watering was already understood, and the agreement provided for the management of the meadow, the rights of the tenants, the necessary construction costs and payments for maintenance and management. John Knight of nearby Stockton was employed to 'drawe a sufficient and competent quantitie of water of the River of Wylde, out of the same River, sufficiently to water and flott all the said groundes or soe much thereof as by industry and art may be watered or flotted ...'. (Kerridge, 1953a, 38-40 and 1953b, 105-118). John Aubrey, who had himself farmed at Chalke recalled in 1680 that 'the improvement of watering meadows began at Wylde about 1635, at which time we began to use them at Chalke ...'. (Aubrey, 1847 edn., 104). Aubrey also recalled the making of water meadows around Salisbury and along the Kennet in north-east Wiltshire at the same time. (*Ibid.*). By the later decades of the seventeenth century water meadows were already a well-established feature of Wiltshire chalkland manors, especially along the several rivers which converge on Salisbury. (Kerridge, 1953, 112-5; 1954, 286).

During the 1640s and 1650s there are numerous references to water meadows being constructed in Hampshire along the Test, Itchen and Meon and in 1669 John Worlidge of Petersfield, Hampshire, could describe the watering of meadows as 'one of the most universal and advantageouse improvements in England within these few years'. (Worlidge, 1669; Bowie, 1987). Likewise in a report on the husbandry of Dorset made to the Geographical Committee of the Royal Society in 1665 by Robert Seymer of Hanford near Blandford Forum, Dorset, the water meadows of the chalklands were described as an established feature of farming practice '... the greatest improvement they have for their ground is by winter watering of it, if it lye convenient for a River or lesser streame to run over it.' (Royal Society, CP, 10/3/10).

Further to the east, and beyond the chalk downlands, water meadows were in use along the Wey between Hazelmere and Frensham by 1680, and aqueducts, sluices and channels survive in many places along the valley. (Bowles, 1988, 1-9).

II. Problems of Construction

During the later seventeenth century water meadows continued to be constructed and extended throughout the chalklands. Expertise in their operation grew, and ever more complex systems were devised. For example, when a water meadow was constructed along the river Stour at Charlton Marshall, Dorset in 1659, 'able and sufficient carpenters' were obtained from Tolpudde for constructing the hatches and Henry Phelps of Turners Puddle, 'a Known Ancient, Able and Experienced waterman' was sent for to supervise the whole project, 'soe ordering the water whereby that the said groundes might be well watered ... as farr as the strength of the River would cover'. the scheme was encouraged by the landlord, Sir Ralph Bakes of Kingston Lacy, and was supported by the Provost and Fellows of Eton College who had

freehold rights in the meadows. A rate was levied on the occupiers of the land to pay for work, and thirty-six tenants contributed £62 12s 6d. (PRO, C5/58/15). The work of laying out a meadow, with precise levels and the essential network of weirs, hatches, channels and drains was inevitably complex and laborious. It required considerable expertise to divert a fast-flowing chalk stream and ensure an adequate covering of the meadow. The detailed estimates for renewing one of the hatches on the Wyndham estate at Upavon, Wiltshire during the mid eighteenth century provide an indication of some of the work involved. Piles had to be driven into the bed of the river Avon, secure foundations laid, and a false river bed construction, with two walls of solid ashlar each 48 feet long and eight feet high on either side to contain the river. The heavy wooden hatches had to be strong enough to withstand the pressure of the water; they were fixed to the foundations by iron clamps and embedded in the walls. (WRO, 2667/22).

An elaborate scheme for watering the meadows on the Avon south of Salisbury was executed during the 1670s by John and Leonard Snow, the stewards of Sir Joseph Ashe and later of his widow, Lady Mary Ashe. Joseph Ashe possessed the manor of Downton and much land along the valley of the Avon, although he lived at Twickenham. The scheme involved a long main carriage to bring the water from Alderbury some two and a half miles upstream. This supplied water to various Ashe properties before reaching Downton, and the construction involved no less than 21 agreements with landowners, farmers and millers, the construction of several bridges as well as a weir and hatches on the river Avon. The eventual cost was more than £2000 which was more than double the original estimate made by John and Leonard Snow. They justified the expense by pointing out that 194 acres of meadow could be watered and that the value of the land had been greatly increased:

‘70 acres which were worth £80 per annum are now worth £180
50 acres which were worth £20 per annum are now worth £100
74 acres which were worth £74 per annum are now worth £148’.

(WRO, 490/891-904; 1946/H21, H25. *VCH Wilts.*, XI, 54-5, 71-7).

In order to convince the tenants of Sir Joseph Ashe that the elaborate work required to create water meadows would be to their advantage, the stewards produced a list of arguments in 1676. These may be summarised as follows:

1. There would be a great increase in the crops of hay.
2. Men could keep more sheep and cattle and thus their arable ground would be improved.
3. There would be an increase in corn and grass for fattening cattle and for butter and cheese.
4. Taking water for the meadows need not hinder the miller.
5. Disturbance or damage caused to other mens' ground by digging carriages, channels. etc. would be properly compensated. (WRO, 490/890).

Further evidence of the rapid spread and potential profitability of water meadows during the late seventeenth and throughout the eighteenth century is provided by the numerous legal disputes between manorial tenants and millers over rights to water. Complex agreements were made concerning the days and times during which each party should have unrestricted use of a river or stream. There were numerous disputes involving millers at many sites along the Test in Hampshire, notably with the owner of Mottisfont mill. (Jones, 1960, 69-72). At Tarrant Rushton, Dorset in 1646 the miller complained that his watercourse was ‘obstructat et divertit causam innundationi pratori’; the construction of water meadows on the river Ebbles at Odstock, Wiltshire could only proceed after long negotiation with the owner of Odstock Mill and agreement as to the dates and times of watering and when the hatches should be shut or drawn. (Salisbury MSS 9/3; WRO, 490/900.) At Nunton near Salisbury in 1698, the tenants agreed to pay Lord Coleraine £3 per annum for the use of water from the stream above his paper mill. At Longparish on the Test in Hampshire five farmers each paid the miller 2s 0d per acre per annum for the use of his water on three days a week and also agreed to have their corn ground at his mill. (WRO, 490/894; Bowie, 1987, 157). At Milton, Berkshire in 1809 100 acres of meadow were watered from a mill stream at the rate of 1s 6d per hour, ‘and the expence is well repaid’. (Mavor, 1809, 510). A long and expensive law suit followed the creation of new hatches and water meadows at Amesbury, Wiltshire by the Duke of Queenbury in 1809 when his neighbours objected to the loss of water for their own lands. (WRO, 377/8). In 1811 Thomas Davis complained that the twenty mills on the Wylde between Warminster and Salisbury were a great hindrance to the water meadows and prevented the construction of new ones. (Davis, 1811, 253).

By the early eighteenth century the practice of watering meadows had spread throughout the downland valleys of Wiltshire, Dorset and Hampshire, and along the Lambourn and Kennet in Berkshire, the Lavant, Rother and Arun in west Sussex and the Wey in Hampshire and Surrey. (Young 1793, 44; Short, 1985, 270-313; Wordie, 1984, 329,331). In 1771 Arthur Young praised the ‘exceedingly rich watered meadows’ along the Kennet from Marlborough to Hungerford, and ‘the uncommon importance of having a command of water to throw at pleasure over grass lands’.

While travelling through Dorset he also noted the improvements made by watering, and described how one man had risen from day labourer to tenant farmer through his expertise and labour in 'bringing water over all the land that he possibly could'. (Young, 1771, III, 31, IV, 306-20). This rapid spread leaves no doubt of their benefits and profitability, and of their importance in the sheep/corn husbandry of the chalk downlands. Expert observers could describe the meadows of south Wiltshire as 'almost indispensable' and the value of the meadows as 'almost incalculable' and that 'the early vegetation produced by flooding is of such consequence to the Dorsetshire farmer that without it their present system of managing sheep would be about annihilated'. (Davis, 1794; Claridge, 1793). In the Hampshire chalklands it was regarded as essential for a successful farm to have water meadow at one end and downland grazing at the other. (Vancouver, 1810, 267).

III. The Operation of the Wessex Water Meadows

The primary purpose of the Wessex water meadows was to provide early grass for the sheep flocks which were such an essential feature of the farming system of the region. A secondary purpose was to provide an abundant and reliable hay crop to sustain the flocks during the winter. The fertility of the thin chalkland soils could only be maintained by the dung of the sheep folded intensively on the land. It was from wheat and barley that chalkland farmers derived most of their income, and large sheep flocks were essential for the production of satisfactory crops. The water meadows provided a lush growth of grass during the hungry weeks of the early spring, in March and April when the hay stocks were exhausted and some six weeks before the natural growth had started. Thus they breached the age-old barrier to agricultural progress, and by enabling farmers to keep larger sheep flocks provided the means to extend arable acreages and increase yields of corn.

As usual, William Cobbett described the situation succinctly. Writing of the Wiltshire downland in 1826, he wrote

'... *sheep* is one of the great things here; and sheep, in a country like this, must be kept in *flocks*, to be of any profit. The sheep principally manure the land. This is only to be done by *folding*; and to fold you must have a *flock*. Every farm has its portion of down, arable, and meadow; and, in many places, the latter are watered meadows, which is a great resource where sheep are kept in flocks; because these meadows furnish grass for the suckling ewes early in spring; and indeed, because they always have food in them for sheep and cattle of all sorts.'

(Cobbett, 1912 edn., II, 40).

In most chalkland manors the operation of the water meadows was closely controlled by the 'waterman', 'meadman' or 'drowner' who imposed a strictly regulated calendar. By Michaelmas each year the hatches, channels and drains would have been checked and cleared. Watering could then begin for short periods, depending on the weather and on the availability of water which was often subject to agreements with millers or other landowners. The aim of the winter watering was to encourage the growth of grass by protecting it from frost and by allowing the winter floods to deposit nutrients around the roots. The grass had therefore to be covered by a thin sheet of moving water. On no account could the water be allowed to stagnate since this would kill off the grass and encourage the growth of weeds and rushes. The ideal was for the water to 'come on at a trot and go off at a gallop'. Under the watchful eye of the waterman a Wessex meadow could produce a lush growth of grass by mid March, and this could be used to feed the ewes and lambs. They were allowed to feed in controlled sections behind hurdles for short periods each day, 400 or more couples to the acre, and straight from the fresh new grass were then folded upon the land destined for the spring-sown barley. This was the period when the water meadows really repaid the trouble and expense of their construction and maintenance. In 1794 Thomas Davis, who was the experienced steward on the Longleat estates in Wiltshire, wrote that

'...the water meadows of Wiltshire and the neighbouring counties are a branch of husbandry that can never be too highly recommended. ...none but those who have seen this kind of husbandry can form a just idea of the value of the fold of a flock of ewes and lambs, coming immediately with bellies full of young quick grass from a good water-meadow, and particularly how much it will increase the quantity and quality of a crop of barley'.

(Davis 1794, 35-8).

Arthur Young also emphasised the value of 'this spring eatage, which is of such importance to flock masters, supplying them with plenty of food at the most pinching season of the year'. (Young, 1795, 266). The sheep were removed from the water meadows at the beginning of May, because at this time they were liable to contract liver fluke and foot-rot from the damp pasture. By now the meadows would have been eaten bare, and the natural downland grazing would be available for the sheep. The meadows could then be watered for a few days and thereafter left for hay. Watered meadows would produce twice as much hay as unwatered land, and the crop could be gained in spite of drought. The hay had to be cut young, about mid-June, or it rapidly became coarse, but yields of two tons to the acre were common. (Young

1808, 222; Vancouver 1810, 276-7; Bowie 1987, 153). Occasionally the water meadows were watered again to produce a second hay crop, but generally they were used for grazing cattle during the late summer when drier conditions meant that they would not 'poach' the ground or damage the intricate network of channels and drains.

Between them, the water meadows and the sheep flocks were the pivot around which downland farms evolved, being the requisites to the production of cash crops of wheat and barley. By the nineteenth century the meadows were so much part of the landscape that in 1878 Thomas Hardy could describe the view from the height of 'Egdon Heath' across 'meadows watered on a plan so rectangular that on a fine day they look like silver gridirons'. (Hardy, 1968 edn., 205).

IV. Costs and Profits

The costs of creating a watermeadow and expenses of operating it varied enormously, depending upon the location, gradient, water flow and other demands upon the water, as well as the original condition of the meadow, so that precise figures can be misleading. Nonetheless various contemporary sources and observers provide examples of capital costs and on-going expenses. The water meadow at March Moores, Twyford, Hampshire cost approximately £3 6s 0d per acre to construct in 1670-72, and Otterbourne Mead, Hampshire just over £6 0s 0d per acre in 1730-31. (Bowie, 1987, 155). Writing of Dorset in the 1780s George Boswell estimated the average cost as £6 0s 0d, while William Stevenson in 1812 put the cost at £7-£8 per acre. (Boswell, 1790, 108-0; Stevenson, 1812, 370). Thomas Davis, describing the Wiltshire meadows in 1794, put the cost at between £12 and £20 per acre, but stated that watered land increased threefold in value. (Davis, 1794, 30-8); in early nineteenth century Hampshire the cost was estimated at £8 or £9 per acre. (Moon & Green, 1940). It was generally agreed that once constructed the annual costs were low.

The authors of the various county surveys or 'General Views' produced for the newly-created Board of Agriculture during the 1790s and early 1800s, were enthusiastic advocates of the benefits of water meadows, and gave figures to support their arguments. William Mavor described the 56 acres of water meadows laid out along the Thames on the estate of Edward Lovedon at Buscot. These cost just over £2 0s 0d per acre and the annual expense was less than 10s 0d per acre, while the work 'has doubled the original value and produce of the land'. (Mavor, 1809, 369-70).

Charles Vancouver provided figures for the profit to be made from an acre of water meadow in Hampshire. He calculated that the expense per annum including interest on the capital invested in making the meadow plus labour, maintenance, rates and title would amount to £5 18s 6d per acre. The income included spring feed for 400 ewes and lambs at 1d for each couple per acre totalling £1 13s 4d; a crop of hay worth £4 17s 6d; a second hay crop or rent of the late summer grazing £2 12s 6d; giving a figure of £9 3s 4d, to which could be added the value of the sheep fold straight from the meadow which he calculated was worth at least 16s 8d per acre, giving an overall total income of £10 0s 0d, or an annual profit per acre of £4 1s 6d. (Vancouver, 1810, 276-7). In the *General View* for Sussex the Revd. Arthur Young produced a similar calculation showing an annual profit per acre of £4 8s 6d exclusive of the value of the sheep fold. (Young, 1808, 222).

Further evidence of the profitability of water meadows is provided by the high rents which could be charged. At Compton, Hampshire in 1738 the rent of unwatered meadow was 20s per acre while water meadow was let at 40s. (Thirsk, 1985, 68). Unwatered meadows on the Itchen around Winchester in 1808 were said to be worth only a third as much as the water meadows. (Bowie, 1987, 157). At Britford, Wiltshire the water meadows were let in 1839 for 80s per acre, while dry meadow was rented for 40s. (Bowie, 1987, 156).

Thomas Davis summed up the situation in Wiltshire when he wrote of the water meadows that 'the improvement in the value of the land is astonishing' and that their usefulness for the sheep flocks 'is almost beyond computation'. They were 'so useful as to be indispensable in south Wiltshire'. (Davis, 1794, 34-5). The consequence of this profitability was that throughout the chalk downlands water meadows were pushed to the limits of the valleys. By the end of the eighteenth century there were said to be 6,000 acres of water meadow in Dorset and 15-20,000 acres in south Wiltshire. (Stevenson, 1812, 304-5; Davis, 1794, 34).

V. Publications and the Spread of Information

In spite of the widespread use and profitability of water meadows, it was not until the later eighteenth century that detailed descriptions of their construction lay-out and management were published. Rowland Vaughan had given precise details of his experiments in 1610, but thereafter agricultural writers such as Blith (1653) and Worlidge (1669)

confined themselves to praise of the early grass and productivity obtained by watering. One of the first practical treatises on the subject was written by a Dorset farmer, George Boswell (1735–1815). Boswell was born in Norfolk, but came to Dorset as a young man and spent the rest of his life in the district around Puddletown, near Dorchester, with only occasional visits to his relatives in Norfolk. It is likely that he came to Dorset in the service of Robert Walpole, second Earl of Orford, who had acquired the manor of Puddletown through his marriage in 1724 to Margaret, daughter of Samuel Rolle of Heanton, Devon. Later, Boswell engaged in farming and other business enterprises on his own account, becoming a tithe collector, maltster, surveyor and mercer. His main interest remained in agriculture and in the spread of improved methods and ideas, especially in spreading knowledge of the techniques and benefits of watering meadows. He also experimented in the construction of a seed drill and a threshing machine. Throughout his life he was a practical farmer, renting land on the Earl of Orford's estate and later on the estate of a local landowner, James Frampton of Moreton. Frampton obviously thought highly of Boswell, and in 1790 granted him a lease of Waddock Farm at Affpuddle, one of the best farms on his estate, with fine new buildings, enlarged farm house and extensive water meadows along the river Frome. In his Memorandum Book Frampton recorded the lease and noted that he had charged a low rent.

‘... keeping rather below than above the market price, and with great allowance always and indulgence to active, spirited servants, particularly to such an uncommon one as Mr Boswell, whence the Landlord has many advantages, especially a choice of sensible, active, responsible and good neighbours’.

(James and Bettey, 1993, 119-20). Boswell contributed to the influential *Journal* of the Bath and West Agricultural Society which was founded in 1777, but his national reputation was established in 1779 with the publication of his book *A Treatise on Watering Meadows*. This was dedicated to a local nobleman, the Earl of Ilchester and to James Frampton, and provided a full account of the methods and benefits of watering meadows, with detailed descriptions and diagrams of weirs, hatches, channels, drains and trenching tools. Boswell's book was essentially a practical guide, and for example, gives much advice on the diversion of streams, surveying of channels, and the siting of hatches. The construction of sluice gates is described in detail with numerous diagrams and suggestions. Boswell stressed his own practical knowledge and experience

‘... not the effusion of a garetier's brain, nor a Bookseller's job, but the result of several years experience...’.
(Boswell, 1779, 1-2).

The book achieved considerable success, and a second, larger edition was published in 1790. It brought Boswell to the attention of contemporary agriculturalists including Robert Bakewell. It also brought him into contact with George Culley, a leading farmer from Northumberland. A series of letters from Boswell to Culley, covering the years 1787 to 1805, provides much detail about Dorset farming, livestock management, social conditions and especially about sheep and water meadows.

Boswell's expertise and enthusiasm led to a request from Culley in 1787 that he might send a workman from Northumberland to Dorset to work with Boswell and his waterman and learn the skills of managing a water meadow. Much discussion followed in Boswell's letters as to the qualities needed in the workman to be sent and the clothes and equipment he would require. Boswell asked for ‘a healthy, robust man who has been used to labour, can write intelligibly, at least to himself, sober, and about thirty years of age’. Some knowledge of carpentry and drawing would be an advantage ‘but no insuperable objection without’. He could be provided with ‘a pair of Water Boots and a spade’ when he arrived. Finally, ‘his Speech and Dialect will be no objection. I have the pleasure to say this part of the Kingdom, amongst the lower Class are not deficient in civility to Strangers, and I shall with great readiness take him under my Protection and show him some degree of attention’. The workman (Harry) duly arrived, and the experiment proved to be a great success; after seven months he returned to Northumberland with evident enthusiasm for the water meadows and knowledge of their management, and there are frequent references to him, together with messages of good will and advice on water meadows, in the later correspondence. (James and Bettey, 1993).

Contemporary with Boswell was the Revd. Thomas Wright who had served as a curate at South Cerney near Cirencester, Gloucestershire during the 1780s. He had been greatly impressed by the water meadows along the river Churn, a small tributary of the Thames, and in 1789 he published *An Account of the Advantages and Method of Watering Meadows by Art*. Later Wright became rector of Ould in Northamptonshire and in 1790 published a second edition of his book, adding as *Practised in the County of Gloucestershire* to the title. As a result of Wright's enthusiasm water meadows were developed along the Churn at Down Ampney and along the river Coln. These were described by Thomas Rudge in 1807 who recommended their wider use in the county. (Rudge, 1807). George Boswell was much less impressed by the Revd. Wright's practical knowledge of the subject and wrote scathingly of ‘a new treatise upon Water Meadows by a Clergyman in Gloucestershire. People in their zeal for a Cause they've espoused generally think they can never point out the

advantages too strongly—but by over doing it often hurt it...’ (James and Bettey, 1993, 138). Other advocates of water meadows included Arthur Young who wrote enthusiastically in many of his numerous publications of the benefits to be gained from watering, and William Smith who was later to be known as ‘the father of English geology’ and who in 1806 published in Norwich his *Observations on the Utility, Form and Management of Water Meadows*. (Young, 1769, 1771, III, 283-6, IV, 81-2; Wade Martins & Williamson, 1994, 22-4). The most influential advocates of the water meadows, however, were the various authors of the General Views, all of whom in the west country wrote enthusiastically about the productivity and usefulness of the system.

VI. Catch-Work Meadows

The success of the water meadows of the chalkland valleys in producing an early growth of grass for the sheep flocks and an abundant reliable hay crop, encouraged farmers in neighbouring areas to experiment with catch-work or hillside meadows. Unlike the ‘floated’ meadows of the chalk, catch-work meadows depended upon water brought in a leat along the contours of a hillside and made to overflow down to subsidiary ‘gutters’ or leats lower down the slope which in turn overflowed on the next part of the hillside, thus ensuring that the surface was evenly covered by a moving sheet of water and achieving a result similar to the floated meadows. Although the system was never quite so satisfactory or so intensively used as the floated meadows, the catch-work meadows were cheaper to construct and easier to manage and relic features of the hatches, leats and gutters can be seen on many hillsides in west Somerset, west Dorset, and east Devon.

Catch-work meadows were also used on the chalk hillsides around Ashbury, Berkshire and along the escarpment of the Vale of the White Horse. (Mavor, 1809, 371). The extensive remains of these hillside meadows can be seen in Dorset at Wynford Eagle and Martinstown as well as in many parts of the Marshwood Vale. In Somerset John Billingsley wrote in 1798 of the watered meadows in parishes of Crowcombe, Stogumber, Monksilver and Nettlecombe in the Quantock and Brendon Hills and noted that they ‘are as good as any in the county ...and invaluable for keeping stock throughout the year’. Further west in Somerset there are remains at Tolland, Dunster and Dulverton while a complete hillside system survives at East Nurcott Farm, Winsford on the border of Exmoor where the river Quarme is brought along the steep hillside by a leat and made to overflow through a series of subsidiary gutters. Similar hillside meadows are to be found in many parts of Devon, notably in the South Hams and around Torrington. Charles Vancouver, writing in 1808, commented on the number of such meadows throughout Devon and stated that ‘The practice obtains very generally through most of the vallies in the county’. (Vancouver, 1808, 313-22). Billingsley described the early grass produced by the catch-work meadows in Somerset and wrote ‘A great part of the watered lands lie on steep declivities; and as the water passes quickly over them, and never lies stagnant, not a rush can be seen’. (Billingsley, 1798, 264-5).

The most remarkable example of the use of catch-work meadows occurred on Exmoor. This vast royal forest comprising some 22,400 acres of bleak, uninhabited moorland was purchased from the Crown in 1815 by the wealthy Midlands ironmaster, John Knight who paid £50,000 for it. In spite of Knight’s enthusiasm and expenditure, his large-scale attempts to reclaim the moorland did not achieve the success he had anticipated. In 1841, however, his son, Frederick Winn Knight, took over the management of the property and controlled it until his death in 1897. He was much more successful, largely through building several farmsteads on the Moor, letting them at low rents and encouraging the tenants to undertake reclamation of the moorland. A major weapon in the struggle to create good agricultural land and nutritious grazing out of the hilly terrain and the acid, peaty soil was the extensive use of ‘catch-work’ meadows. These had already been introduced on various parts of the moor by John Knight, and their use was continued and extended by his son and especially through the influence of the steward Robert Smith. Smith served as steward from 1848 to 1861 and remained as a tenant on Exmoor until 1868; he was an enthusiast for catch-work water meadows, and became an expert in their construction and management, conducting tests on the temperature and quality of the springs and on the best method of using the water. In 1851 he wrote an account of this work on the meadows which was published in the *Journal of the Royal Agricultural Society* (Smith, 1851, 139-48). Smith described the meadows he had created, the main ‘carriage’ or water course, the gutters along the hillside and the calendar of watering. As with the floated meadows he claimed that ‘the first outlay is the main expense ... the annual expenses to maintain their efficiency being small in comparison with the result’. In suitable locations he arranged for the main leat to run through the farm yard or past cattle sheds so that dung and urine was mixed with the water and provided additional nutrient. The meadows were laid out in five or six acre sections, and proved invaluable in producing early grass for the ewes and lambs and abundance of hay for the winter. Smith claimed that the water meadows provided by the landlord were greatly appreciated by the tenants and that the system was spreading rapidly on the Knight’s Exmoor estate, ‘New meadows are being laid out upon nearly every farm’. By the 1880s rents per acre on Exmoor ranged from 5s 0d to £1 5s 0d, while water meadow land could command as much as 33 10s 0d per acre. (Orwin & Sellick, 1970, 107-8).

The remains of these meadows are still very evident on the Exmoor hillsides. (Orwin, 1929, 31-79; Havinden, 1981, 108-9).

VII. The Decline and Abandonment of the Meadows

During the later nineteenth century the water meadows began to fall into disuse, and by the mid-twentieth century only a few were still being worked. The introduction of artificial fertilizers meant that the fold of the sheep flock was no longer essential for growing satisfactory crops of corn on the downlands, and number of sheep declined rapidly. For example, sheep numbers in Dorset declined from more than 700,000 in 1870 to 300,000 in 1900, and to 46,000 in 1947. In Wiltshire sheep numbers fell from 775,000 in 1870 to 162,000 by 1939. The widespread use of imported feed-stuffs, together with root and fodder crops and the introduction of new strains of grass meant that the early grass provided by the water meadows was no longer so important. Moreover, the water meadows were labour intensive, hatches, channels and drains needed constant attention, and the surface could not bear the weight of modern machinery nor the twentieth century tractors, so hay had to be cut using scythes. Above all, the prolonged agricultural depression starting in the 1870s brought profound changes to farming. The demand for early lambs declined in the face of imports from New Zealand; the price of wheat and barley fell dramatically because of foreign imports, and more and more land was laid down to grass. It was only the sale of liquid milk which could now be sent to the towns by rail which kept many farmers in business. The abandonment of the traditional sheep/corn husbandry in favour of dairy farming led to a further decline in the acreage of water meadows.

All the chalkland valleys, and many hillsides in other parts of the west country, have the easily-recognisable hatches and intricate network of channels, but most present a sorry picture of neglect and decay. Ditches are filled and channels flattened for the convenience of modern farming operations. In only a few places have water meadows survived and continue to be worked in the traditional manner. Examples can be seen in Dorset at Wolfeton on the Frome north of Dorchester and on the Dewlish Brook east of Puddletown. In Wiltshire meadows are still floated along the Avon at Lower Woodford and at Britford south of Salisbury. Sluices, hatches and channels survive in the Wey valley between Bramshott and Headley, in the Meon valley at Meonstoke, and along the Itchen, Test and Avon valleys. A selection of the tools used by the watermen or 'drowners' can be seen in the Countryside Museum at Breamore, Hampshire. Remains of the now-disused systems can also be seen along most of the chalk streams of Wiltshire and Dorset, notable at West Overton and Clatford on the Kennet, at Bishopstone on the Ebbles, and at Fordington, Moreton, Puddletown and Piddlehinton along the Frome and Piddle in Dorset.

The value of the meadows as a cost-efficient method of producing grass without the use of expensive modern fertilizers is still recognised, and attempts have been made to revive their use or adapt them to modern conditions. During the 1980s an experiment of this kind was made by the Ministry of Agriculture on the river Ebbles at Odstock near Salisbury. The hatches of a disused water meadow were restored, but instead of the surface of the meadow being ridged to accommodate channels and drains it was flattened but carefully 'graded' or sloped so that the water entered at one side and gently flowed across the surface of the meadow to the drain at the other side. It was hoped that this would allow machinery to be used without damaging the surface. Sadly, the scheme did not prove satisfactory and the experiment has been abandoned.

A much larger and more elaborate scheme has been introduced by the National Trust on the Sherborne estate in north-east Gloucestershire. More than 150 acres of water meadow were constructed along the bank of the river Windrush at Sherborne during the Napoleonic War period or soon after, no doubt as a result of the success of the nearby meadows of South Cerney, Buscot and elsewhere along the Thames and its tributaries, and following the publicity given to them by the Revd. Thomas Wright. The Sherborne meadows continued in use until the early twentieth century, but were ploughed up, the ridges destroyed and the surface of the meadow flattened to grow corn during the Second World War. During the 1990s the Sherborne water meadows have been restored by the National Trust. The stone sluices have been rebuilt, strongly-made wooden hatches installed and the deep channels which convey the water from the Windrush have been excavated. No attempt has been made to restore the ridges which formerly spread the water over the land, but the flat, gently-sloping surface is expected to distribute the water evenly and ensure that it is kept moving. Already the meadows are producing lush grass and abundant hay, and have also become a valuable haven for wildlife, especially for water fowl.

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