THE LANDSCAPE OF THE KNIGHTS ON EXMOOR
A CASE STUDY FOR THE EXMOOR MIRES PARTNERSHIP

'A bleak, wild and bold undertaking'
Robert Smith 1856, Agent for the Knight Exmoor Estates

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ABBREVIATIONS

CAK Charles Allanson Knight
DRO Devon Record Office, Devon Heritage Centre, South West Heritage Trust
EMP Exmoor Mires Partnership
ENPA Exmoor National Park Authority
ENPHER Exmoor National Park Historic Environment Record
FWK Frederic Winn Knight
GPS Global Positioning System
JK John Knight
NMP National Mapping Programme
SHC Somerset Heritage Centre
SRO Somerset Record Office, Somerset Heritage Centre, South West Heritage Trust
WRO Worcester Record Office, Worcestershire Archive and Archaeology Service

ACKNOWLEDGEMENTS

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1.0 EXECUTIVE SUMMARY

This project, commissioned by the Exmoor Mires Partnership, on behalf of the Exmoor National Park Authority, has investigated aspects of the reclamation of Exmoor Forest which was undertaken by the Knight family in the 19th-century. The study used a combination of archaeological field assessment of the surviving remains of the reclamation in the Exmoor landscape, the information from a wide range of archaeological and palaeoenvironmental work carried out in advance of mire restoration work by the Exmoor Mires Partnership, and a large body of documentary evidence. The main outcome of the study is to show that the extensive remains of the surface drainage and irrigation (for improvement of the grazing) schemes across the moorlands of Exmoor Forest date to the early phases of the reclamation process.

2.0 INTRODUCTION

2.1 Background to the study

This study was commissioned by the Exmoor Mires Partnership (EMP), on behalf of the Exmoor National Park Authority (ENPA). The overall aim of the study is to selectively explore aspects of the reclamation of Exmoor carried out by the Knight family in the 19th century by a combination of documentary research and archaeological investigation (ENPA 2018).

2.2 The study area

2.2.1 The study area is the former Royal Forest of Exmoor, as defined between 1414 and 1819, now the civil parish of Exmoor. The name 'Exmoor' is often applied to the whole of the National Park, so to avoid confusion the name 'Exmoor Forest' is used throughout this report to refer to that parish. Exmoor Forest is a triangular block of ground, occupying much of the western part of Exmoor National Park (Fig 1). The landscape is one of high, rounded plateaux, reaching heights of over 480m on the Chains and Dure Down to the north, and on Hangley Cleave to the south, with deeply incised river valleys, locally known as combes, cutting through the hillsides. Much of Exmoor Forest is drained by the River Barle and its tributaries; along its eastern and northern boundaries it is drained by the headwaters of the River Exe and the East and West Lyn Rivers (Fig 2). Simonsbath, a small village, lies at a crossing point of the River Barle towards the centre of Exmoor Forest; 19th-century farms, the majority founded

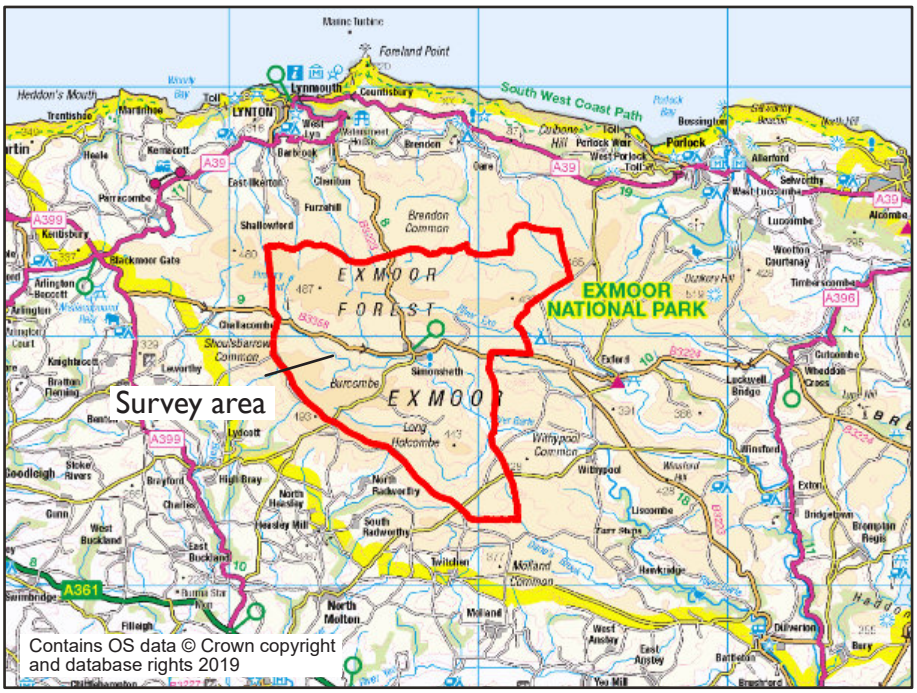


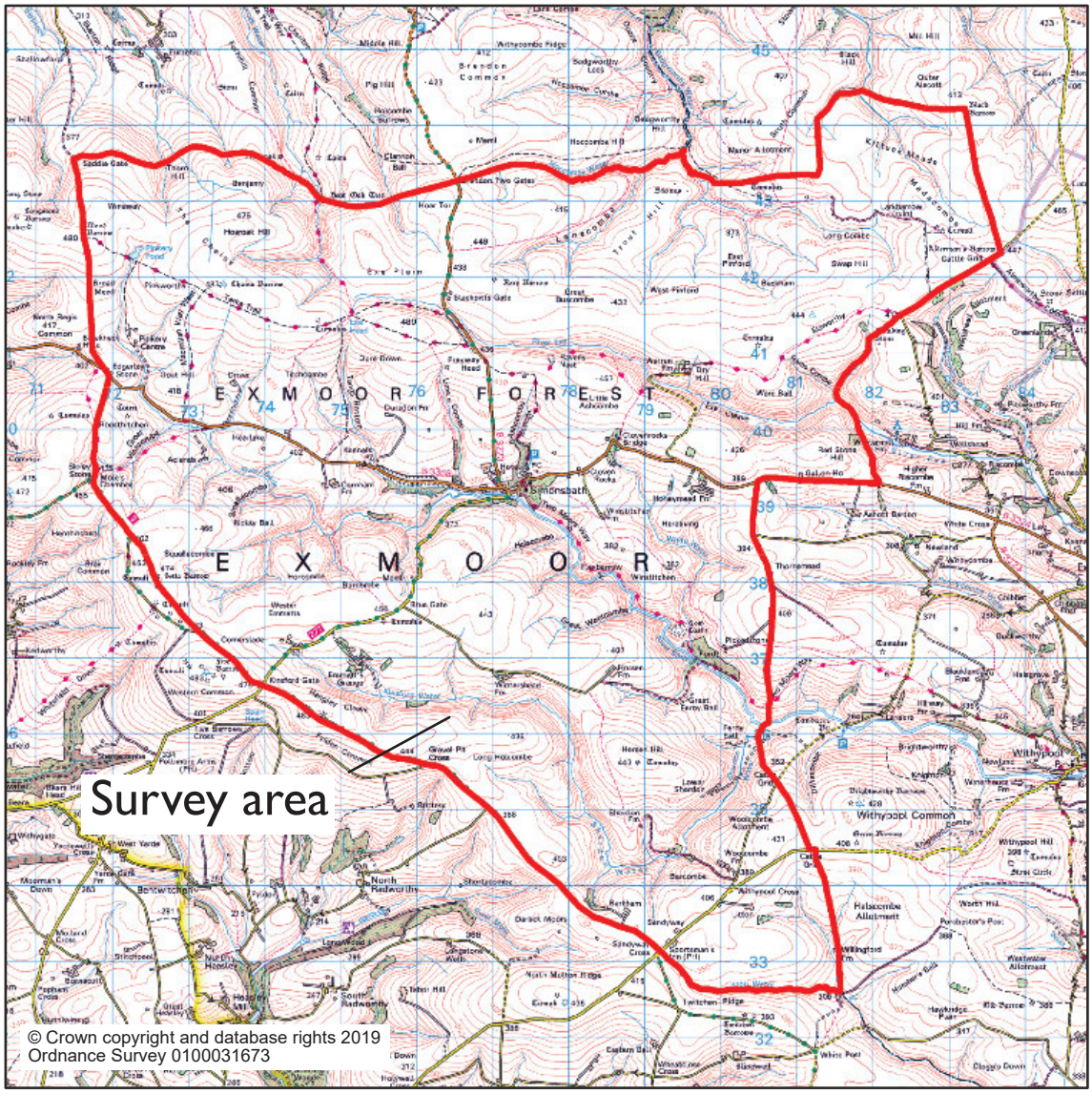
Fig 1 Location map

by the Knight Family, make up the rest of the settlements (Fig 2).

2.2.2 The geology of Exmoor Forest comprises Middle Devonian Sandstone and Conglomerate to the north; Middle Devonian Mudstone, Siltstone and Sandstone to the centre, and Upper Devonian Mudstone, Siltstone and Sandstone to the south (bgs.ac.uk).

2.2.3 The landscape is made up of two distinct types: open moorland and recently (19th-century) enclosed farm land (Preece 2007). The open moorland comprises Exmoor's Moorland Units 12/13 and 14: The Chains/Exe Plain/Warren/Larkbarrow and Southern Exmoor Forest. These are characterised by extensive areas of Molinia dominated grass moorland and combes, with blanket bogs and valley mires (ENPA 2011, 7; 30-33). The Knights' influence on the landscape is visible across the whole of Exmoor Forest, particularly striking are the extensive 19th-century enclosures of the grass moorland associated with the Knight farms (Fig 3). The enclosed farm land radiates out from the farms established by the Knights and generally supports pasture for livestock rearing (Fig 4).

Fig 2 The study area: location and topography



2.3 Methodology

2.3.1 The project methodology was developed following a desk-based assessment. It considered a range of material which is fully referenced in that report (9.3 Appendices A and B) (Riley 2018):

The considerable body of information resulting from the archaeological mitigation strand of the EMP: archaeological walkover surveys, watching briefs, metric surveys, palaeoenvironmental investigations and thematic studies.

The transcription of archaeological features from aerial photographs carried out by the National Mapping Programme (NMP) by Historic England for the ENPA.

Archaeological survey work and historic building assessments in Exmoor Forest not within the EMP remit.

The records contained in the Exmoor National Park Historic Environment Record (ENPHER).

The Light Detection and Ranging (LiDAR) datasets in the form of geo-referenced raster images, for the study area.

The Knight Archive, South West Heritage Trust, Somerset Heritage Centre: a collection of correspondence, estate accounts and other material relating to the Knight's Exmoor Estates which has recently been made available for study.

Contemporary accounts of the reclamation of Exmoor Forest and the standard reference book: The Reclamation of Exmoor Forest, written from an agricultural historian's perspective (Orwin 1929).

2.3.2 The desk-based assessment resulted in several areas and themes for research and field assessment which served to answer the questions posed in the project brief. These questions are:

i. The processes of reclamation – how was it achieved? What methods were used?
ii. The chronology of reclamation
iii. The function of different features (ENPA 2018, 3.1).

Fig 3 (above left) 19th-century enclosures on grass moorland, Kittuck Meads and Larkbarrow (Hazel Riley)

Fig 4 (left) Horsen Farm and its fields (Hazel Riley)

2.3.3 A programme of rapid field assessment and investigation was designed to investigate the following features:
Canals
Leats
Open drains and drainage systems

2.3.4 Areas for further research were:
Water supply to farms
Robert Smith and reclamation
Other features: railway trackbed at Exe Head and several ponds recorded in the Exmoor HER

2.3.5 The project archive is held at the ENPHER.

2.3.6 Grid references are set out as follows: XY 1234 5678 taken from map evidence; 123456 789123 recorded using hand-held Global Positioning System (GPS).

2.3.7 Gaps in the documentary record were highlighted in the desk-based assessment and the following sources were also consulted to help establish the chronology of reclamation: the Knight Collections at the Worcester Record Office and material held at the South West Heritage Trust, Somerset and Devon Archives.

2.4 Sources consulted
2.4.1 The Knight Archive: South West Heritage Trust, Somerset Heritage Centre
2.4.1.1 Estate documents
Exmoor Abstract 1819: account book detailing expenditure on John Knight's Exmoor estate April 1819-March 1820
Exmoor Cow Stock 1829 to 1835: records of the cattle on John Knight's Exmoor estate 1829-1835
Osmond Locks Accounts 1839 – 1840: account book detailing expenditure on John Knight's estate January 1839 to February 1840
John Litson's Monthly Accounts 1840: account book detailing expenditure on John Knight's estate March to August 1840

2.4.1.2 Correspondence
Kn.Corr.002. Headley Family and JK and FWK: 1833; 1834; 1852
Kn.Corr.003. Knight Family Members: 1807; 1835; 1868; 1876; 1879; 1880; 1882; 1884; 1889
Kn.Corr.004. 1840s: 1842-1846
Kn.Corr.005. 1850s: 1851; 1852; 1853; 1855; 1856; 1859
Kn.Corr.006. 1860s: 1863; 1866; 1868
Kn.Corr.0030. Knight Letters 1840s: Letters from Mogridge (agent) to FWK concerning management of the Exmoor estate 1844-1847
Kn.Corr.031 1774; 1834; 1836; 1852; 1861; 1862; 1865; 1867; 1871; 1876; 1877; 1879-1881
Kn.Corr.Exm.032.Letters to Mrs Knight: undated family letters
Kn.Corr. Letters 1841 to 1850: 1841; 1843; 1845-1850 FWK to JK reports on his work on Exmoor estate; Robert Smith (agent) to JK with his ideas for Exmoor Forest reclamation
KN_CORR_007: 1870s
KN_CORR_008: 1880s
KN_CORR_009: 1890s
KN_CORR_010: 1860s Frederic Smyth (agent) to FWK concerning management of the Exmoor estate

KN_CORR_011: 1840s livestock and ponies on Exmoor estate
KN_CORR_012: 1850-1851 Robert Smith (agent) to FWK concerning management of the Exmoor estate
KN_CORR_013: 1857 Robert Smith (agent) to FWK concerning management of the Exmoor estate
KN_CORR_014: 1858 Robert Smith (agent) to FWK concerning management of the Exmoor estate
KN_CORR_015: 1856 Robert Smith (agent) to FWK concerning management of the Exmoor estate
KN_CORR_016: 1856 Robert Smith (agent) to FWK concerning management of the Exmoor estate
KN_CORR_017: 1852 Robert Smith (agent) to FWK concerning management of the Exmoor estate
KN_CORR_018: 1853 Robert Smith (agent) to FWK concerning management of the Exmoor estate
KN_CORR_019: 1859 Robert Smith (agent) to FWK concerning management of the Exmoor estate
KN_CORR_020: 1868 Frederic Smyth (agent) to FWK concerning management of the Exmoor estate, shepherds and sheep management
KN_CORR_022: 1855-1856 William Fowler to FWK concerning Wolverley rents, details of mining business on Exmoor and Exmoor rents and tenants
KN_CORR_023: 1856-1859 Henry Scale to FWK concerning working the iron mines on Exmoor
KN_CORR_024: 1860s various correspondents concerning tenancies for Exmoor farms
KN_CORR_025: 1877-1882 various correspondents to FWK
KN_CORR_026: 1849; 1850s FWK legal documents and correspondence
KN_CORR_027: 1850s concerning the Exmoor estate, includes estimates of work needed on farms, a document by Robert Smith (agent) outlining the work carried out at Emmett's Grange to 1853 and abstracts from Exmoor labour accounts 1857-1858
KN_CORR_028: 1855 FWK bills
KN_CORR_029: 1819-1825 Rich and Strong to JK concerning the purchase of Acland's Exmoor properties; sketch of plan and elevation for a circular kennel for stag hounds on back of letter dated 1825

2.4.2 Knight Collections: Worcestershire Archive and Archaeology Service
2.4.2.1 WRO 10470/899:310/122 Accounts of John Knight 1835 and 1836
Complete set of accounts for John Knight's Exmoor and Brendon estates for the years 1835 and 1836 compiled by Osmond Lock at Simonsbath. Details about purchases of reed, building materials, lime, hay, oats etc., details of when and where building and agricultural work was carried out, including repairing fences/boundaries/dry wall and various types of drains, water carriages. Lists of all the estate workers paid each month.

2.4.3 South West Heritage Trust: Somerset Heritage Centre
2.4.3.1 Papers of Roger John Sellick (1930-1988)
A\BAZ/1/3 Sales particulars of Simonsbath Farm, Exmoor
A\BAZ/1/4 Knight Papers, general
Includes notes on Exmoor estate accounts 1839-40, a printed copy of the indenture and memorandum between the lease and tenant of the Knight farms, the transcription of a letter (from FWK?) about the dishonesty and treachery of Robert Smith, an incomplete, undated copy of an Exmoor Labour Account, a copy of John Knight's taxes 1837-1838, receipts from livestock 1852-1858 and an account of the Exmoor School 1857
BAZ/1/5 Photocopies of letters and diaries, and transcripts, relating to the management of the Knight Estates on Exmoor 1819-1960s
Roger Sellick's work on the Knight family correspondence: transcripts of several letters written 1826-1845 which are now missing but were apparently copied by Charles

Orwin when he was researching *The Reclamation of Exmoor Forest* (1929). The letters contain details of John Knight's trips to Carlisle and Edinburgh to buy livestock for Exmoor, the takeover of the Exmoor estates by FWK, and JK's declining health.
A\BAZ/1/6 Inventory of land, stock and contents of properties at Simonsbath 1833
A small notebook containing 4 inventories:
Stock at Lynmouth as taken by T Timmins 24th November 1829
Inventory taken at Lynmouth by William Litsom 27th September 1830
Land measured at Simonsbath and Honeymead 12th July 1833
Stock at Simonsbath, Cornham and Honeymead 10th July 1833
The notebook contains a wealth of information regarding 19th-century hill farming and reclamation, for example, references to subsoil ploughs, draining ploughs and a water wheel.
A\BAZ/1/8 Photocopies of Knight papers held at Kidderminster Library, Herefordshire, with additional notes by R J Sellick and a copy of the catalogue to the papers held at the library 1835-1850s
These are mostly copies of documents concerning the allotment of the Exmoor estates to John Knight and the sale of the Exmoor estates by Frederic Knight to the Fortescue family. They include a letter (1852) from William Howchin to Frederic Knight, which gives details of livestock, problems with labourers and farmers, and the practicalities of farming on Exmoor, and an incomplete copy of Osmund Lock's accounts from 1835-1836. Sellick notes that the following items listed in the Kidderminster catalogue are missing:
Plan of Brendon Common and Exmoor Forest in the County of Devon early 19th century 1½ inch to mile
Plans of other John Knight farms
A\BAZ/4/8 Copies of photographs of West Somerset 1865-1912
A\BAZ/4/10 Photographs of places on Exmoor
Honeymead farm house c 1900 by Alfred Vowles
Larkbarrow and Toms Hill 1930
Livestock on Exmoor Forest 1950s
Subsoiling at Blackpits 1952
A\BAZ/4/16 Photographs and negatives relating to Exmoor Forest c 1800-1986
Exmoor Forest farms in 1950s and 1960s
Exmoor Forest boundary in 1960s and 1970s
Simonsbath 1952 and 1971
Two-wheeled cart at Duredon farm

2.4.3.2 Blathwayt Manuscripts DD/BR/bn
DD/BR/bn 31 John Knight's letters 1826 and 1827 to Blathwayt Estate regarding the railway from Porlock Weir to Simonsbath

2.4.3.3 Miscellaneous Somerset Records DD/X/YL
DD/X/YL Map Exmoor Ironstone Deposit (undated c 1850s)
Shows the course of the proposed railway from Simonsbath to Porlock Weir with stations at Simonsbath, Limecombe and Larkbarrow

2.4.4 South West Heritage Trust, Devon Heritage Centre
2.4.4.1 Fortescue Collection 1262M
1262M/0/E5/1 Map, valuations, schedules of sale, and correspondence concerning sale of Honeymead, part of the Exmoor estate

3.0 THE KNIGHT FAMILY AND EXMOOR

3.1 The Forest of Exmoor

The history of the Royal Forest of Exmoor, its origins, customs and changing boundaries, was recorded in detail by E T MacDermot (1973). His Exmoor story ended in the early 19th century, when Sir Thomas Acland, who held the forestership of Exmoor, applied for a further lease of Exmoor from 1814. Rather than simply recommending a renewal of Acland's lease, the newly formed Commissioners of His Majesty's Woods, Forests and Land Revenues ordered that a survey of the property be made, with the aim of establishing whether any part of Exmoor was suitable for growing oak timber. This survey resulted in an act, dated 1815, for 'Vesting in His Majesty certain parts of the Forest of Exmoor otherwise Exmore, in the Counties of Somerset and Devon; and for inclosing the said Forest'.

3.1.2 In 1816 Inclosure Commissioners were appointed to survey and value the Forest; lands were set aside for the repair of roads and watering places for cattle, the rest was allotted to His Majesty; Sir Thomas Acland, the owner of the tithes, and to other parties who had claims to rights on the Forest. The portion to the King was set out 'as near to the centre of the said Forest as conveniently may be'; Acland's allotment was to be as near to his other property in the neighbourhood. Two years later, in June 1818, the sale of the King's Allotment was advertised. On July 23rd tenders opened at the offices of the Commissioners and the Forest was purchased by the highest bidder: John Knight of Wolverley Hall, Worcestershire, and 52 Portland Place, London, for £50 000 (MacDermot 1973, Chapter XV). A year later John Knight bought Sir Charles Bamfylde's allotment of 1880 acres on the SW side of the Forest, Sir Thomas Acland's allotment of 3200 acres on the NE side of the Forest, together with the adjoining manor of Brendon; several smaller land allotments were also bought. John Knight owned some 15 500 acres of the former Royal Forest by 1820 (Orwin 1929, 21; 27).

3.2 Enclosure and reclamation

3.2.1 The sale of Exmoor Forest took place towards the end of what Harvey has termed the 'Agrarian Phase of the Agricultural Revolution (1750-1820)' (Harvey 1984, Chapter 4). This was a time of rapidly rising population, from around six million people in England and Wales to some 12 million by 1821, with a growing proportion of these people concentrated in large towns and cities. At the same time, the traditional way of increasing the supply of food was becoming increasingly impractical, as the reclamation of new farmland from 'waste,' such as moorland and common land, was reaching its limits. Extravagant schemes of reclamation, such as the construction of extensive catch water meadows in the valley of the River Maun at Clipstone, Notts, by the 4th Duke of Portland in 1819, which brought 300 acres of unproductive land in Sherwood Forest into sheep pasture and hay meadows, were reported by the newly formed Royal Agricultural Society of England (Denison 1839). The 4th Duke of Portland was well known as an agricultural improver and John Knight was certainly familiar with his work and wrote to his wife about enclosure on the former Royal Forest of Inglewood in Cumbria:

> 'The Duke of Portland has within a few years brought a large tract of land into cultivation between Appleby and this place [Carlisle]. It looks very neat but the land is too feeble to pay anything in these times of peace and plenty. The people seem now employed and comfortable and the extent of Road making quite incredible'
> (Letter from JK to Jane Knight, October 8th 1826 SRO A/BAZ/1/5).

3.2.2 Individual landowners and tenants also took on what now appear to be extreme farming enterprises: Teignhead Farm, begun in 1808, was a holding of 1551 acres at 450m OD on the former Royal Forest of Dartmoor, Devon, with several arable fields

near the farmstead (Stanbrook 1994, 11-41). Cordilleras Farm, in Swaledale, Yorks, was built by John Hutton in 1813, (Harvey 1989, 46). The farm and most of the fields were named after South American mountain ranges, reflecting the pioneering spirit of the enterprise. The farm was built at over 360m and 500 acres of arable land were reclaimed from uncultivated moorland, where oats were grown successfully for over 20 years (Fig 5).

Fig 5 Cordilleras Farm, Swaledale, Yorks (Photo © Hugh Mortimer) (cc-by-sa/2.0)

3.2.3 On Dartmoor, several men obtained grants from the Duchy of Cornwall in about 1780 to enclose large areas of the former Royal Forest and form new estates, based on cultivation of arable and root crops as well as stock rearing. The best known of these is Thomas Tyrwitt, secretary to the Prince of Wales and auditor to the Duchy of Cornwall, who built the estate of Tor Royal, enclosing 2300 acres at an altitude of over 400m between 1785 and 1798. Tyrwitt's vision was to form a small, self-sufficient agricultural community, cultivating many acres of corn and flax, root crops and timber plantations on high moorland. He built several farms, a village – Princetown – and built or improved several roads. Other profitable estates were envisioned by Thomas and John Hullet, who enclosed over 3000 acres of common land and built the village of Postbridge and an estate of 900 acres was formed at Beardown by Edward Bray, agent for the Duke of Bedford in Devon, who spent a 'small fortune' in the process (Somers Cocks 1970, 245-261).

3.2.4 Billingsley, an official of the Board of Agriculture, undertook the Board's survey of the agriculture of Somerset in 1794. He set out a prospectus for the reclamation of Exmoor Forest, noting that the country has: pure water, capable of watering some hundreds of acres; soil favourable to vegetation; an inexhaustible stock of fuel in the form of turf; black peat for burning lime, working iron, smelting ore; materials to make the roads comfortable; shelter and soil for timber plantations; pasture for the depasturage of sheep; veins of copper and iron; proximity to the sea ports of Porlock, Lynmouth and Combe Martin and several market towns; a large vein of limestone; building stone and slate, and large tracts of land well adapted to the cultivation of flax and grain (Billingsley 1794, 173-175).

3.3 John Knight at Lea Castle

To understand why John Knight bought Exmoor forest and what his vision for the land was to be, it is necessary to consider his background in Worcestershire both as a businessman and an estate owner. John Knight was born in 1767 and baptised at Wolverley near Kidderminster, Worcs. The Knight family owned the Cookley ironworks and Edward Knight, John's uncle, built Lea Castle in 1762, described in 1848 as 'a noble mansion surrounded by 550 acres of land enriched with plantations of oak and other timber' (www.lostheritage.org.uk). John Knight inherited Lea Castle in 1812 and was

concerned with the management of the Cookley ironworks and the family's estates: 'a man of energy and innovation who was very familiar with the iron industry, agricultural improvement and the management of estates (Wilson-North 2017, 4). John Knight married twice, first to Helen Charlotte Hope Weir in 1795, she died in 1801 and there were no children. He married Jane Elizabeth Allanson-Winn, daughter of Lord Headley, Baron Allanson and Winn of Aghadoe, Co Kerry. They had six children whilst living at Lea Castle; the eldest, Frederick Winn Knight, born in 1812, took over the management of Exmoor after his father's retirement (below, 4.3)

3.3.1 The Knight estate at Lea Castle is described in some detail in the agricultural survey of Worcester (Pitt 1813). Pitt visited Lea Castle in 1807 and he acknowledges the help of John Knight thus: 'To J Knight, Esq. of Lea Castle, Wolverley, I am much obliged, for showing me his spirited cultivation' (Pitt 1813, xii). This visit seems to have been made when there were plans and changes to the estate. The farm at Lea Castle, 330 acres on light, sandy, warm soil, is managed in a 'capital and spirited style', with 159 acres of turnips, barley, wheat, carrots and vetches, the rest pasture, meadows, woods and plantations. 'Mr Knight has made experiments on folding sheep for both wheat and barley….he uses lime and soot plentifully, and means to bring his farm nearly into the Norfolk system but with some variations' (Pitt 1813, 26-27). Pitt describes the cultivation of the arable crops at Lea Castle in some detail:

> 'Mr Knight grows annually fifty acres, or more, generally upon a turf fallow, but sometimes after wheat, vetches, or carrots; they are mostly drilled, but some sown broadcast; the turnip drilling is thus managed, after well working the land and laying on lime four tons per acre, which costs 14s 6d per ton, ready money, delivered upon a canal against one side of the farm, the lime being spread and well harrowed in, the land is stricken into two furrow ridges, about two feet from middle to middle; the dung cart is then applied (Pitt 1813, 95-96).

John Knight was experimenting with different types of turnip seed, buying Swedish turnip seed from his connections with the iron trade, and Pitt credits him with reviving the cultivation of carrots in the area: 'I was assured that the growth of carrots had begun to decline amongst the Wolverley farmers, till Mr Knight took it up with spirit and roused their attention' (Pitt 1813, 105). The livestock at Lea Castle were sheep: Leicester and South Down, with the intention to increase the flock to 400 ewes and 50 rams and wethers, together with plans to winter feed 'a good many' bought in cattle with turnips (Pitt 1813, 28-29).

3.3.2 Pitt also described the landscape around Lea Castle in a section called 'Picturesque Farming' which was being re-organised:

> About 200 acres around the mansion, formerly in irregular uncouth divisions, with wide slovenly hedges, are now laid, or laying together, the roads better disposed both for convenience and appearance, and the hedges stocked up, but the trees, which are in abundance carefully preserved, to give a park like appearance; this is, at present, divided into lots by temporary hurdles, and may hereafter be more permanently divided by quickset fences, planted and disposed so as to have the best landscape effect.
> (Pitt 1813, 27-28).

John Knight was also planning improvements to the house and in 1809 commissioned the architect John Carter to remodel Lea Castle, although these plans were not carried out and the house was sold in 1823 (Wilson-North 2017, 7).

3.3.3 As well as his own improvements to the Lea Castle estate, John Knight would have been familiar with the work of his fellow Worcestershire landowners. Pitt saw the

enclosure of the waste at Bromsgrove Lickey, some 15 km to the east of Lea Castle, where about 1000 acres of former heath, furze and fern now grow turnips, clover, clover potatoes and grain on a high tract of sandy gravel (Pitt 1813, 52). He described the transformation of a boggy ground into a landscape park at Croome Court, the Palladian mansion of the 6th Earl of Coventry, 30km south of Lea Castle:

> The most skilful drainer I know in Worcestershire, is the present Earl of Coventry: his part of the county was a morass not half a century back, and is, at this present time (though formerly a Moorish soil) perfectly dry, sound for sheep and other cattle. He has but few under drains. His principal drains are open, formed thus: (Fig 6). Turfed to the bottom, so that cattle can graze without any loss of herbage; no water ever stands; and Croome it is now noted for its dryness, as well as being well kept; and although the house is surrounded with 1400 acres, under his own inspection, you do not see a tree, bush, or thistle, growing upon it, undesigned or out of place. It may very justly be stiled a pattern farm to this kingdom, from its well-formed plantations, and its judicious and extensive drains. He has a beautiful breed of the Holderness or Yorkshire cattle.
> (Pitt 1813, 191-192)'

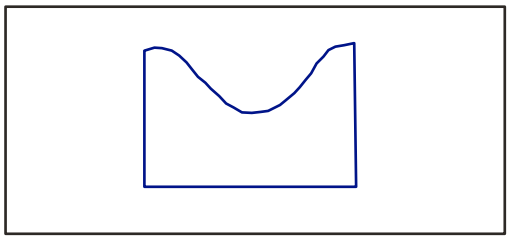


Fig 6 Section of open drain at Croome Court, Worcs (after Pitt 1855, p 191)

3.4 John Knight at Lynton and Simonsbath

John Knight moved to Exmoor in April 1819, living at Lynton until about 1826 when Simonsbath became his base. Work began on the reclamation of Exmoor Forest in May 1819 (Knight Archive Exmoor Abstract 1819; Letters written by JK from Simonsbath November 1826 and June 1827, SRO DD/BR/bn 31). John Knight was involved with all aspects of the work, sketching plans for an ornate kennel to house his stag hounds on the back of a letter dated May 1825 (Fig 7), travelling to Carlisle, Edinburgh, Bristol and Hereford to buy cattle in 1826, and, writing to his wife in August 1826, 'full of my plans as usual; perhaps when you return you will find too many of them executed' (Letter to JK from Mr Law, Knight Archive KN_CORR_029; Letters to Jane Knight from JK, SRO A/BAZ/1/5).

3.4.1 The considerable property of Richard Payne Knight, owner of Downton Castle, passed to his brother, Thomas, on his death in 1824, then to his niece, Charlotte Rouse-Boughton. Richard Payne Knight's uncle, Edward, was the grandfather of John Knight and John Knight firmly believed that, following Thomas Knight's death, the settlement should have followed the male line of which he was the senior representative. John Knight's claim to the Payne Knight estate was finally decided in the Court of Chancery in 1840 in favour of Charlotte and her family.

3.4.2 By 1837 Jane Knight was no longer able to live at Simonsbath due to ill health and John and his wife left Exmoor for Jersey (Letter from Harriet Trevelylan to Jane Knight August 19th 1837, SRO A/BAZ/1/5), before moving to Rome. A letter from John Knight to his son, Frederic, written in 1838 shows that John's health was also declining; it also adds another twist to the Knights' Exmoor story and explains who was managing the Exmoor estates during the time between John's departure for Jersey in 1837 and the transfer of the management of the Forest to Frederic in 1841:

> The Forest is going on well as much as Charles has taken the active management of which I am no longer capable. My locomotive powers are so fallen off. I consider that Charles will pay attention to the economy of the business and that it will then be a most profitable concern
> (Letter JK to FWK Feb 10th 1838, SRO A/BAZ/1/5).

Fig 7 Plan and elevation of a kennel for John Knight's stag hounds, drawn on the back of a letter dated May 2nd 1825 (Reproduced with the kind permission of the South West Heritage Trust SHC A/EJM/1/3/1)

In 1839 John Knight and his wife moved from Jersey to Rome. Although John Knight never returned to Exmoor, he must have wanted to return at times as his wife wrote to him:

> I think that perhaps after another summer I might be able to bear the confinement, if you feel that our living in the South of England, whilst you live on Exmoor, would be any equivalent gratification, equal to the risk I should run of losing the little strength I have gained
> (Letter Jane Knight to JK June 2nd 1841 SRO A/BAZ/1/5).

Jane Knight died in June 1841; earlier that year John Knight passed the management of the Forest over to his eldest son, Frederic Winn Knight.

3.5 Frederic Winn Knight and his agents

Frederic Winn Knight took over the management of the Forest with the intention of running the farming enterprise himself, seemingly based at Cornham, and he was full of enthusiasm for Exmoor:

> I am determined if it is profitable or not, to buy another flock of ewes in Scotland this year. We have a capital stock of more than 300 cows, and 10 bulls of the best sort from Scotland - I must have cattle and will have food for them
> (Letter FWK to Jane Knight March 19th 1841, Knight Archive Letters 1841 to 1850).

By July 1842, in the light of the failure to inherit the Payne Knight estates, the problems of getting any income from Exmoor is already becoming apparent and the idea of finding tenants who will pay rent is being considered:

> I am going to try and let Honeymead, Cornham and Brendon with allotments of the Forest for what I can get for them – If no one will have them I do not see what to do as I am quite convinced of the impossibility of keeping them in hand and making them pay anything
> (Letter FWK to Margaret Knight July 12th 1842, SRO A/BAZ/1/5).

3.5.1 John Mogridge from Molland became FWK's Exmoor agent in 1844 and his letters to FWK tell the story of building, enclosing and letting farms across the Forest, including Emmett's Grange, Larkbarrow, Duredon and Picked Stones (Knight Archive KN/CORR/0030 Knight Letters 1840s). In 1848 Robert Smith left his farm on the Burley estate in Rutland to replace John Mogridge as Frederic Knight's agent on Exmoor. He took on Emmett's Grange as a tenant, and set about 'with great speed with his own farm at Emmets, breaking ground and carrying lime fast, and cutting onto the long spring and thoroughly draining every bog as he comes to it' (Letter from FWK to JK August 21st 1848, Knight Archive KN/CORR/002). Robert Smith continued the process of finding tenants for the new farms on Exmoor, farming at Emmett's Grange and supervising prospection for iron on the estate. Smith retired from Exmoor under a cloud (Undated draft letter by FWK, SRO A/BAZ/1/5) and Frederick Smyth, a tenant of the Fortescue estate at Wistlandpound, took over as agent. The focus of farming on the Forest changed to an extensive sheep enterprise, with shepherds and livestock moving from Scotland to Exmoor, which was gradually divided into herdings based at the farms created by FWK.

3.5.2 John Knight died in 1850, Frederic Knight came under considerable pressure from the legacies left to his siblings to make a financial return from Exmoor Forest. His brother Charles wrote to Robert Smith in 1851 making enquiries about the finances of

the farms on Exmoor, and whether keeping cattle would pay better than having tenanted farms (Letter CAK to Robert Smith August 9th 1851, Knight Archive KN_CORR_012). Frederic's disgust at the situation is recorded in a letter to Lady Headley:

> With regard to proper Pride, I am proud of my own honesty, and proud of my wife's, and of my management of Exmoor. Of family pride I confess I have little, of any sort, remaining. There is nothing that Chancery can bring to light, for the amusement of the gossiping world, except that my Father left such large fortunes to his younger children as necessitated the sale of the estates and the breaking up of the family, and that the younger children insisted on their pound of flesh, and they had it
> (Letter FWK to Lady Headley 1852, Knight Archive KN/CORR/002).

3.5.3 Following the death of his son in 1879, Frederic Knight sold the reversion of his Exmoor estates to the Fortescue estate in 1886. John Knight's Exmoor Forest was finally transferred to the Fortescues at Castle Hill after Frederic died in 1897.

4.0 THE DOCUMENTARY EVIDENCE

4.1 'Full of plans' (John Knight 1826)

The definitive study of the reclamation of Exmoor Forest was written in 1929 by C S Orwin, who had access to the Knight papers and records then held by Major Eric Knight at Wolverley House. It is clear from Orwin's book that these sources included the correspondence now preserved in the Knight Archive, together with a number of letters which are now missing but which were partially copied by Roger Sellick. Orwin does not seem to have seen the account books for Exmoor and estate records from 1819, 1820, 1835, 1836, 1839, 1840, early 1850s); his earliest such source was a rate-book of 1858 (Orwin 1929, ix). Orwin was the director of the Institute of Agricultural Economics at Oxford and The Reclamation of Exmoor reflects this: it is a study written by an agricultural and economic historian.

4.1.1 Work began on the reclamation of Exmoor in May 1819. John Knight's priorities, carried out between May and December 1819, were: building a ring fence; building roads; building canals; building water carriages; constructing open drains; building cottages; carrying out repairs to the old buildings at Simonsbath Farm; quarrying stone and lime (Knight Archive Exmoor Abstract 1819). In 1820 building the New House at Simonsbath; building Cornham and Honeymead Farms; enclosing Honeymead Farm, and building Hoar Oak Cottage (Fig 8) were added to the list. Figure 9 shows the main elements of John Knight's reclamation project begun in 1819-1820.

Fig 8 The remains of Hoar Oak Cottage in Long Chains Combe (Hazel Riley)

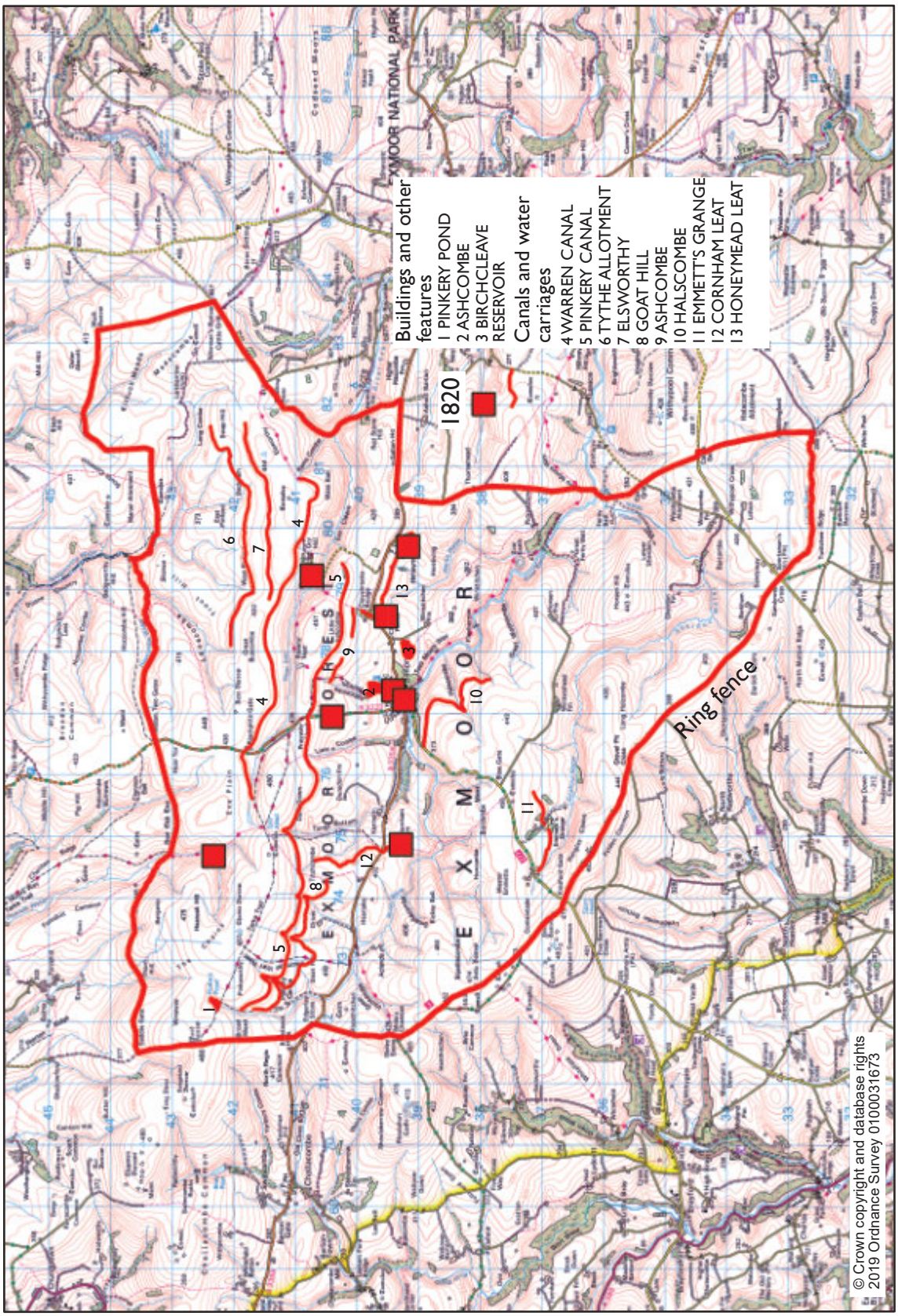


Fig 9 Main elements of John Knight's reclamation 1819-1820

4.1.2 The documentary evidence for the decade following the purchase of the Forest and the Exmoor Abstract consists of correspondence and two estate record books. On November 28th 1826 John Knight wrote to the Blathwayt estate's agent enclosing a proposal for a railway linking the small port at Porlock Weir with Exmoor Forest; a second letter written the following year requests an answer to the proposal:

> Sir, I beg leave to offer the inclosed proposals for your consideration
> Rail Road, with inclined planes from Porlock to Exmoor Forest
> Mr Knight requires a sufficiency of land given to him during a lease for the road viz 25 feet in width, space at the Weir in the field adjoining the marsh for erecting wharfs, warehouses, agents and labourers houses and limekilns, with the privilege of searching for and taking stone and materials from any convenient parts of the estate for erecting such buildings and making such roads as he may think necessary. Also the power of diverting the several streams of water at pleasure for scouring the harbour, supplying engines, and filling the wet dock as to raise vessels for unloading them with advantage and spaces on several parts of Porlock Common for reservoirs and leads for supplying the planes with water.
>
> The improvements he proposes would add so largely to the value of the surrounding lands that he would expect the port to be wholly given up to him for the term of a lease for 3 lives or 99 years on an acknowledgement being paid by him annually, wherein he would engage to deepen the floodgates of the marsh, to excavate part of the said marsh and keep the whole in repair and at the same time let the port be a free port to all traders whatsoever
> (November 28th 1826, June 23rd 1827 letters from JK to Charles Bailey, Nynehead Estate SRO DD/BR/bn 31)

The other letters from this decade are from John Knight to his wife, Jane, who was living at the Knight's London house while he travelled to Scotland and Hereford buying cattle for Exmoor. Unfortunately these letters are now missing but Roger Sellick copied parts of them, probably from C S Orwin's research work as parts are reproduced in The Reclamation of Exmoor Forest. The letters reflect a man who is full of energy and enthusiasm as this extract shows:

> I shall go from this place [Edinburgh] to Hereford Fair, as my appetite for Cattle has been by no means satisfied by my purchase at Falkirk. I got there a day too late, not knowing the right way. I did however get about 400 most beautiful West Highland Bullocks and they were not cheap (though much more so than last year). The scene was beautiful and this day such as we have lately enjoyed on Exmoor – a considerable plain covered with immense herds of Cattle standing separately and mostly by Persons in a variety of Highland Dress – and all kinds of Music but the Bag pipes left the others little chance of being heard, and a long row of very large Tents full of Whisky divided in the middle of this plain the Highlanders from the Angus or lowland cattle. This city is become the finest imaginable and the country round it in the finest state of cultivation and more and better planted than any part of England
> (JK to Jane Knight October 12th 1826, SRO A/BAZ/1/5).

In all, John Knight bought 695 cattle during this trip, presumably mostly bullocks as the Exmoor Cow Stock record book for 1829 to 1835 records that he made further trips to Falkirk in 1828 and bought 48 Scotch cows and in 1831 when he bought 150 Scotch heifers (Knight Archive Exmoor Cow Stock 1829 to 1835).

4.2 'Blankets for the men' (Stock Book 1833)

A small notebook in Roger Sellick's papers contains an enormous amount of information about life on John Knight's estate and the buildings at Simonsbath in the early 19th century (Stock at Lynmouth and Simonsbath 1829, SRO A/BAZ/1/5). It is a small notebook with the following entries:

Stock at Lynmouth as taken by T Timmins 24 November 1829
Stock at Lynmouth as taken by William Litson 27th September 1830'
July 12th 1833 Land measured at Simonsbath and Honeymead
10th July 1833 Stock at Simonsbath:
Granary
Carpenter's Yard
Carpenter's Shop
Mr Harvey's Shop
Smith's Shop
Lower Stone Quarry
Upper Stone Quarry
Coach House
Cow Sheds
White Rock Cottage etc
At the New Building
Garden by the River
Dog Kennel
Saddle Rooms
Stables
Lime Shed
Poultry House etc
Stock at Honeymead Farm
Stock at Cornham Farm

4.2.1 Building materials, mostly timber, are listed at Lynmouth in 1829 and 1830, as well as Master Knight's work bench, Philip Knight's chair and one house model –for John Knight's mansion? It is the stock at Simonsbath, Cornham and Honeymead that lists the equipment – mostly hand tools - which carried out the reclamation. The granaries at Simonsbath contained the bulk of the hand tools: 70 spades, 69 turnip hoes, a breast plough, seven gutter knives and a gutter shovel and 38 stone saws. The carpenter's yard stored large equipment such as carts and wagons and a large iron harrow. A two-wheeled cart was photographed at Duredon Farm by Roger Sellick 1953 (Fig 10). Mr Harvey's [work] shop was the place for more complicated machinery, perhaps waiting for repairs. There was a large waterwheel, taken to pieces, draining ploughs and drilling ploughs, an old chaff cutter, a wooden case containing four iron cog wheels and a large whimsey wheel (used in mining for raising buckets from a shaft). The list includes wood plugs for a cast iron pipe for a pond. The lime shed contained building equipment including a wooden centre for forming arches and a quantity of slaked lime. A large shaft for a water wheel was listed as being 'by Cloven Rocks.' Oats were grown at this time and stored in ricks protected by hurdles as the stock book notes '59 oak hurdles round the oat ricks in Birch Cleave.'

4.2.2 The estate farms at Cornham and Honeymead were well equipped for cultivation:

Honeymead Farm
5 bullock carts
2 thriples (haylades)
1 horse cart
3 wheebarrows
5 double ploughs
3 pair wooden drags
3 pair wood harrows
2 pair iron harrows
4 iron ploughs
1 iron plough with double mould boards
1 spading horse plough
2 single wood horse ploughs
3 wood collars
1 cast iron collar
1 large subsoil plough
1 pigeon house, fixed
1 old double plough without shears
1 winnowing machine

Granary
6 chaff boxes and knives
1 chaff machine
24 bullock yokes and bows
15 chains for yokes
31 new bows for yokes
3 seedlips (basket for sowing seed)
2 dung flails and scraper
6 potato planters
3 pick axes
1 pole pick
13 turnip hoes
1 hay knife
1 guttering level
1 guttering knife
7 turnip gaffs
36 meadow rakes
30 hay picks
3 Irish rakes
15 dung forks with handles
2 dung forks without handles
1 horse couch rake
2 hand turnip drills
1 hand turnip drill of a different construction
32 bullock rings and chains

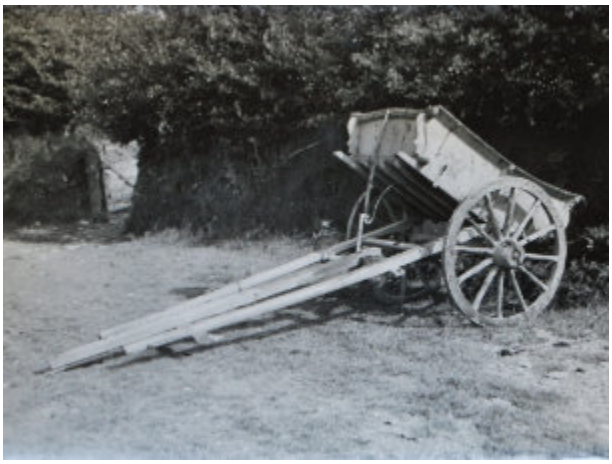


Fig 10 Two-wheeled cart at Duredon Farm, 1953 (Reproduced with the kind permission of the South West Heritage Trust SHC A/BAZ/4/16/7)

In the stables and outhouses
1 potato washer
2 dock irons
8 bullock rings and chains
2 rings without chains
1 lime bushel
29 workmens blankets

Cornham Farm
1 bullock cart
3 horse carts
4 double ploughs
4 single iron ploughs
2 scufflers or cultivators
1 turnip drill
1 potato washer
38 rings and chains for bullocks
2 pair of iron harrows
3 pair wood harrows
2 pair drags

Granary
1 threshing and 1 winnowing machine
1 chaff cutting machine
10 yokes and bows for plough bullocks
4 bullock chains
2 seedlips
8 dung forks
3 dung flails
1 barn rake
6 pick axes
1 pole pick
2 rock axes
3 iron bars
2 wheelbarrows
1 dock iron
4 Irish rakes
2 new spades
1½ sacks of grass seed
1 new plough share
1 windlass
1 chain
2 mining buckets
6 bullock chains and rings
Full harness for 10 horses
1 small subsoil plough
16 hay picks
14 meadow rakes

The stock book records that there were tools and 22 men's blankets at the Warren Cots, and 22 men's blankets in the granary at Cornham Farm, suggesting that the men who carried out the hard graft of reclamation were lodged both in the relative civilization of the estate farms and out on the Forest.

4.2.3 That same year, 1833, John Knight wrote to Frederic, who was staying with his uncle in Ireland, full of news about and enthusiasm for, Exmoor Forest, with plans for breeding staghounds for hunting his fallow deer and stocking the Chains with red grouse (Appendix 3 Letter JK to FWK March 2nd 1833, Knight Archive KN/CORR/002).

4.2.4 A complete set of accounts for John Knight's Exmoor estate for the years 1835 and 1836, compiled by Osmond Lock at Simonsbath, gives a detailed picture of work on the Forest 16 years after it began in 1819 (WRO 10470/899:310/122 Accounts of John Knight 1835 and 1836). Work continued on the boundary fence, presumably renewing and repairing the original boundary. There are several references to cleaning the Pinkery Canal and water carriages near Goat Hill and Prayway Head, and cleaning drains on Swap Hill. The main effort of reclamation at this time was drainage: cutting surface drains on Sparcombe, Blackpits, the Chains and the North Forest, and draining land at Cloven Rocks, Cornham Close, Duredon and Limecombe. Floating gutters were made on Ashcombe in December 1835 and a water carriage was constructed on Duredon in December 1836. Pinkery Pond was constructed by 1836: John Quartley was paid for pulling down the fence at Pinkery Pond in January of that year. There is a record of turf cutting at Blackpits and Ashcombe in September 1835, in December Robert Gregory was still drying turf at Blackpits and Henderson and a boy were paid to drive cattle off the turf. Oats, hay and lime were all bought into the estate: lime was purchased from Cutcombe, hay from Dulverton, and oats from North Molton, Loxhore, High Bray, Kentisbury and Exford.

4.2.5 Osmond Lock's accounts for January 1839 to February 1840 (Knight Archive Osmond Locks Accounts 1839 – 1840) show that work on the reclamation carried on by estate workers after John Knight had left for Jersey and Rome. Work on the boundary fence and on internal boundaries is listed, with details of work right across the estate, from North Molton Common to Benjamy and Black Barrow; the accounts often date a particular feature: the dry-stone wall to the north of Cow Castle was built in August 1839 (Fig 11). Surface drains were cut on the North Chains, Prayway (1839) and on Lanacombe (1840). Drainage at Cornham Farm is detailed from January and February 1840: a water meadow at Cornham, and a water carriage and surface drains in Cornham New Field.

Fig 11 Dry stone wall at Cow Castle, built in August 1839 (R Wilson-North) (© ENPA)

4.2.6 An account book detailing expenditure on John Knight's estate from March to August 1840 includes a reference to making gutters on Ashcombe in April 1840 (Knight Archive John Litsons Monthly Accounts 1840).

4.2.7 Between 1835 and 1840 over 5476 perches (110kms) of surface drains were cut on the Chains, the North Forest, Prayway and Lanacombe, most of them by two men: William Rawle and Richard Bale. A comparison of the lengths given in these account books with the surface drains recorded by the Exmoor NMP suggests that the surface drains on the Chains were made between 1835 and 1840 and were one of the final elements of John Knight's reclamation project (Fig 12).

4.3 'Still much to do and much expense required' (Frederic Winn Knight 1846)

4.3.1 John Knight handed over the management of the estate to his eldest son, Frederic, in early 1841, but an arrangement was made with Charles, John's second son, in 1838 (3.4.2). A letter from Lord Headley, Frederic's uncle, confirms this and also that John Knight was still putting his plans into actions while he was in Rome. The letter described the Irish custom of using turf to burn in lime kilns and how John was planning to do the same:

> Darby, poor Peter's brother, was here the other day to look out for three Labourers for your Father to take over to the Forest, who were accustomed to burn Lime in Running Kilns…. I told him to apply for persons of Character, as we have 120 Lime Kilns in the Ploughlands of the Description your Father wishes to introduce namely to be used with Turf, which he has succeeded in firing and making according to the Irish Fashion – at least such is Darby's account, who knows something about the Matter. Out of our people none would go – but he got three Men from this Neighbourhood, able bodied men, who would do well if they go, and these with those already in the Forest from Ireland, would be able to do all that is wanting in this Line at first, that is to cut Turf and saw in Summer and burn Lime in Winter; Lime it seems is found at the Warren and hence the want of Men used to burn it. Darby says there certainly is a large Lump discovered at last, but cannot say more, not knowing; but so much found as to want six men for burning is good per se, and may lead to a very considerable Result – if so the Forest is at once doubled in Value. The Farm as I hear from same Authority and the Management of the Labourers is given over to your Brother Charles
> (Letter Lord Headley to FWK April 14th 1839, SRO A/BAZ/1/5).

This plan could explain the sheer amount of turf cutting which is recorded in the 1835-1840 account books. For example, in September 1835 129 500 turves were cut and dried at Blackpits; 52 500 turves were cut and dried at Ashcombe (Knight Archive Osmond Locks Accounts 1839 – 1840). The search for a workable limestone on Exmoor Forest continued:

> Papa's chief object is as usual Quarries. There is no more appearance of Lime than there was ten years ago but Papa has cut a good deal of Rock at Cloven Rocks and thinks that there may be lime underneath as soon as he can get men he intends to try for it. There has been cut through say 200 feet of Rock that will most of it effervesce with an acid
> (Letter CAK to ? May 1840, SRO A/BAZ/1/5).

> I am 29 tomorrow. My father has given me the entire management of the Forest. I have great confidence of being able to burn lime in the Warren within a few months by open? work. The rock breaks at the top with 94% of lime and is

> precisely like the beds of the best lime rocks at Combe Martin. This rock has not been cut by the adit but is behind it. I have been several times to Combe Martin to make my bargains and they are now putting lime on my fallows at Cornham 6s per ton cheaper than Mr Williams delivered. When the road is made on Challacombe Common which I will do very soon, I shall get it cheaper (Letter FWK to Jane Knight May 8th 1841, SRO A/BAZ/1/5).
>
> I have everyday more and more hopes of the limerock in Duredon Bottom which will be a great thing if it tries out well. I was thinking a water wheel pit. (Letter FWK to JK December 24th 1847, Knight Archive Letters 1841 to 1850).

4.3.2 A letter from Charles Knight to Frederic Knight is full of advice to his older brother about farming on Exmoor, ranging from the supply of good waterproof coats for the men, to care of lambs and calves, and the best way to save hay and carry out subsoil ploughing (Appendix 3 Letter from CAK to FWK October 23rd 1841, SRO A/BAZ/1/5).

4.3.3 The main sources of evidence for Frederick Knight's first decade of estate management are two collections of letters: from Frederic to his father, and from his agent, John Mogridge (Knight Archive Letters 1841 to 1850; Knight Letters 1840s). From as early as 1843 Frederic was worried about the financial situation of both Exmoor Forest and the Cookley ironworks. He argued that although he had done everything he could to retrench on Exmoor, he had nothing to sell: no calves, few lambs, and his attempts at cattle dealing failed due to both the quality of the stock and a fall in prices: 'If I continue to farm on the Forest I shall be ruined' (Abstract of FWK letters, Knight Archive Letters 1841 to 1850). Frederic's solution was to let farms on Exmoor, giving an income to pay mortgage debts; his letters record the problems of finding the right tenants and he planned to farm at least one of the farms himself:

> I am afraid that I shall be obliged to live on the Forest and to take to farming one of my farms, at least, to prepare it by lime for letting – people are afraid of the inclined land, they cannot put prairies on it and they can make no immediate profit from it – now my idea is that buying South Down sheep early in the spring, keeping them on the Forest during the summer and feeding them off in the autumn with turnips, could not be a very losing game – I can grow turnips in the [?] spaded land with certainty at a certain price (Letter FWK to JK October 14th 1847, Knight Archive Letters 1841 to 1850).

4.3.4 The letters from John Mogridge, agent to Frederic Knight 1844-1847, set out in great detail when and how the Knight farms were built and equipped: the foundations for Larkbarrow farmhouse were laid by April 1846, using lime from Porlock and local sand, it was finished in July that year (Fig 13); 'Mr Matthews wants his cheese room plastered and lathed at Picked Stones. I suppose it is necessary, as the cheese will be injured by the heat of the slate' (Letters J Mogridge to FWK April 6th 1846; 24th July 1846; 25th February 1846, Knight Archive Knight Letters 1840s). His correspondence with FWK also illustrates the difficulties the labourers faced working on enclosures on the south part of the Royal Forest (Fig 14): 'I must send two or three teams regularly on the South Forest. How they will be able to cross the Forest I scarce know the land being so wet' (Letter J Mogridge to FWK March 27th 1846, Knight Archive Letters 1841 to 1850).

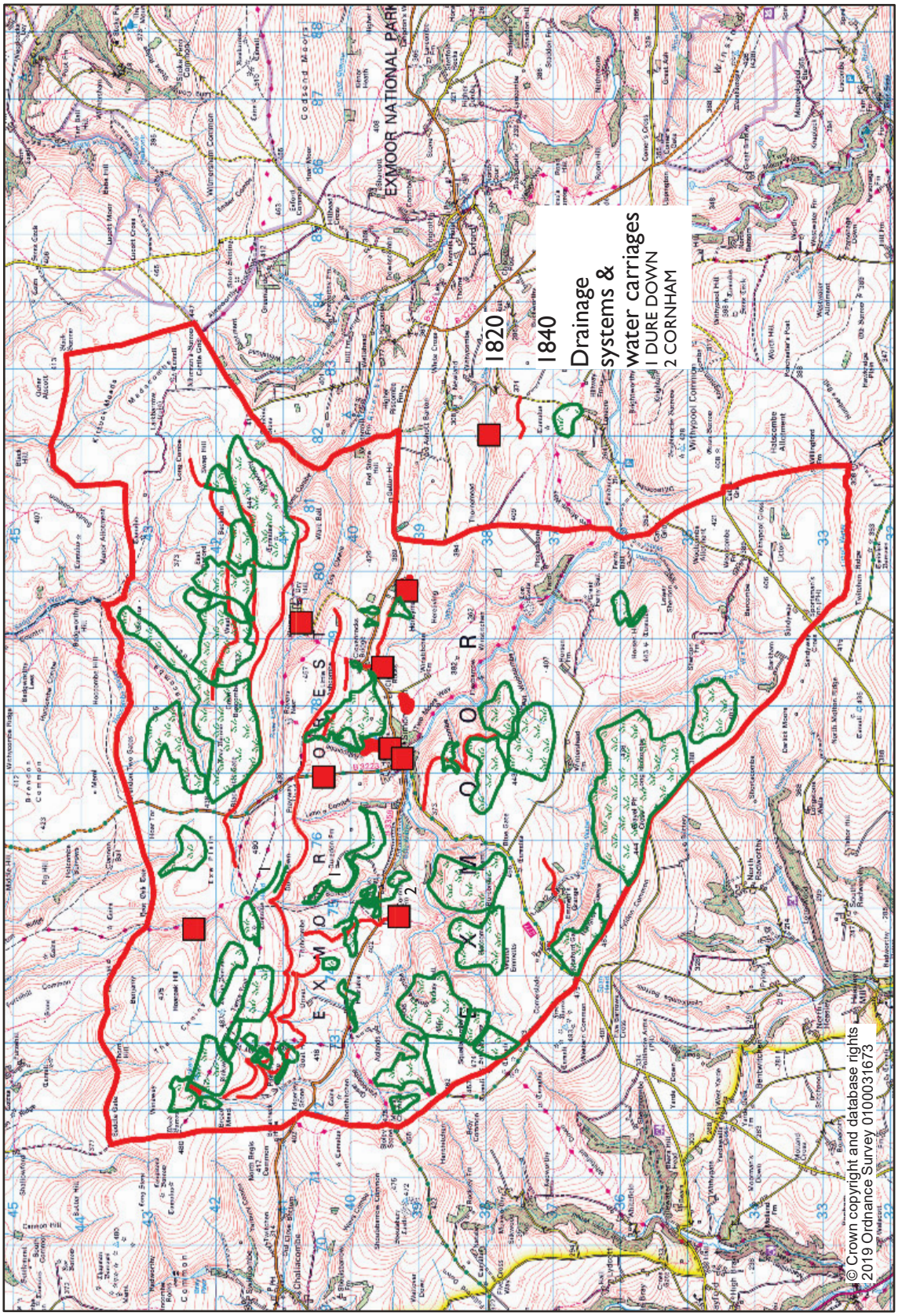


Fig 12 Main elements of John Knight's reclamation 1840

4.4 'A decided improvement in the appearance of things' (Frederic Winn Knight 1849)

John Mogridge was replaced by Robert Smith as Frederic Knight's Exmoor agent in 1848; he took on the farm at Emmett's Grange (Fig 15) as a tenant and began work on improving the farm even before the farmhouse was complete (Letter FWK to JK August 4th 1848, Knight Archive Letters 1841 to 1850). By April 1849 five farms were let to new tenants: Horsen, Wintershead, Goathill and Pinkery, Larkbarrow and Tomshill and Frederic Knight sees Robert Smith as the driver to the success of the new farms:

> I have a great deal to do in getting them into their farms although the chief part of the building and heavy work is done. They are going about cultivating in good [?] following the example Robert Smith has set at Emmetts. Everything now depends on the result of his crops
> Letter FWK to JK April 5th 1849, Knight Archive Letters 1841 to 1850).

4.4.1 Robert Smith set out his plans for Exmoor and the results of his first year farming at Emmett's Grange in a long letter to John Knight written in November 1849. The letter sets the scene for the next decade of events on Exmoor and is transcribed in Appendix 3. Smith also compiled a detailed record of his outlay at Emmett's Grange to the end of 1853: a total of £927 1s 9d. This document gives details of roads made, draining and water carriages constructed, subsoiling carried out, and buildings erected, including linhays in the meadows (Statement of expenditure by Tenant on the Emmetts farm, in landlords, or permanent improvements Knight Archive KN_CORR_027); much of this work survives in the landscape surrounding Emmet's Grange (Fig 15) (Bray *et al* 2011). Smith also compiled estimates for the work which was needed on Exmoor Forest in November 1855. It lists

Fig 13 (above left) Larkbarrow Farm, Cottages and Tomshill Farm in the early 20th century (Reproduced with the kind permission of the South West Heritage Trust SHC A/BAZ/4/10)

Fig 14 (left) Enclosures on Long Holcombe on the south side of Exmoor Forest seen from a stone quarry on Horsen Hill (Hazel Riley)

Fig 15 (above) Water carriages west of Emmett's Grange: Robert Smith's 'show farm' (Hazel Riley)

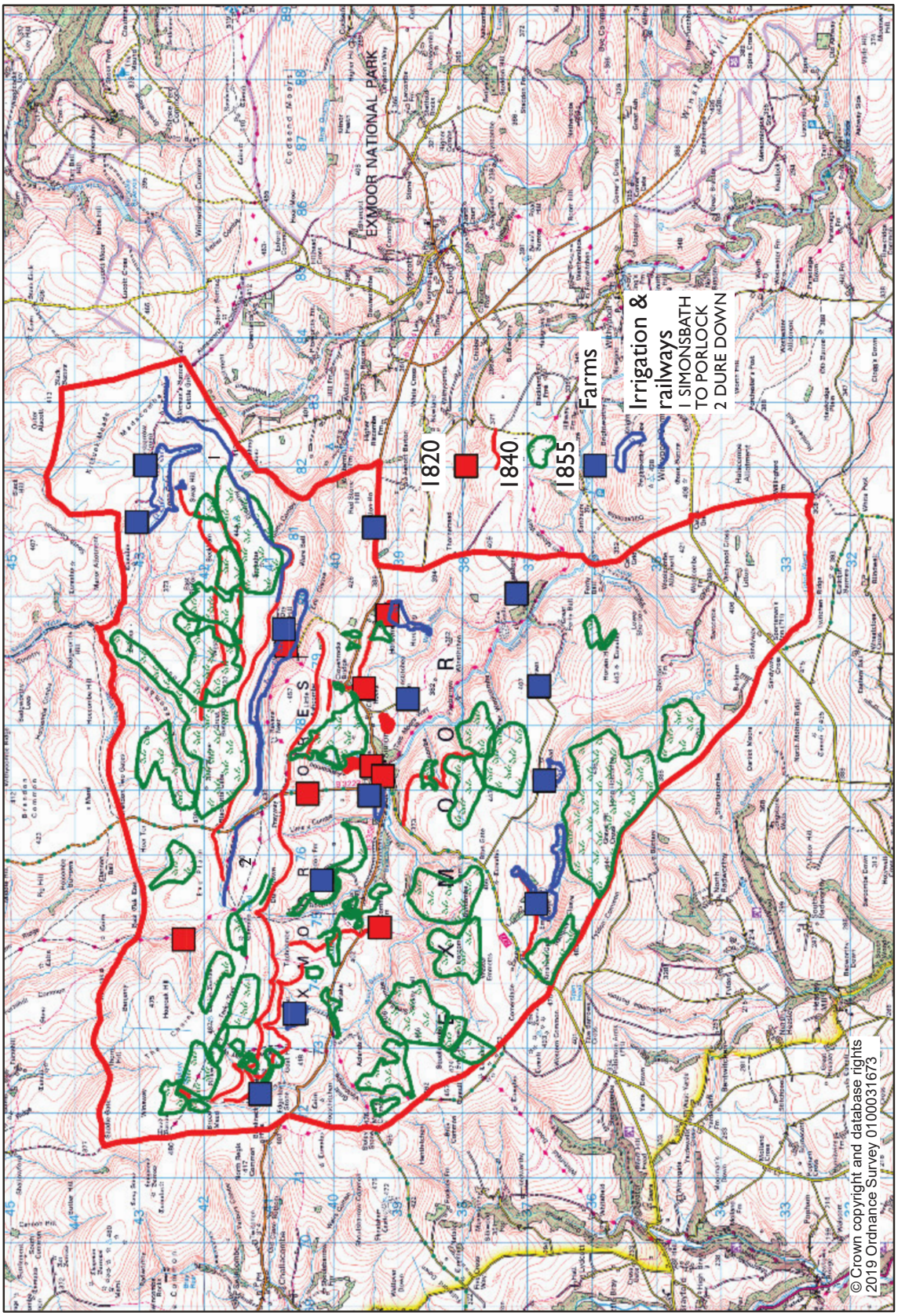


Fig 16 Main elements of the reclamation of Exmoor Forest 1855

work required on each farm or allotment of land and shows that most of the enclosure of the Forest had been carried out by 1855, with substantial amounts of new fencing and repairs required. Figure 16 uses the information in this document together with correspondence from Mogridge and Smith to Frederick Knight to show the main features of the reclamation of Exmoor Forest up to 1855 (Statements of Estimates for the year ending November 1st 1855, Knight Archive KN_CORR_027).

4.4.2 The extensive correspondence from Robert Smith to Frederic Knight details the daily running of the Exmoor Forest farms and estate for the period from 1850 to 1859. They contain evidence for the chronology of improvements made at several farms, including Larkbarrow and Tomshill Farms (5.3). The earlier letters show the difficulties in cultivating arable and root crops of all kinds:

> I have (since the rent day) looked into my corn very closely and am sorry to say that the 60 acres (although immense in bulk) will [no] more than pay for the seed and labour of sowing and thrashing. I assure you sir these continued disappointments are very serious I have now during the three last summers (all of which have been very fine) grown upwards of 200 acres of corn of varied kinds and taking the whole lot together, the result has been the same, say nothing of lime bills, rent, draining etc and the first wet season I had scarce anything of any kind. These with other unfortunate results (after my heavy outlay), have completely deceived me in any estimates of the returns both as to Capital and periods….Le Blanc complaining bitterly about his farming results, and says things are serious – having no turnips for his £60 spent in lime and £40 in spading, ploughing etc which appears to upset him – the turnips upon the Forest want rain very much – they are not good this year, as a general crop upon the different farms
> (Letter R Smith to FWK September 11th 1851, Knight Archive KN_CORR_012).

4.4.3 By 1856 the relationship between Robert Smith and Frederic Knight had virtually broken down. Smith wrote about his request to pay rent at the same time as the other tenants, to Mr Fowler, who worked for Frederic:

> I am really at a loss to know what it means [FWK not replying to previous requests], especially after exerting myself in every way to further Mr Knight's interests. The result is before you, and I ask the present favour as a tenant and not in the character of agent.
> I feel much averse to enter upon comparisons, otherwise could dwell at some length upon the state of other tenants farms, fences, arrears of rent, amount of lime, drawn and etc in comparison with my own hitherto costly 'show farm' for the good of the property.
> Feeling as I do, that I have been sincere in my occupations of agent and tenant, and have in great measure redeemed the property, and now refused even a letter in reply to my very small and humble request to pay my rent when the other tenants pay theirs, I cannot help reflecting upon the past, and in doing this it reminds me that I have now spent 8 years of the best of my life, to the injury of my family and their comfort, and am many hundreds worse in capital, than when I entered upon this 'Bleak Wild' and bold undertaking, without a cultivated field on nearly 700 acres of land, to graze even a Dairy Cow or Riding Horse and these home truths are known to Mr Knight, otherwise I might refer to the present state of this tenantry, and also the way in which the property was given into any charge….
> It troubles me much to press this subject, neither should I, if I did not want the money as a convenience to carry on the farm.

I have not sold a single thing from the farm since October last, neither can I until the sheep are shorn, this is sorry work, under war prices, and in comparison with corn farms
(Letter R Smith to Mr Fowler April 17th 1856, Knight Archive KN_CORR_016).

4.4.4 Robert Smith stayed on as Frederic's agent to FWK until 1859 and was involved with ironstone prospection and mining across Exmoor Forest. Henry Scale was appointed as local superintendent of mining by Frederic in 1856 and his letters contain details of the prospecting work undertaken between 1856 and 1859 (Knight Archive KN_CORR_023). Smith's successor, Frederick Smyth, took on the job of finding shepherds and sheep to run the Forest as a series of large holdings for sheep, loosely based around the Knight farmsteads of the 1840s (Knight Archive KN_CORR_10; KN_CORR_020).

5.0 RECLAMATION IN THE LANDSCAPE

5.1 The canals

There are two canals documented in the Exmoor Abstract: the Warren Canal and the Prayway Canal, both begun in 1819. The Prayway Canal is now more usually known as the Pinkery Canal. The Pinkery Canal was the subject of a detailed survey in 2004 and the following summary draws on that report (Barrett 2004). The Pinkery Canal runs along the 435m contour on the north side of the River Barle, from a point NW of Pinkery Farm in the west at SS 7221 4188 to Three Combe Hill, south of Warren Farm, in the east at SS 7936 4019 (Fig 9). Some of the best stretches of the canal in its original condition are to the north of Pinkery Farm, where it comprises a channel, 2.5-3m wide, 2m deep with banks 1-2m wide, 0.5-1m high on both sides (Fig 17); the canal is some 9km long. In several places the canal has been re-used by enclosure boundaries (Fig 18) (Barrett 2004, fig 6). Pinkery Pond, a large reservoir formed by the construction of a massive dam across a headwater stream of the River Barle, lies some 400m to the north of the western end of the Pinkery Canal. The reservoir was not connected to the canal, but it was presumably intended as the water source for the canal (below; Riley 2012).

Fig 17 (above left) The Pinkery Canal NE of Pinkery Farm (Hazel Riley)

Fig 18 (left) The Pinkery Canal re-used by enclosure boundary, Limecombe (Hazel Riley)

5.1.1 The Warren Canal
The Warren Canal runs along the northern side of the Exe Valley, from Exe Head in the west at SS 7562 4172 to Rams Combe in the east at SS8080 4092, a total length of some 7.5km (Fig 9; Front Cover).

5.1.2 Exe Head to Blackpits
This part of the canal runs through some very wet ground with areas of dense rushes making access difficult. The canal starts at the River Exe, NE of Exe Head at 275642 141723 (Fig 19). It has been re-used by the enclosure boundary between Exe Plain and Dure Down. A profile was recorded at 276353 141850 where access was possible: here the canal remains have been modified by the enclosure boundary bank and by a farm access track (Fig 20). The canal bed is 6.5m wide, up to 0.9m deep with a level, stony track 3.3m wide on the north and the enclosure boundary bank on the south sides (Fig 21).

5.1.3 Blackpits to The Warren
The canal between Blackpits and The Warren has been re-used by the enclosure boundary between Prayway Meads and Great and Little Buscombe and Trout Hill (Fig 22). At 278618 141409 the remains of the canal comprise a water-filled ditch, 2.1m wide, 1m deep on the north side of the enclosure boundary, with a re-cut ditch 1m wide, 0.6m deep on the south (Figs 21, 23).

5.1.4 The Warren to Rams Combe
The canal between The Warren and Rams Combe has been re-used by the enclosure boundary between the enclosures on The Warren, Dry Hill and Ware Ball, and Elsworthy. West of Warren Farm, the enclosure boundary may have been constructed on the southern bank of the canal. The canal remains comprise a ditch, 1.5-2m wide and up to 0.9m deep, with a bank 2m wide and 0.6m high to the south (Fig 24). Between Warren Farm and Dry Hill the remains of the track bed of the Simonsbath to Porlock Railway run parallel to the Warren Canal. The remains of the canal comprise a ditch, 2.5m wide, 0.5m deep, with the enclosure boundary on the south side, and a broad bank, 2m wide, 0.4m high, on the north. The track bed lies to the north of this (Figs 21, 25). The ditch has been re-cut recently (Fig 26). A track runs along the south side of the enclosure boundary from Warren Farm to Ware Ball; it may well run along the southern bank of the canal (Fig 27). At the canal end at Rams Combe, the southern bank of the canal is visible in improved fields on the south of the enclosure boundary: a shallow channel, 1m wide, 0.6m deep, with a broad, flat-topped bank, 1.6m wide, 0.5m high (Fig 28). On the north side of the enclosure boundary the re-cut ditch is a sharply cut feature with a flat bottom, 2.2.m wide, 1.2m deep (Fig 29).

Fig 19 The west end of the Warren Canal, Exe Head (Hazel Riley)

Fig 20 (above) The Warren Canal between Exe Head and Blackpits (Hazel Riley)

Fig 22 (above right) The Warren canal east of Blackpits (Hazel Riley)

Fig 23 (right) The Warren Canal on Trout Hill (Hazel Riley)

Fig 24 (left) The Warren Canal west of Warren Farm (Hazel Riley)

Fig 25 (below left) The Warren Canal and track bed of the Simonsbath to Porlock railway on Dry Hill (Hazel Riley)

Fig 26 (below) Re-cut ditch on the course of the Warren Canal, Dry Hill (Hazel Riley)

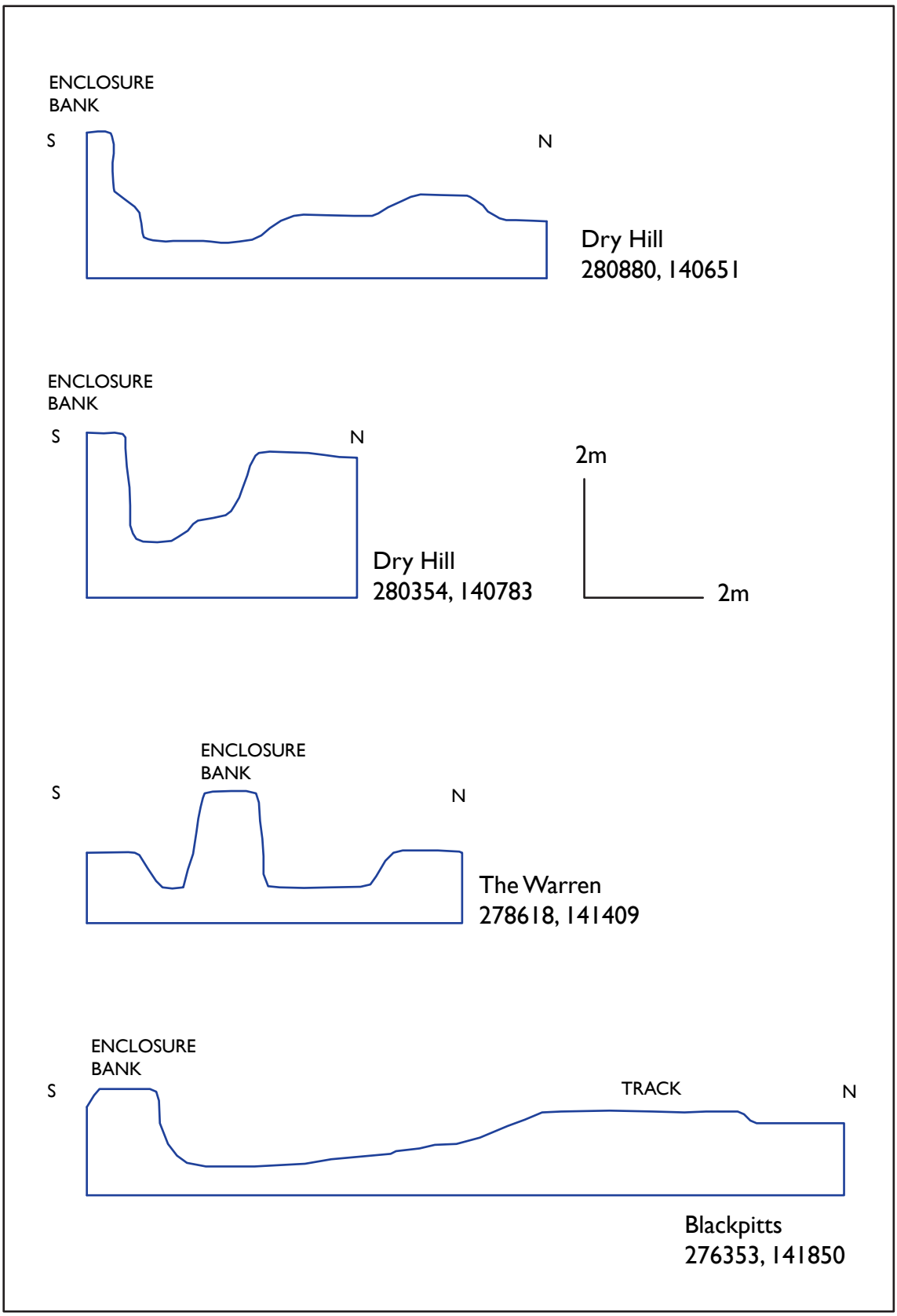


Fig 21 The Warren Canal: profiles

5.1.5 The Warren to Elsworthy
Burton identified a northern branch of the Warren Canal, running along the south side of West Pinford and the north side of Elsworthy from SS 7865 4138 NW of Warren Farm, to SS 8196 4173, south of Larkbarrow Farm (Burton 1989, 65). Field investigation suggests that this is a contour leat or water carriage, and it is considered below (5.3).

5.2 Pinkery Pond, the canals and reclamation

5.2.1 There has been much discussion about the function of the Pinkery Canal and Pinkery Pond. Orwin suggested that Pinkery Pond and the canal were constructed to provide irrigation water for the stretch of land between Pinkery Farm and Honeymead (Orwin 1929, 31-32). Burton argued that the canal was built to provide water to power inclined planes on a proposed railway to the coast (Burton 1989, 62-64). A survey of Pinkery Pond and its environs in advance of EMP mire restoration work suggested that the reservoir and canal were intended to provide water power for some of the Knight farmsteads on Exmoor Forest (Riley 2012, 10-11). Little has been written about the Warren Canal: Burton linked it with supplying water for an inclined plane for a proposed railway; elsewhere it has been dismissed as part of the 19th-century enclosure boundaries (Burton 1989, 62-64; Barrett 2004, 35).

5.2.2 The new evidence for the chronology of these features, together with the information from the Exmoor Abstract, allows the canals and Pinkery Pond to be put at the heart of John Knight's reclamation project. The Exmoor Abstract shows that the Pinkery Canal was dug between October 1819 and March 1820, and that the Warren Canal was built between November 1819 and March 1820 (Knight Archive Exmoor

Fig 27 (left) Modern track, perhaps using the southern bank of the Warren Canal, east of Warren Farm (Hazel Riley)

Fig 28 (below left) Bank on the south side of the Warren Canal, Rams Combe (1m scale) (Hazel Riley)

Fig 29 (below) Re-cut ditch on the course of the Warren Canal, Rams Combe (1m scale) (Hazel Riley)

Abstract 1819). Pinkery Pond was built well before 1836: in January of that year John Hartley was paid for 'Pinkery Pond pulling down old fence' (WRO 10470/899:310/122 Accounts of John Knight 1835 and 1836). The survey of Pinkery Pond showed that the pond was earlier than several surface drains (Riley 2012, 10): as the surface drains were probably dug in the 1830s (4.2.7), the field evidence and documentary evidence suggest that the pond was complete by 1830 and was the reservoir to supply the Pinkery Canal (Fig 30). The Abstract shows that the Pinkery Canal and the Warren Canal were named as canals, implying that they were planned to allow the movement of bulky materials – such as lime, stone, and minerals - into, around, and out of the heart of Exmoor Forest.

5.2.3 John Knight was familiar with canals: the Factory Arm of the Staffordshire and Worcestershire Canal linked the Knight's ironworks at Cookley with the rest of the canal network in the Midlands. The main canal was also used to deliver lime onto the farm at Lea Castle (Pitt 1813, 95). The problems of transporting large quantities of fertiliser – calcareous sea sand and limestone – into the agricultural hinterlands of north Cornwall and Devon were being addressed in the late 18th and early 19th centuries by work on the Bude Canal, the Bideford to Torrington Canal and the Tamar Manure Navigation (Harris and Ellis 1972).

5.2.4 The Bude Canal and Bideford to Torrington Canal were built not to take large barges but small tub-boats, which were 20' long, 6' wide and carried 5-6 tons: wooden or iron tanks which were chained together and pulled by one or two horses. Both the Pinkery and Warren Canals were large enough to take these sorts of tub-boats. Planning for the Bude and Bideford Canals was underway when John Knight bought Exmoor; Sir Thomas Dyke Acland was a subscriber to the Bude Canal Company and a neighbour of John Knight. A further link between the Bude Canal and the Exmoor canals is found in John Knight's Cow Stock Book which has a sketch of Bude Harbour drawn by Sir Thomas Dyke Acland (Fig 31).

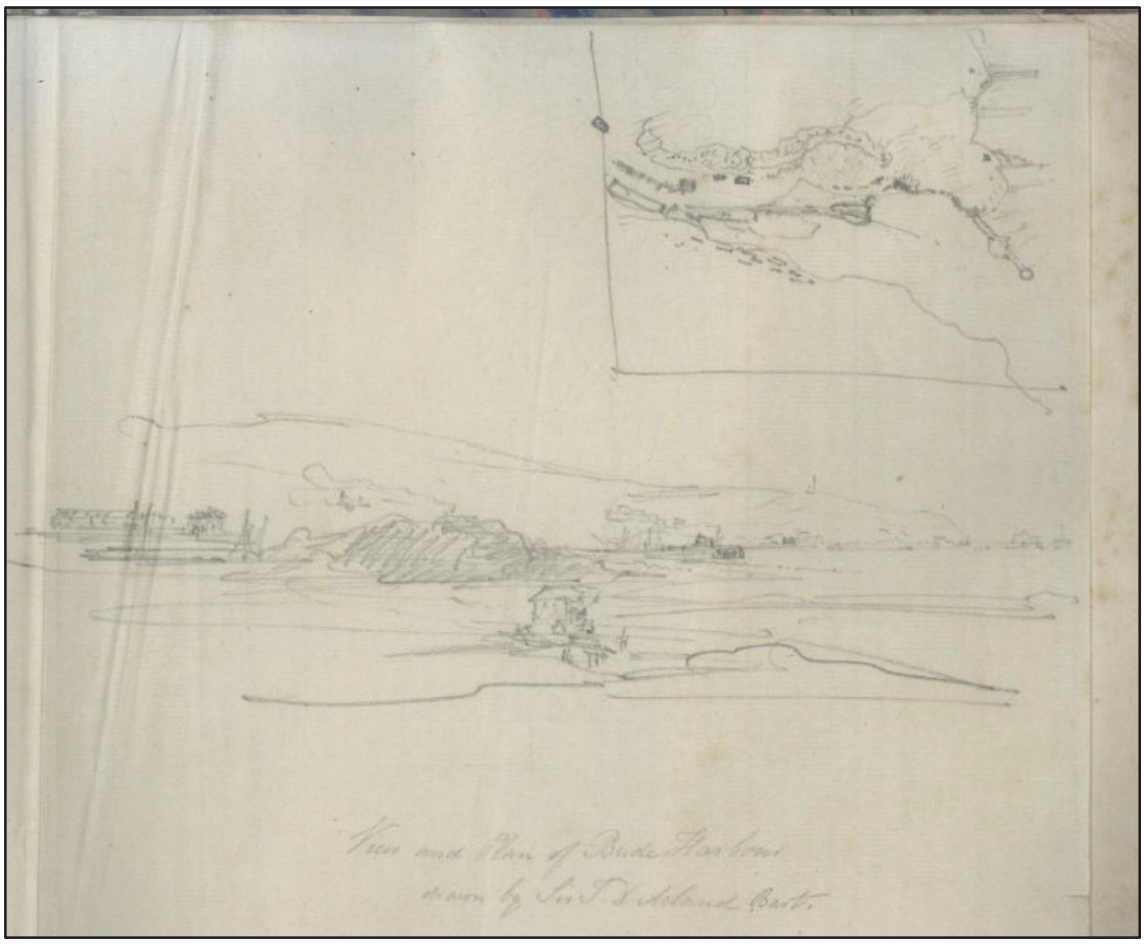
5.2.5 The small harbour at Porlock Weir is only a few miles from the NE boundary of Exmoor Forest. John Knight planned to link his estate to this port by a railway from Porlock Weir, across Porlock Common which was owned by the Blathwayt estate (4.1.2). The presumption is that John Knight's railway was planned to run to the eastern end of the Warren Canal at Rams Combe. Permission from the Blathwayt estate was never granted and John Knight's railway was not built.

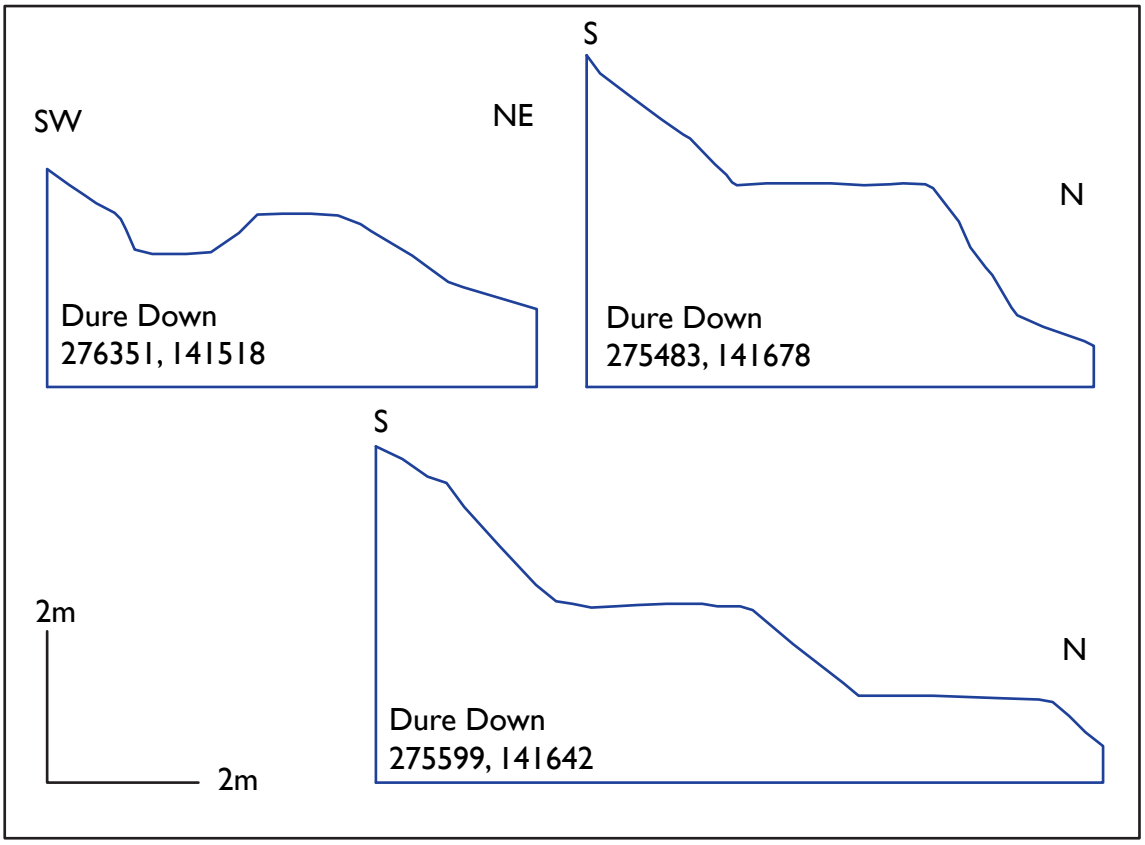
5.2.6 The Pinkery Canal spans nearly the whole breadth of Exmoor Forest, from the west boundary SE of Woodbarrow Gate to Three Combe Hill south of Warren Farm. It is hard to see how this was intended to function as a canal without proposing an aqueduct across Exe Cleave to link the Warren Canal with its intended railway junction

Fig 30 (left) Pinkery Pond and dam: reservoir built to supply water to the Pinkery Canal (Hazel Riley)

Fig 31 (page 32, top) View and plan of Bude harbour by Sir Thomas Dyke Acland drawn on John Knight's Exmoor Cow Stock Book (Reproduced with the kind permission of the South West Heritage Trust SHC A/EJM/3/3/2)

Fig 32 (page 32, bottom) Earthworks on Dure Down: profiles 1:100 scale



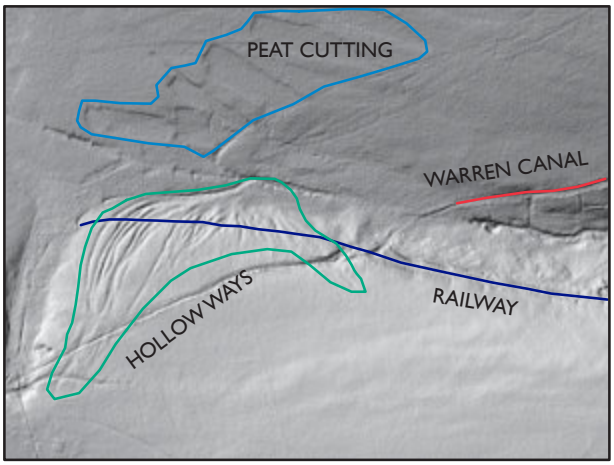

SW
NE
Dure Down
276351, 141518
S
N
Dure Down
275483, 141678
S
N
Dure Down
275599, 141642
2m
2m

to the Pinkery Canal. Field investigation carried out for this study has suggested that the Warren Canal could have linked to the Pinkery Canal by continuing around Exe Head, along the south side of Dure Down to join the Pinkery Canal at Prayway Head. Two substantial linear earthworks curve around the NE side of Dure Down. A level track runs from Exe Head at SS 7521 4169 for 700m along the 435m contour to SS 7622 4151. The track is 1.7-2.5m wide, cut into the slope up to 1.6m (Figs 32,33). At Exe Head the track runs across an area of medieval hollow ways (Fig 34). From SS 7634 4151 a channel, 1.6m wide, 0.5m deep, with a bank, 1m wide, 0.9m high on the downslope side runs along the 435m contour, around the eastern side of Dure Down for some 300m to SS7659 4126 (Figs 32,35). This may have been part of the plan to link the Pinkery Canal to the Warren Canal and so to a railway and port at Porlock Weir.

5.2.7 The level track could be the remains of the track bed for a railway which was built in the 1850s by Frederic Knight as part of the exploitation of Exmoor's ironstone deposits. A 19th-century map of Exmoor's mineral deposits shows the route of a proposed railway from Simonsbath, via Exe Head, along the Warren and Dry Hill to the Forest boundary at Larkbarrow (SRO DD/X/YL Map Exmoor Ironstone Deposit, c 1850s). Stations are shown at Simonsbath, on Titchcombe and on Larkbarrow. A reference to draining the Higher Terminus Field in 1855 probably relates to the proposed station on Titchcombe (Statements of Estimates for the year ending November 1st 1855, Knight Archive KN_CORR_027).

5.2.8 The canals may also have played a part in the extensive irrigation schemes which were part of John Knight's reclamation plans (5.3). The Stover Canal, constructed in the late 18th century, ran from Newton Abbot to Ventiford in south Devon, It served to drain and irrigate land on the Stover estate, as well as carrying clay and granite. The water meadows on the Stover estate were watered with the overflow from the canal and manured with mud from the canal bed (Askew Nelson Ltd 2013, 24-25).

Fig 33 (left) Railway track bed, N side Dure Down (1m scale) (Hazel Riley)
Fig 34 (below left) Railway track bed crossing medieval hollow ways, Exe Head (Lidar © Geomatics)
Fig 35 (below) Channel linking railway track bed and Pinkery Canal, Dure Down (Hazel Riley)



5.3 Upland irrigation: water carriages and catchwater meadows

5.3.1 A water meadow was an area of grassland in which the quantity of grass was increased and the quality of the grass was improved through artificial irrigation. Water was moved onto the meadow at certain times of the year via a system of channels, passing a continuous, moving film of water through the sward – stagnant water being low in oxygen damages grass. The terms 'floating' or 'floating meadows' were often used for this form of grassland management, the term 'drowning' was applied to the act of applying the water. The irrigation of grassland was undertaken to secure an early bite of grass for livestock in the spring, to shorten the time that cattle and sheep needed winter fodder by bringing forward the growth of spring grass by several weeks. The irrigation began before Christmas and continued until early March, with a short period of drying before the livestock were put into the irrigated fields. The grazing animals were moved on in late April or May, followed by a second, shorter period of irrigation to maintain moisture to enhance the hay crop in the summer. The moving water dressed the sward with dissolved lime and other sediments which fertilised the soils; the process also resulted in complex chemical effects which improved the pastures by favouring the growth of more palatable grasses over other species (Williamson and Cook 2007, 3).

5.3.2 There are two main types of water meadows: bedwork systems which used river water on flat, valley floors, and catchwork or catchwater meadows, constructed on hillsides. Catchwater meadows took water from a spring or stream via a channel, sometimes called a headmain or water carriage, along the side of a hill; the water was allowed to overflow the channel or it passed through openings in its side, so that it spread down the slope before returning to the parent stream or being taken off the land by an artificial tail drains. A series of parallel gutters below the water carriage could be dug to encourage a more even flow of water down the slope (Williamson and Cook 2007, 4).

5.3.3 Bedwork water meadows were an important part of the sheep-corn system of agriculture in the chalk river valleys of Wessex from the early 17th century; catchwater meadows were common in western England in the 17th and 18th centuries as part of an agricultural system based on livestock farming. In the later 18th and 19th centuries, the practice of irrigation by catchwater systems spread into upland areas of England, Scotland and Wales. In these areas, irrigation was used to bring on an early growth of grass but of particular importance was to improve the quality of the upland pastures. This imitated a natural phenomenon widely observed in the uplands – flushes of good, palatable grass growing around springs on hillsides. The dissolved oxygen in the flowing water encouraged the growth of broadleaved grasses at the expense of coarser grasses (Williamson and Cook 2007, 4-5). Flush irrigation, where the water was mixed with lime and other nutrients such as manure, was particularly important in upland areas to replace nutrients lost by leaching from high rainfall; upland irrigation was commonly carried out for two to three days and repeated in 10-12 days (Williamson 2007).

5.3.4 The Exmoor Abstract clearly differentiates between the canals and water carriages, and this difference is continued through into the Exmoor Accounts 1835-1840 (Knight Archive Exmoor Abstract 1819; Osmond Lock's Accounts 1839-1840; John Litson's Accounts 1840; WRO 10470/899:310/122 Accounts of John Knight 1835 and 1836). In 1819 and 1820 water carriages were constructed across Exmoor Forest on: Halscombe and Woolcombe; Little Ashcombe; Great Ashcombe; Cloven Rock and Honeymead; Pinkery, Hearlake, Goat Hill and Driver and the Tythe Allotment (Lanacombe, Trout Hill, Pinfords, Swap Hill, Kittuck, Madacombe) (Knight Archive Exmoor Abstract 1819) (Fig 9).

5.3.5 The Tythe Allotment water carriage is a long channel, curving along some of the more remote parts of the Forest. It begins close to a tributary stream of Hoccombe Water on Great Buscombe, and follows the 400m contour across West and East Pinford, Beckham and Swap Hill to end in one of the enclosed fields of Larkbarrow Farm: a total length of some 3.6km. The morphology of the earthwork is uniform for most of its course. It comprises a rush-filled, U-shaped channel, 2.5-2.8m wide, 0.5-0.8m deep, with a bank, 1-1.1m wide, 0.9-1m high, on the downslope side (Figs 36,37). The water carriage is crossed by several drainage systems and enclosure boundaries along its course; it is demonstrably the earlier feature in the landscape in all cases.

5.3.6 To the north of this, a similar earthwork runs along the 425m contour for some 3.2km, from The Warren at SS 7864 4138, along the north side of Elsworthy to SS 8196 4173, south of Larkbarrow Farm. Between 278834 141427 and the NW corner of the Elsworthy enclosure boundary at 280090 141430 the earthwork is a substantial feature in the landscape: a channel 3.5m wide, 0.8m deep, with a bank on the downslope (north) side, 1.5m wide, 1m high (Figs 36,38). From the NW corner of the Elsworthy enclosure the earthwork has been used by the enclosure boundary between Elsworthy and Beckham. The earthwork comprises a rush-filled, flat bottomed channel, 4.6m wide, 0.7m deep, with the enclosure boundary on its north side (Fig 36). At 280261 141425 the earthwork has been modified by a later drainage system; it is up to 6m wide and 0.6m deep. East of this, the channel narrows to 2.5-3m wide; it continues with a uniform morphology to 281961 141734. Burton suggested that this was a branch of the Warren Canal, but its morphology suggests that it was a water carriage, probably taking water from the Warren Canal and associated with the long water carriage to the north (5.3.5).

5.3.7 The Pinkery, Hearlake, Goat Hill and Driver water carriage runs from a headwater stream of the River Barle, south of Pinkery Pond, at SS 7220 4156, along the 420m contour to Titchcombe, at SS 7423 4048. The earthwork has been re-used by enclosure boundaries for most of its length and has been variously recorded as a hedge side ditch or contour leat (ENPHER MSO1088) and a bank (ENPHER MSO10129). Where the water carriage survives in its original form, it comprises a U-shaped channel, 1-2m wide, 0.5m deep, with a bank, 3.1m wide, 0.6m high, on the downslope side, and an intermittent upslope bank. The earthwork has been re-used by an enclosure boundary on Goat Hill, where it can be seen as a ditch, 1.2m wide, 0.4m deep, with a flat-topped bank 2.4m wide, 0.4m high on the south side of the boundary (Figs 36,39).

5.3.8 Little and Great Ashcombe are now enclosed, improved pasture fields to the north and NE of Simonsbath. Much of the SE slopes of Little Ashcombe contain the remains of an extensive and complex system of drainage ditches which were surveyed in 2015 as part of the EMP (Riley 2015). The drains are unlike the water carriages described above from Great Buscombe to Swap Hill and Pinkery to Titchcombe: the channels run down the hillside to drain into Ashcombe

Fig 37 The Tythe Allotment water carriage on East Pinford (Hazel Riley)

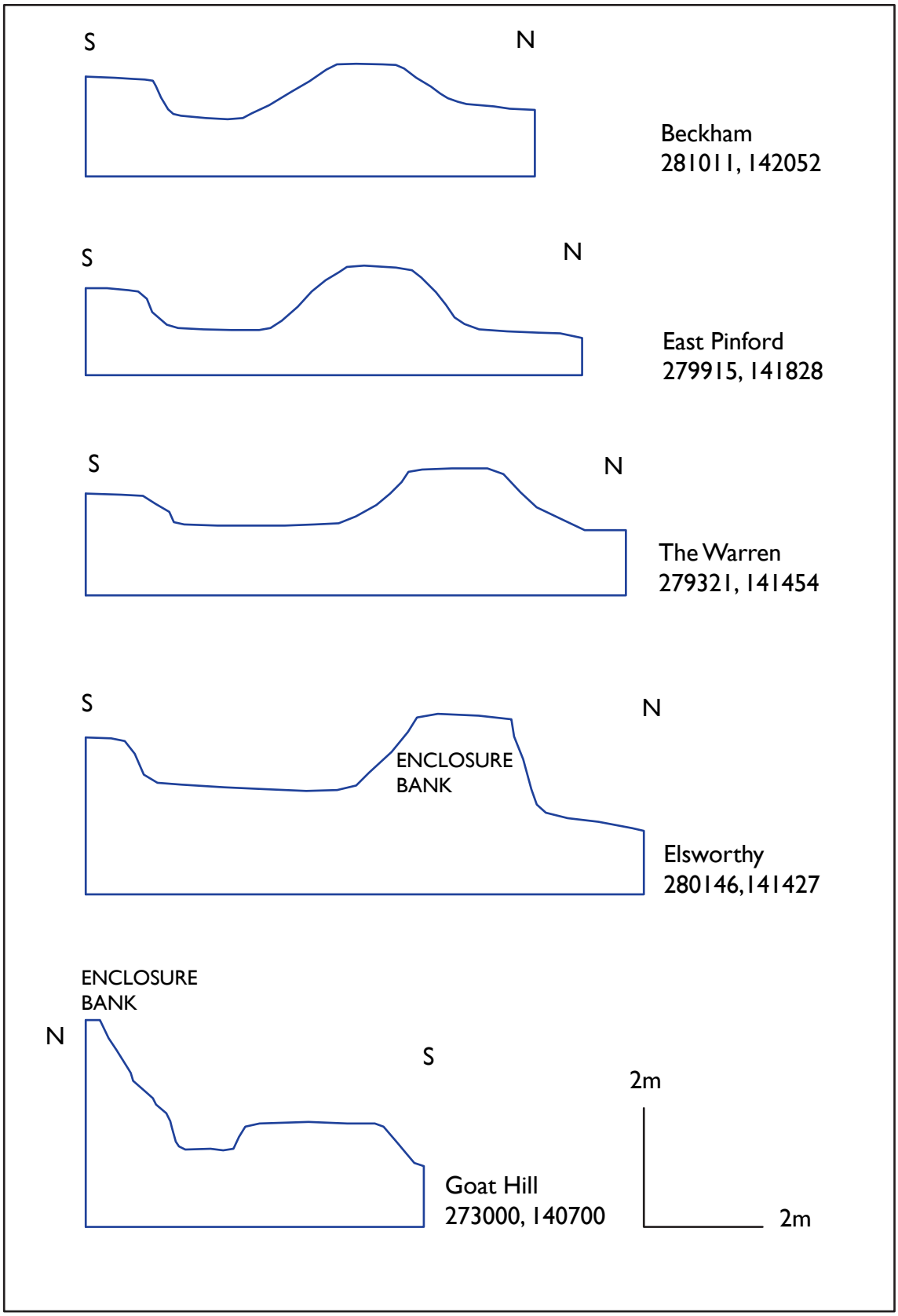


Fig 36 Water carriages: profiles 1:100 scale

Fig 38 (above) Water carriage on West Pinford (Hazel Riley)

Fig 39 (above right) Water carriage on Goat Hill, re-used by an enclosure boundary (Hazel Riley)

Fig 40 (right) The head channel of the drainage system on Ashcombe probably re-uses part of the water carriage built 1819-1820 (1m scale) (Hazel Riley)

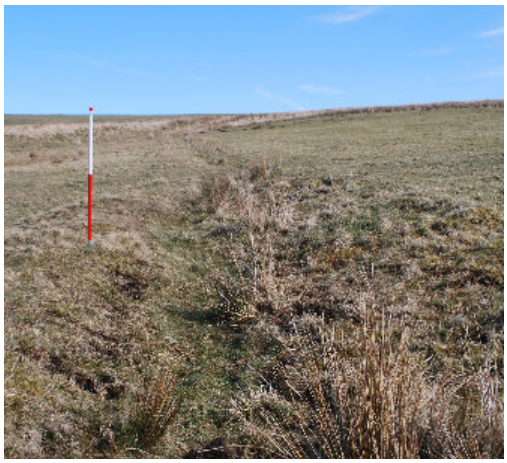


Fig 41 (left) The Halscombe and Woolcombe water carriage on Little Halscombe (L Bray) (© ENPA)

Fig 42 (below) Lower contour leat on Dure Down (Hazel Riley)

Fig 43 (below left) Contour leats on the east side of Tangs Bottom (Hazel Riley)

(5.3.13). A possible contour leat was identified from aerial photographs (ENPHER MMO2405) on the eastern edge of the drainage system. It runs along the 425m contour and can be seen on Lidar images continuing to the east. The drainage system may have re-used part of John Knight's water carriage as the head channel of the drainage system (Fig 40).

5.3.9 The water carriage on Woolcombe and Halscombe is probably the linear earthwork discovered during a recent EMP survey of the area and interpreted as a water management feature or a post-medieval field boundary (Bray 2013, 7; ENPHER MEM22499). The probable water carriage runs along the southern side of the Barle Valley, from a tributary stream of the River Barle along the 385m contour to Halscombe, where it meets an existing enclosure boundary which seems to have re-used the earthwork for much of its length. The earthwork comprises a channel, 2m wide, with a bank, 2-3m wide and up to 1.6m high on the downslope side (Fig 43).

5.3.10 Two contour leats on the south side of Dure Down, north of the Pinkery Canal, were recorded from aerial photographs (ENPHER MMO2347). The leats run SE/NW from the head of Tangs Bottom along the 460m and 450m contour for some 500m. The earthworks comprise substantial channels, 2.6m wide, 0.5m deep, with a large, flat-topped bank, 1.6m wide, 1.2m high, on the downslope side. Two further contour leats run for c 0.5km and 1.5km along the eastern side of Tangs Bottom, taking water to Duredon Farm (Figs 42,43). There are references to constructing some 464 perches (c 2.3km) of water carriages on Dure Down in October 1835 and December 1836, giving a probable date for these earthworks (WRO 10470/899:310/122 Accounts of John Knight 1835 and 1836).

5.3.11 John Knight's water carriages should be seen as a major part of his plans for the reclamation of Exmoor Forest. Both the surviving evidence in the landscape and the documentary evidence outlined below show that John Knight set out an extensive system of water carriages to systematically irrigate and improve the upland pastures across Exmoor Forest. The Pinkery and Warren Canals may also have been intended to carry the materials needed for flush irrigation onto the Forest and could also have provided overflow water and mud for the irrigation process. The construction of several water carriages was one of his first undertakings and there is evidence that they were in use for irrigation as early as the winter of 1819/1820: there are references to 'letting water out of the water carriages' twice on December 24th 1819, twice on February 5th 1820 and once on February 19th 1820. The use of the plural – carriages - does suggest that several were being worked at this time (Knight Archive Exmoor Abstract 1819).

5.3.12 The use of the water carriages for irrigation continued into the 1830s. There are references to cleaning the water carriages near Goat Hill and at Prayway Head in 1835, and to building water carriages on Dure Down in 1836 (WRO 10470/899:310/122 Accounts of John Knight 1835 and 1836). There are references to a 'water carriage' at Emmett's Grange in 1844 before the farm was built (Letter J Mogridge to FWK June 11th 1844, Knight Archive CORR_0030) and to an 'old water carriage' at Emmett's Grange in 1849, when Robert Smith was using the water from a bog which he had drained to irrigate some native grass 'by way of an old water carriage' (Letter R Smith to JK November 3rd 1849, Knight Archive Letters 1841 to 1850). The practice of irrigation of upland pastures continued on Dure Down in the 1860s: 'if time and weather permit he can clean the old water carriage. But I fear this will not be done to be of service this season' (Letter F Smyth to FWK January 15th 1868, Knight Archive KN_CORR_020). Samuel Sidney visited the horse sales at Simonsbath in the early 1850s and commented on the water-meadows, indicating that these were already well-established features in the landscape:

> On my first visit to Exmoor, 25 years ago, some beautifully green water-meadows existed near Simonsbath. Others have since been made, but not in the proportion that might have been expected. Looking at the numerous hill-side springs and brooks, each offering the utmost natural facilities for successful irrigation, more might easily have been done
> (Sidney 1878, 91).

5.3.13 Several smaller scale catchwater meadows, associated with the later Knight farmsteads, were recorded by the NMP at Driver, Wintershead, Duredon, Larkbarrow, Tomshill, Simonsbath, Horsen, and Emmett's Grange. There is documentary evidence for two much earlier catchwater meadows: 'floating gutters' were cut and made on Ashcombe in 1835 (WRO 10470/899:310/122 Accounts of John Knight 1835 and 1836). The remains of these can be seen in the improved pasture fields between Ashcombe and Cloven Rocks, where an extensive and complex system of channels running with and across the slope covers some 50ha (Fig 44) (Riley 2015). This could represent the remains of a catchwater meadow which took water from White Water at Cloven Rocks, which has been modified by later drainage channels. The catchwater meadows at Cornham were constructed in 1840 (Knight Archive Lock Accounts 1839-40). William Hannam, tenant at Cornham 1845-1858, described how he cut gutters to improve the pastures at the farm:

> The piece adjoining 32 Acres when I enters the Farm was many Acres of it covered with Rushes. The stream of water from the Yards was flowing over it from two large Gutters at the Top where the Grass was very Rank and Rushy – I had 6 Large Gutters Cut down across it to take the water to the Bottom in its Foul State and a lot of other Gutters cut at the Bottom on the Dead Level which made the Bottom of the Field nearly as good as the other. By paying attention to the water and washing the Dung down over it Brought [the Redd Clover] up as thick as it could come and by alternately Mowing it cleaned it of the Rushes
> (Orwin et al 1997, 281).

5.3.14 Robert Smith was a great advocate of the use of irrigation and catchwater meadows as part of the process of reclamation for moorland farms and described in detail the process of setting out water carriages and water meadows for improving grass and hay (Smith 1851). As well as his work on improving his farm as a tenant at Emmett's Grange, Smith oversaw the improvements carried out by Frederic Knight's tenants, writing that 'New meadows are being laid out upon every farm' (Smith 1851, 148). The remote farms on Tomshill and Larkbarrow had proved difficult to let; in 1852 the tenants of Larkbarrow were forced to sell their livestock, agricultural equipment and furniture in order to pay outstanding rent. Smith saw this windfall as an opportunity to improve the farmstead, and his letters allow the dating of the irrigation systems at Larkbarrow and Tomshill which are significant features in the landscape around Long Combe (Fig 45) (Jamieson 2001; Riley 2017):

> First we are really lucky to have got any rent from such a party as Meadows, and further I think it next to impossible to let the farm again to a good tenant without preparing the way for him now that the farm is in such disrepute both as to the late tenant and its appearance. To remedy this, and to have the way for letting the Tomshill House and Farm, I am exceeding anxious that you should allow me to spend the amount now received in getting the rest of the farm into good grass and water meadows?
> (Letter R Smith to FWK April 15th 1852, Knight Archive KN_CORR_017)

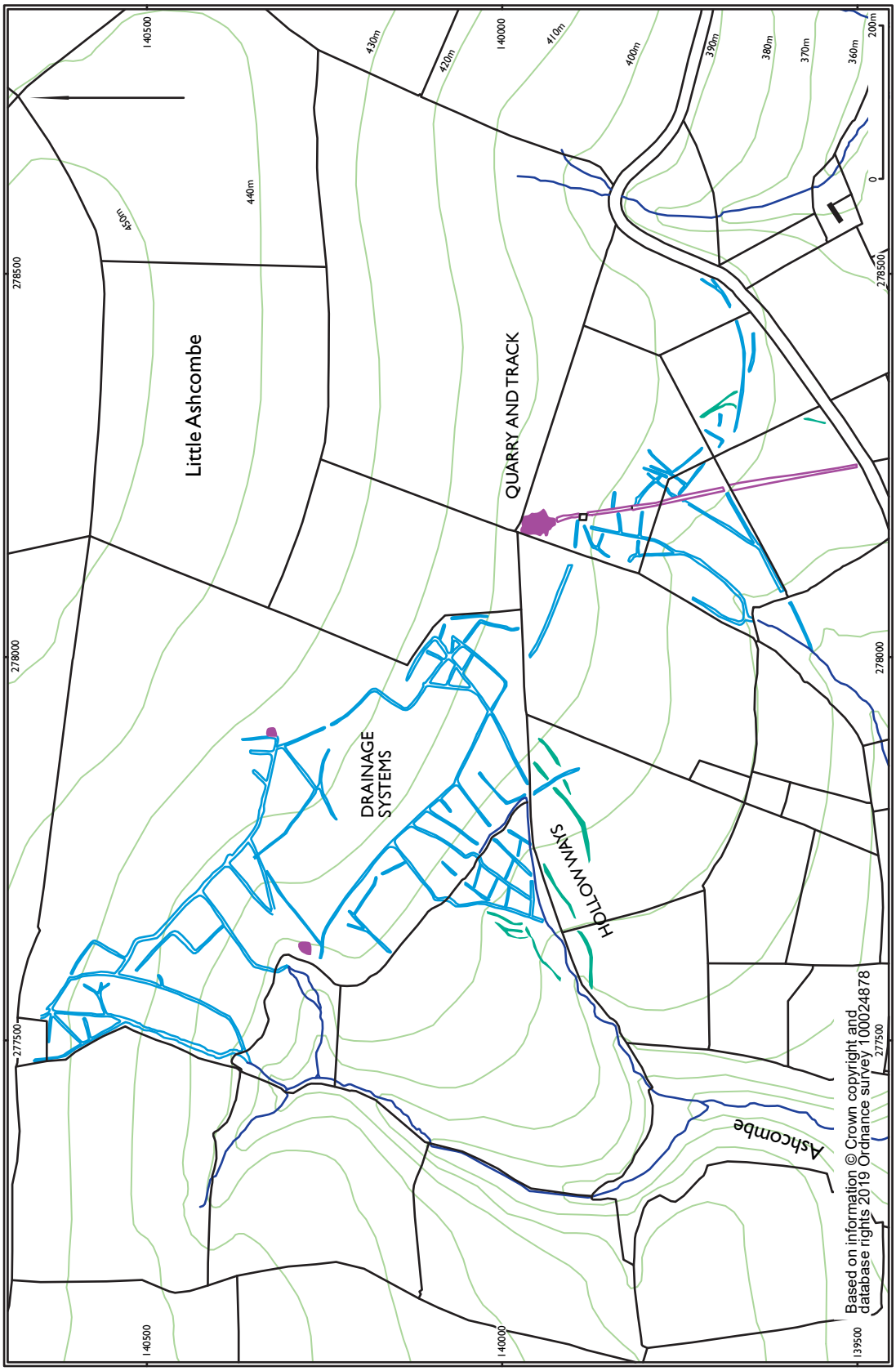


Fig 44 Plan of the floating gutters, Little Ashcombe

Five years later he got the opportunity: 'I have set out the Larkbarrow draining and water carriages, which will improve the farm very much, the future hay crop will repay the outlay' (Letter R Smith to FWK December 2nd 1857, Knight Archive KN_CORR_013).

5.3.15 The water meadows at Duredon and Larkbarrow were being used for irrigation in the 1860s:

> The weather here up to last Friday has been a very nice frost with a little snow on the hills, since then we have had very good weather for ploughing etc with plenty of water for irrigation. Since you left until this week little or nothing has been done to the water meadows….I put in Pool cleaning the Water Carriage on Duredown to take the springs of water that rise below the house and beside the road leading to the house with the necessary gutters for irrigation in the field, for which I am to give him 10d per score perch. When he has done this and cut the gutters in Duredown Meadow if time and weather permit he can clean the old water carriage. But I fear this will not be done to be of service this season
> (Letter F Smyth to FWK January 15th 1868, Knight Archive KN_CORR_020).
>
> As soon as the frost is gone I will see to the ploughing and water meadow at Duredown, Larkbarrow and the front of the House. They were carting black soil to Duredown meadow when I left on Saturday. I will see to the bones and acid tomorrow but I will have nothing to do with the risk of carriage of the acid again….when I can spare a day I will ride over to Larkbarrow and see the ewes and the water meadow
> (Letter F Smythe to FWK May 8th 1868, Knight Archive KN_CORR_020).

5.3.16 The water carriages on Exmoor Forest are one of the most intriguing aspects of John Knight's reclamation plans: they may have influenced the locations of the later Knight farmsteads. The farms which were established in the 1840s at Pinkery, Driver and Duredon were well placed to use water from the Pinkery water carriage; the Halscombe and Woolcombe water carriage runs to Mount Pleasant, an area of small enclosures which were established by the 1850s. Mount Pleasant is listed in the estate records for 1855. Works to be done include making a new road, draining, putting up new fences and repairing old fences (Fig 46) (Statements of Estimates for the year ending November 1st 1855 Knight Archive KN_CORR_027). Emmett's Grange was built close to 'the old water carriage' (Letter R Smith to JK November 3rd 1849, Knight archive Letters 1841 to 1850).

Fig 45 Water carriage, Larkbarrow Farm (Hazel Riley)

Fig 46 The 'New Road' on Mount Pleasant (Hazel Riley)

5.4 Water supplies to Cornham and Honeymead Farms

The two estate farms, Cornham and Honeymead, which were started in 1819 to 1820, were supplied with water; the remains of these systems are still visible in the landscape.

5.4.1 Cornham Farm water supply

A leat runs from Bale Water, at SS 7459 4064, along the 395m contour, to Cornham Farm (Fig 47). The channel is rock cut, 1.5m wide, 0.4m deep, with a flat-topped bank, 0.75m wide, 0.8m high, on the downslope side (Figs 48,49). North of Titchcombe Bungalow, a large enclosure bank lies on the west side of the leat, closely following its course (Figs 48,50). Several channels have been cut through the leat between Bale Water and the Titchcombe boundary, allowing any water flowing in the channel to run back down into Bale Water. The leat runs across some improved pasture to the SW of Titchcombe Bungalow where it is just visible as a very slight channel, 3.5m wide, 0.5m deep, with an eroded bank, 1.2m wide and 0.75m high on the downslope side (Figs 48,50). North of Cornham Farm, the leat is visible as a substantial, flat-bottomed channel, 2.5 m wide, 0.6m deep, with a bank on the downslope side, 1.8m wide, 0.75m high. A second channel, 2.7 wide, 0.4m deep, with a bank, 1.7m wide, 0.5m high on the downslope side, lies on the east side of the main leat channel (Figs 48,52). The 1st edition map shows the leat entering the NE side of the yard at Cornham, and probably entering a farm building. A further water channel runs from the NE corner of the farm yard south towards the River Barle (Fig 53).

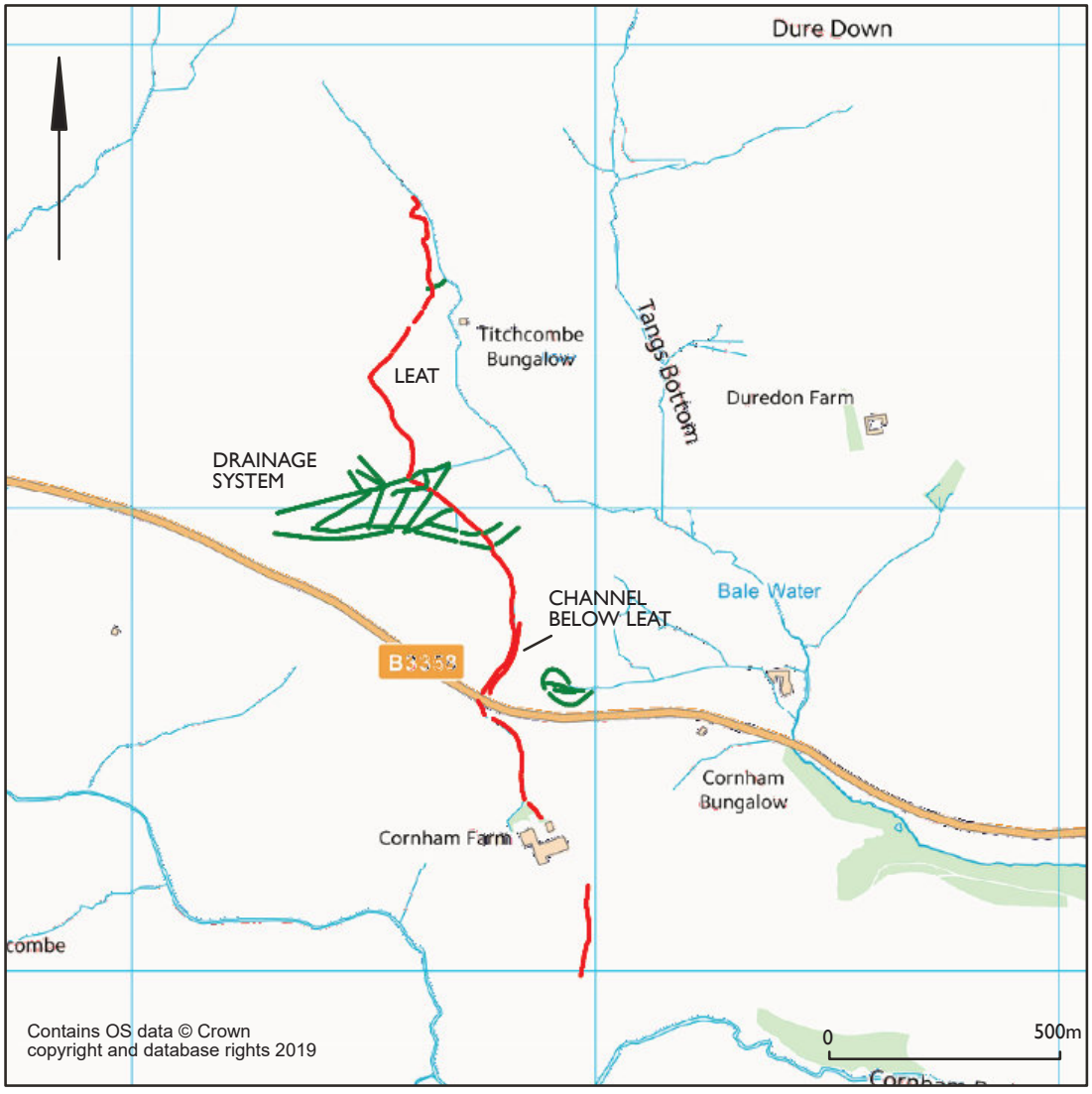


Fig 47 The Cornham Farm leat

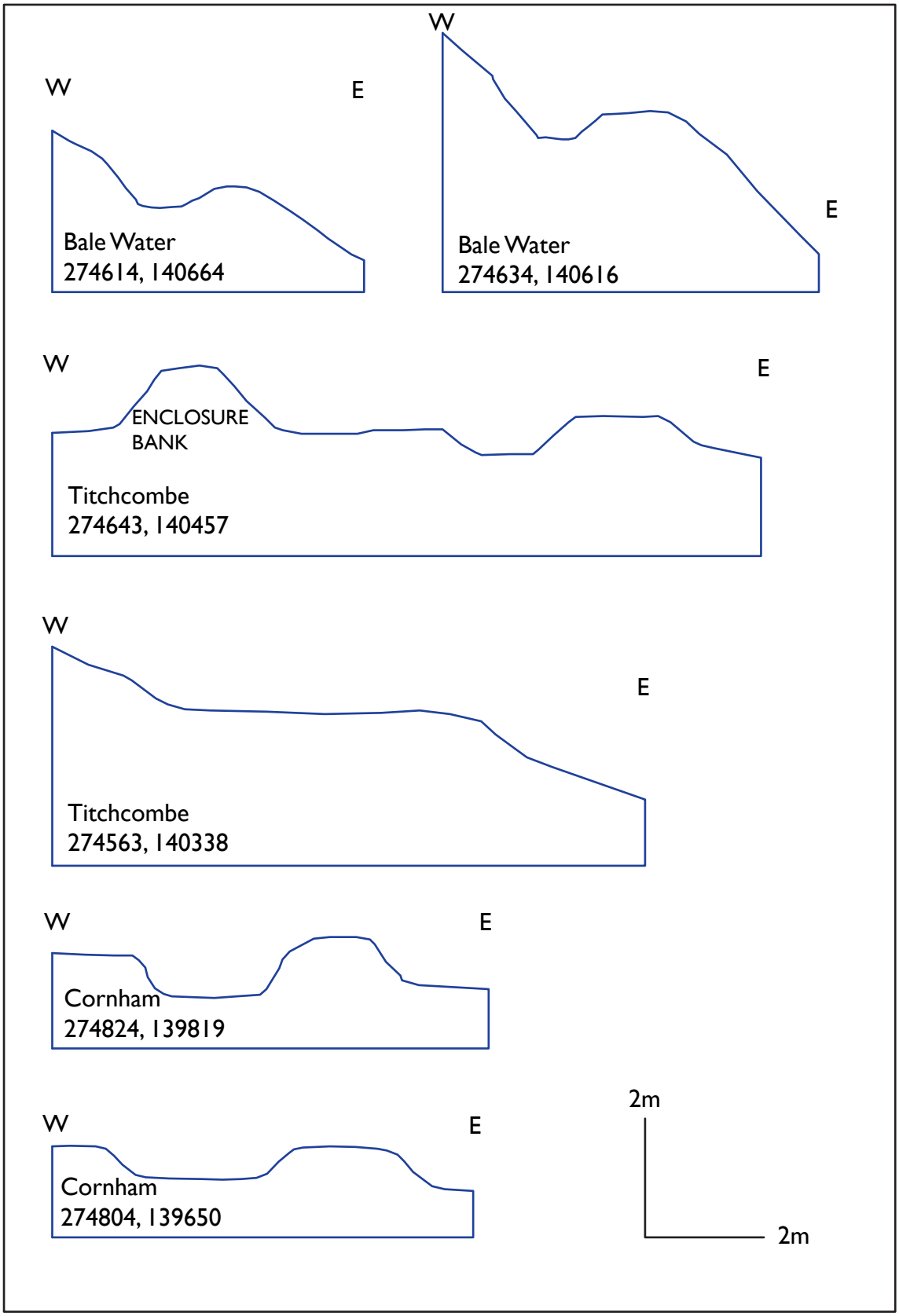


Fig 48 Cornham Farm leat: profiles 1:100 scale

Fig 49 (above) The Cornham Farm leat at Bale Water (1m scale)(Hazel Riley)

Fig 50 (above right) The Cornham Farm leat with enclosure bank, north of Titchcombe Bungalow (Hazel Riley)

Fig 51 (right) The Cornham Farm leat in improved pasture SW of Titchcombe Bungalow (1m scale) (Hazel Riley)

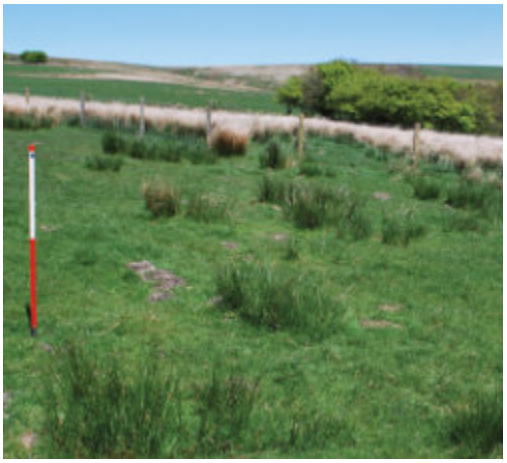


Fig 52 (left) The Cornham Farm leat with a second channel, north of Cornham Farm (1m scale) (Hazel Riley)

Fig 53 (below) Cornham Farm and the Cornham Farm leat

5.4.2 Honeymead Farm water supply
The water supply for Honeymead Farm consists of two features: a drainage system north of the road at Clovenrocks Bridge and a leat which runs from White Water south of the bridge, at 278605 139801, to Honeymead Farm (Fig 54). The leat begins close to White Water, in woodland below Clovenrocks Bridge, at 278605 139801, where it survives as a silted channel, 0.9m wide, 0.5m deep, with a bank 0.5m wide, 0.4m high on the downslope side, and cut into rock on the upslope side. In places the downslope side of the channel is retained by a stone wall, built of close set, vertically pitched stone slabs, 0.9m high and 0.5m high (Figs 55,56,57).

East of the woodland the leat runs for some 200m through an improved pasture field and is visible as a silted channel, 1.4m wide, 0.4m deep, with a bank 0.6m wide and 0.6m high on the downslope side (Fig 58). This part of the leat was apparently damaged in 1952 following the summer storms which caused the Lynmouth flood and other damage on Exmoor (information from farm manager). At 278763 139598 the leat has been incorporated into an enclosure boundary; the leat channel can be seen as a ditch, 1.5m wide, 1m deep, with a bank and retaining wall, 1.8m wide, 1.2m high, on the downslope side, and the remains of the original bank of the leat channel visible to the south as a level platform, 1.4m wide and 1m high (Figs 59,60). At 278883 139593 the leat has been cut through and levelled, water is diverted into a culvert (Fig 61). Between this point and Honeymead Farm the leat channel is visible as a ditch, 1-2m wide, up to 0.7m deep, on the north side of an enclosure boundary (Fig 62). At the farm, the leat channel can be seen running towards one of the farm buildings. The 1st edition map shows a linear pond by this building at the end of the leat (Figs 63,64). That map also shows that the leat was originally supplied with water from the headwater streams of White Water at Clovenrocks Bridge, augmented by a system of large open drains, 1.5-2m wide and up to 1m deep, which run into the stream (Figs 65,66).

5.4.3 The Exmoor Abstract shows that the Honeymead water supply was constructed between July and October 1819. Cornham Farm buildings were in progress by 1820 (Exmoor Abstract 1819); the leat channel is one of the earliest features in the 19th century landscape of improvement: it is earlier than the Titchcombe enclosure boundary and a drainage system. The historic map evidence shows that the leat ran to the farmstead suggesting that the leat was probably contemporary with Cornham Farm and was built in the early 1820s (Fig 53).

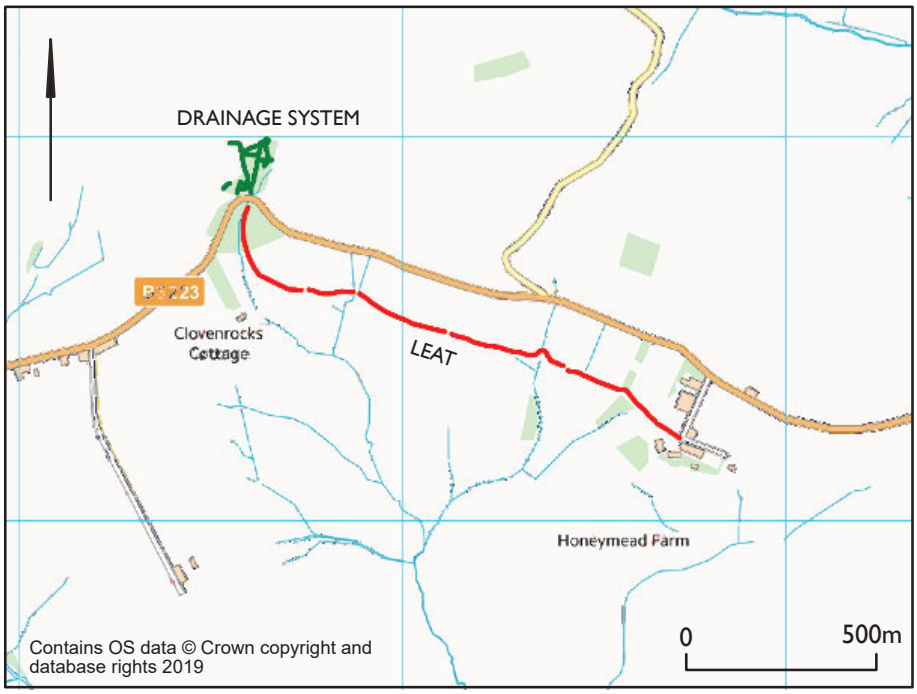


Fig 54 Honeymead Farm leat

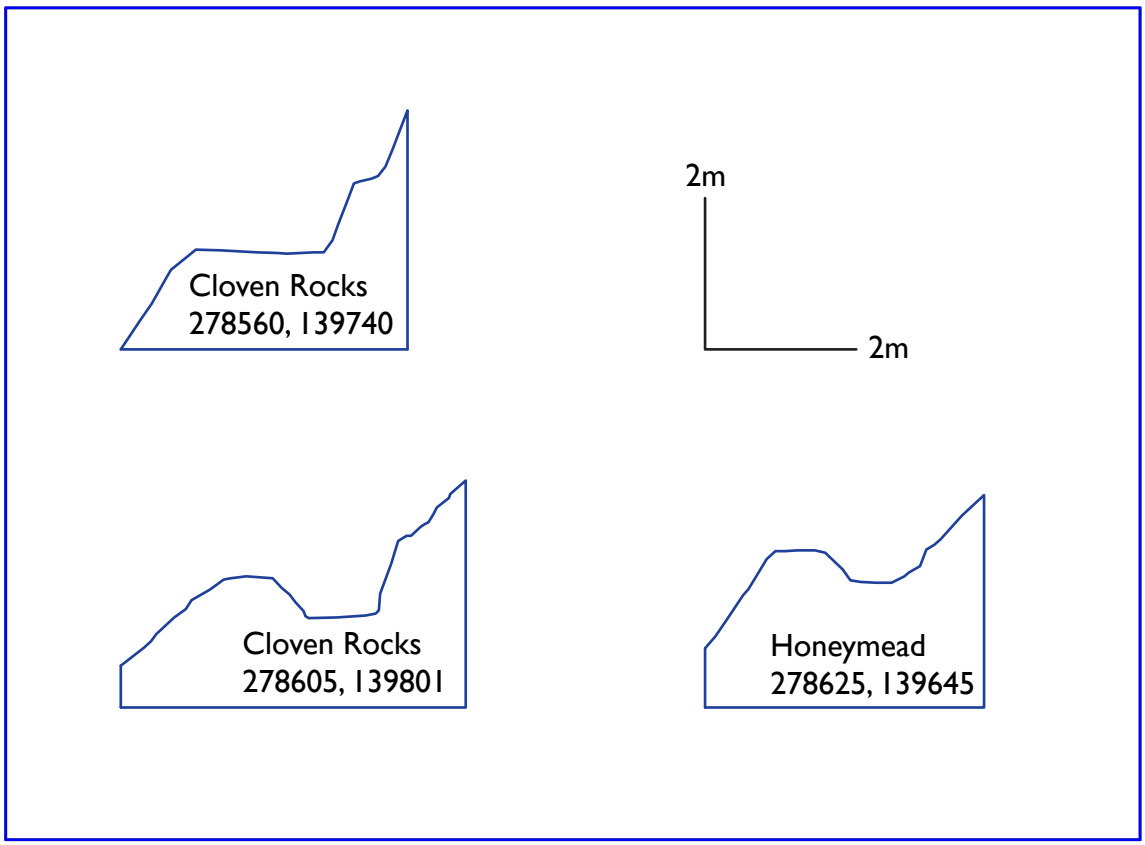


Fig 55 (above) Honeymead Farm leat: profiles

Fig 56 (left) The silted leat by White Water (1m scale) (Hazel Riley)

Fig 57 (below left) Retaining wall to leat channel (1m scale) (Hazel Riley)

Fig 58 (below) The Honeymead Farm leat in improved pasture field (1m scale) (Hazel Riley)

Fig 59 (above) Honeymead Farm leat re-used by an enclosure boundary (north side) (Hazel Riley)

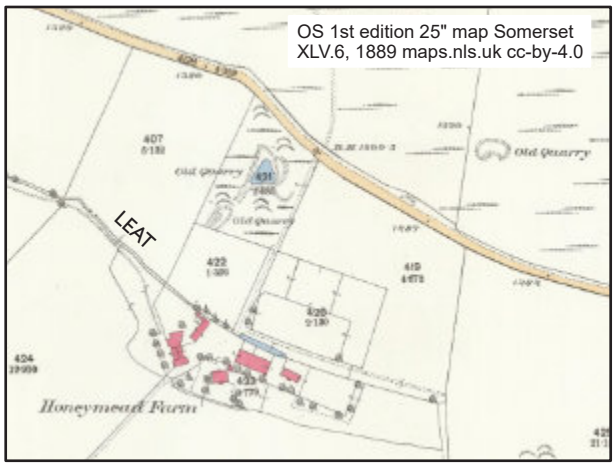
Fig 60 (above right) Honeymead Far, leat re-used by an enclosure boundary (1m scale) (Hazel Riley)

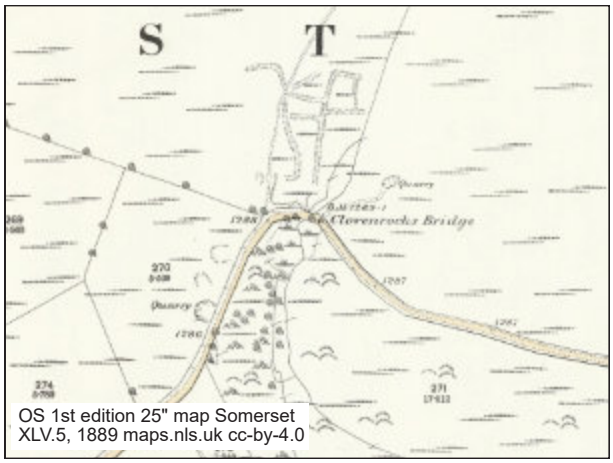
Fig 61 (right) Honeymead Farm leat: culvert and drains (Hazel Riley)

Fig 62 (left) Honeymead Farm leat and enclosure boundary (Hazel Riley)

Fig 63 (below) Honeymead Farm leat at the farm (Hazel Riley)

Fig 64 (below left) The leat and Honeymead Farm





OS 1st edition 25" map Somerset XLV.5, 1889 maps.nls.uk cc-by-4.0

Fig 65 Drainage channels and leat at Clovenrocks Bridge

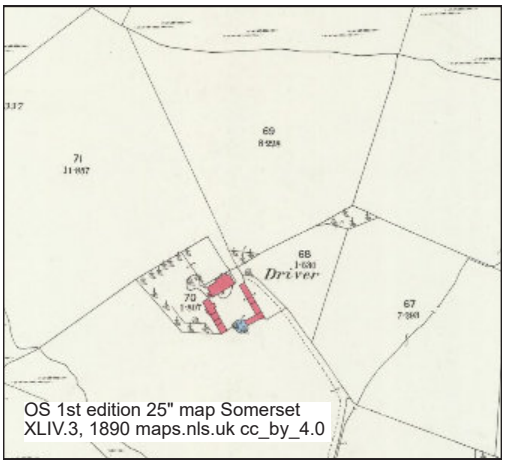
Fig 66 Drainage channels at Clovenrocks Bridge

5.5 Water power at the Knight farmsteads

5.5.1 A sale of stock and equipment at Cornham Farm in 1845 included threshing and winnowing machines and a circular saw mill (Burton 1989, 251): it is likely that these were powered by the leat described above. Burton also mentions a water-powered chaff cutter at Cornham (1989, 91). A sale at Honeymead in 1860 included a waterwheel and barn thresher; there was still a waterwheel and barn thresher in use at Honeymead in the mid- to late 1920s (Burton 1989, 91). In 1846 Frederic wrote to his father that he had got a chaff cutter chaffing all the hay eaten at Simonsbath with 'your water wheel,' probably the one recorded in the stock book at Simonsbath in Mr Harvey's Shop in 1833 (Letter FWK to JK January 8th 1846 Knight Archive Letters 1841 to 1850; SRO A/BAZ/1/5 Stock at Lynmouth and Simonsbath 1829). In 1849 Robert Smith wrote that he was planning to take water from Kinsford Water for water power; Smith's letters from 1857 suggest that the later farms were not supplied with water power as a matter of course:

> We are going to take a level from Horsen House back to the Barle to see what can be done in bringing water on to the farm….The level that has been taken from the House to the South Forest Bog will do admirably for bringing a body of water on to the farm – even for a Water Wheel
> (Letters R Smith to FWK December 1857 Knight Archive Letters 1841 to 1850).

5.5.2 Only a few of the Knight farmsteads have been the subject of systematic surveys. At Driver Farm, drive shafts were found in the barn and in a shed described as an engine house, and it was suggested that this may be built on the site of a horse engine house (Blaylock 2018, 15-16). The 1st edition map shows a pond on the south side of the farmyard, with an enclosure to the NW which could be the site of a header pond for a water supply (Fig 67). At Horsen Farm no evidence was found that water power was ever used there, but the farm has a secondary horse-



OS 1st edition 25" map Somerset XLIV.3, 1890 maps.nls.uk cc_by_4.0

Fig 67 Driver Farm, 1890

engine house attached to the barn (Jones 2000, 3). At Emmett's Grange Farm, a contour leat, fed by a reservoir, running towards the NW side of the farm, together with timber framing and belt drives for machinery in the threshing barn suggest the provision of water power, although the authors also suggest that a horse engine may have been attached to the end of the barn (Bray et al 2011, figure 5.2; 610-11). No evidence for water power was found in a rapid assessment of the farm buildings at Duredon Farm (Blaylock 2017a).

5.5.3 Pinkery Pond was the second reservoir built by John Knight. In 1819 a reservoir was begun on a hill above Simonsbath on the summit of Birchcleave. The remains of this can still be seen in 'Reservoir Field' where a pear-shaped enclosure, 250m NE/SW and 170m NW/SE, defined by field boundaries is clear on current mapping (Fig 68). The reservoir remains comprise a broad ditch with intermittent internal and external banks. On the west side of the enclosure the ditch still holds water, it is up to 8m wide, 1.3m deep. The internal bank is 2m wide, 1m high and the external bank has been re-used by the enclosure boundary where it takes the form of a broad, flat-topped bank, 9.5m wide and 1.4m high, planted with a beech hedge (Fig 69). To the north and south the ditch is dry but is still a substantial earthwork, 1-2m wide and up to 1m deep (Fig 70).

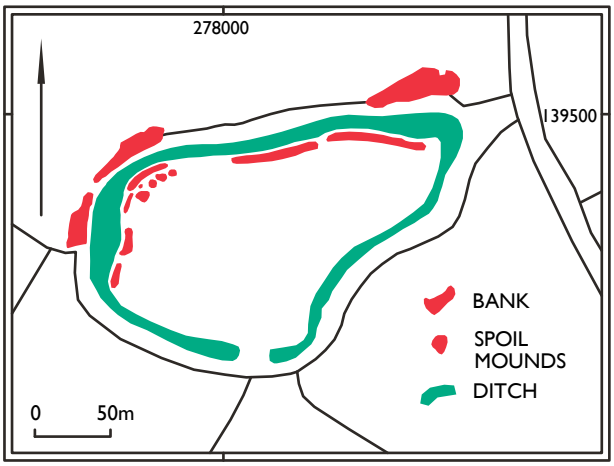


Fig 68 (left) Reservoir Field and the earthwork remains of Birchcleave Reservoir (based on © Geomatics Lidar and field investigation)

Fig 69 (below) The western side of Birchcleave Reservoir (Hazel Riley)

The 1st edition map shows a pond at the NE side of the reservoir, this is now an area of willow scrub, suggesting that the reservoir was filled from a spring as well as rainwater (Fig 71). Birchcleave Reservoir was clearly an integral part of John Knight's reclamation plans but its purpose remains a puzzle. The water could have been intended as a reliable water supply for Simonsbath, for domestic, agricultural and industrial uses. There are no leats or channels connecting the reservoir to Simonsbath but stored in a workshop at Simonsbath in 1833 were wood plugs for a cast iron pipe for a pond, suggesting that water was to be fed from Birchcleave Reservoir by iron pipes (SRO A/BAZ/1/5 Stock at Lynmouth and Simonsbath 1829).

Fig 70 Ditch on the south side of Birchcleave Reservoir Hazel Riley)

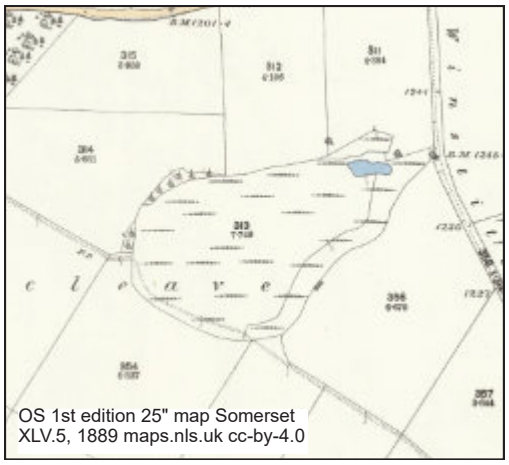


Fig 71 Birchcleave Reservoir, 1889

5.6 Surface drains and drainage systems

The extent of the drains and drainage systems constructed in the 19th century on Exmoor Forest has only recently been fully realised, firstly by the work of the Exmoor NMP which recorded many hectares of surface drains and more complex drainage systems from aerial photographs, and then by the work of the EMP, analysing Lidar data and commissioning archaeological walkover surveys in advance of mire restoration work. Orwin dismissed the surface drains on the Forest as mostly dating from Frederic Knight's management of the Forest and 'failing completely in their purpose' (Orwin 1929, 33).

5.6.1 The sheer scale of surface drainage undertaken across Exmoor Forest is best appreciated from the areas transcribed by the Exmoor NMP from aerial photographs (Fig 16). Surface drains covering a total of c 1546 ha were recorded in the following areas:

North and west of Pinkery Pond
East and SE of Pinkery Pond
NE of Chains Barrow
Exe Head
Exe Plain
Lanacombe
Great Buscombe
Trout Hill, East and West Pinfords
Elsworthy (Sparcombe in 1835/6)
Great Woolcombe, Little Halscombe, Horsen

Deer Park
Burcombe
Horcombe, Burcombe, Wester Emmetts
Squallacombe, South of Squallacombe
Setta Barrow
Great Vintcombe, Little Vintcombe, Black Hill
Hangley Cleave, Long Holcombe, Verney's Allotment

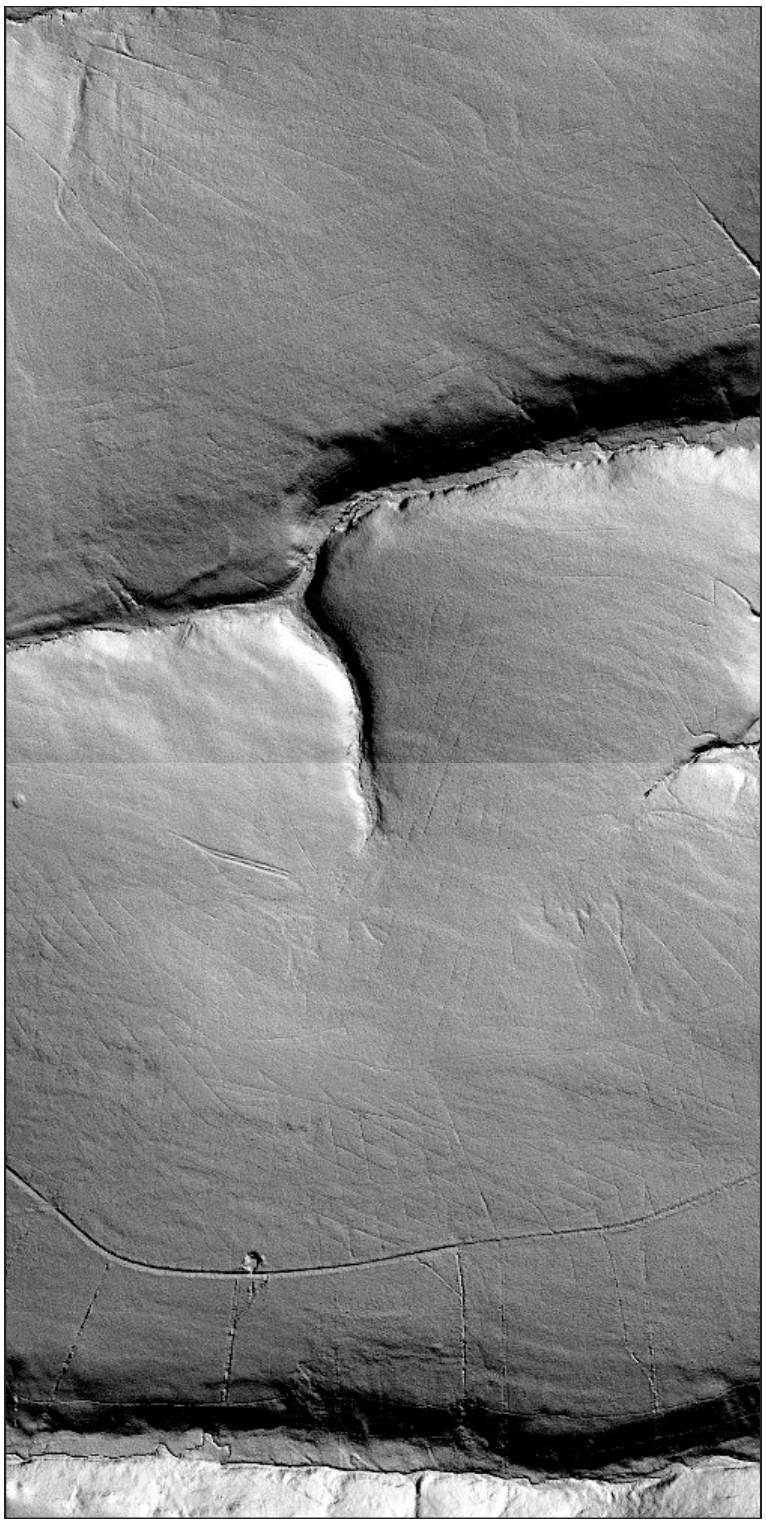


Fig 72 Lidar image showing surface drains on Lanacombe and Great Buscombe, dug in 1839-1840 (© Geomatics)

5.6.2 The surface drains are carefully laid out to take into account the local topography. Good examples of this occur across Lanacombe and Great Buscombe (Fig 72). On Lanacombe a series of parallel drains running along the valley flow into a discharge channel which drains into Hoccombe Water; on Great Buscombe the drains follow the contours of the spurs, above the enclosures on Prayway Meads two phases of surface drains are evident: drains running across the contours are cut by drains running along the contours. The drainage system on Long Holcombe and the eastern part of Hangley Cleave appears to have been planned and laid out as a single scheme, with channels radiating out from the ridge top, channelling water into eight main discharge channels which flow into Kinsford Water to the north and east, and the River Mole to the south (Fig 73). The Lidar image shows that the drainage system appears to pre-date the N/S enclosure between Long Holcombe and Hangley Cleave, with some of the surface drains cut by this boundary. It also shows how some of the drains have been cut through and re-worked at a later date. On Hangley Cleave a typical drain on the ridge is a silted, narrow channel, 0.5m wide and 0.3m deep (Fig 74). The discharge channels into Kinsford Water are broad, V-shaped channels, some 6m wide and 1.5m-2 deep (Figs 75 and 76). A linear prospecting trench for ironstone clearly cuts through on the surface drains on the NW side of Hangley Cleave (Fig 77).

5.6.3 The surface drains on Great Buscombe and Lanacombe can be dated from the Exmoor Estate accounts: in 1839 and 1840 William Rawle cut 1404 chains (28km) of surface drains on Prayway (Little and Great Buscombe, north of Prayway Meads) and Lanacombe (Knight Archive Osmond Locks Accounts 1839 – 1840). Surface drains on Sparcombe, the North Forest and the Chains were dug in 1835 and 1836, accounting for those recorded on Elsworthy, around Pinkery Pond and across the Chains; the 'North Forest' may refer to Trout Hill and the Pinfords (WRO 10470/899:310/122 Accounts of John Knight 1835 and 1836). The drainage system on Hangley Cleave and Long Holcombe was suggested to date from the 1850s, by one of FWK's tenants, under the supervision of R Smith (Riley 2017, 23). The documentary evidence considered here, however, suggests that the drainage system is earlier than this. A close examination of the Lidar images shows that some of the ditches on the ridge pre-date the N/S enclosure boundary which bisects the drainage system. The division of Long Holcombe from Hangley Cleave is difficult to date precisely. Long Holcombe was enclosed by 1855; work was carried out on the Long Holcombe boundary in 1836 (WRO 10470/899:310/122 Accounts of John Knight 1835 and 1836; Statements of Estimates for the year ending November 1st 1855, Knight Archive KN_CORR_027). It is now clear that Robert Smith only carried out a small amount of work on Long Holcombe. A comparison of the costs of draining and water carriage works he carried out up to 1853 suggests that the amount of work he carried out on Long Holcombe was minimal (Statement of expenditure by Tenant on the Emmetts Farm, in landlords, or permanent improvements, Knight Archive KN_CORR_027). The mineral prospecting trench was most likely dug by 1854 and was part of Fredericc Knight's campaign to establish the potential value of the minerals on Exmoor Forest (Orwin 1929, 121).

5.6.4 The field evidence and the documentary evidence suggest that the surface drainage across Exmoor Forest was one of John Knight's main efforts in the reclamation process. Open drains were dug on the Chains, at Exe Head and on Hearlake in 1819 and 1820 (Knight Archive Exmoor Abstract 1819). The accounts show that work was in progress across the northern part of Exmoor Forest between 1835 and 1840. The surface drains were carefully planned to work with the topography and were a means of improving the moorland grass for sheep and cattle on the flat ridge tops, where catchwater irrigation was impractical. In places, as seen on Little Buscombe and on Long Holcombe, the drainage channels were re-worked to improve their efficacy, but many kilometres of surface drains on Exmoor Forest are now silted and can be seen as rush-filled channels snaking across the landscape (Fig 78).

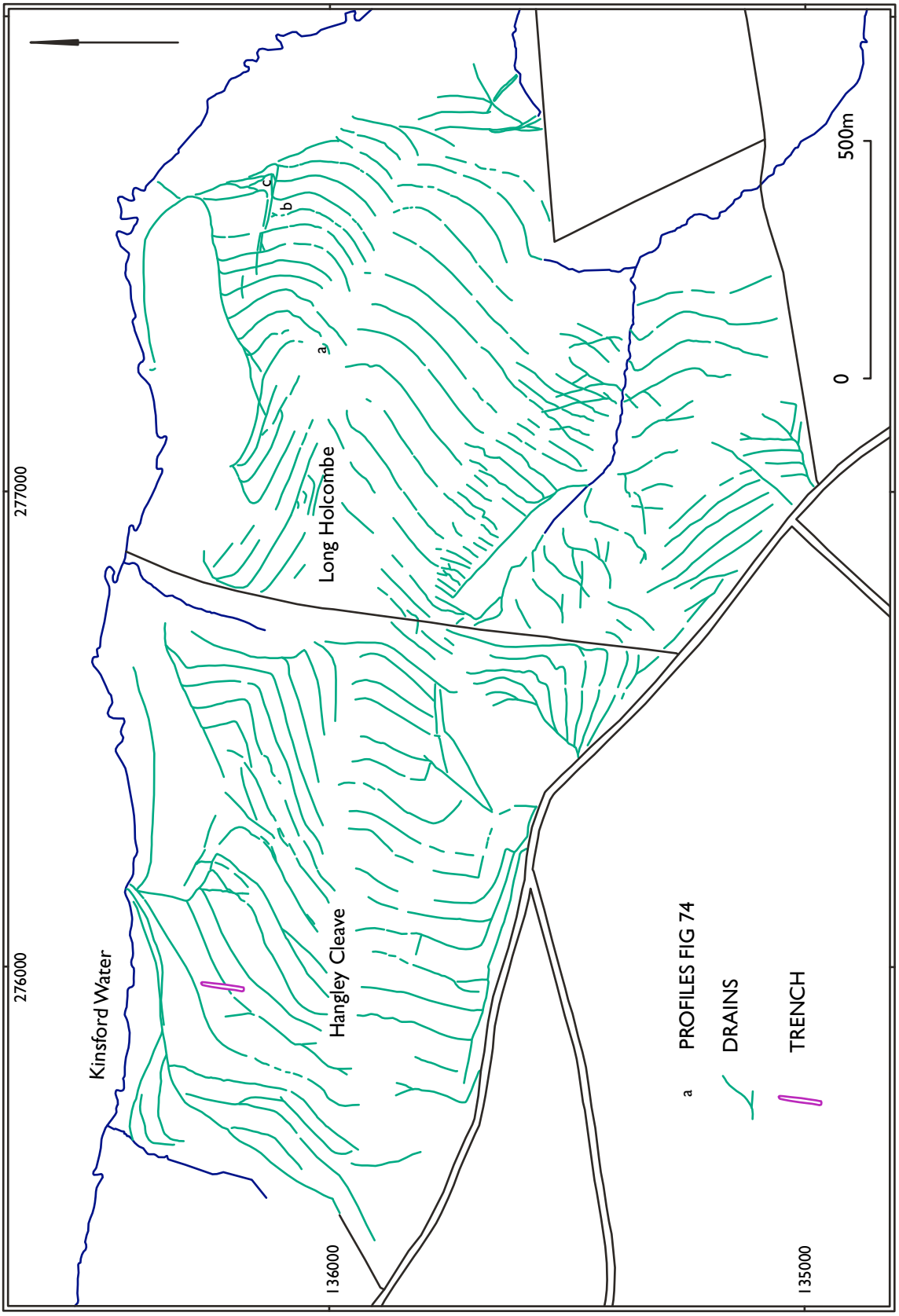


Fig 73 Transcription of the drainage systems on Hangley Cleave and Long Holcombe from Lidar images

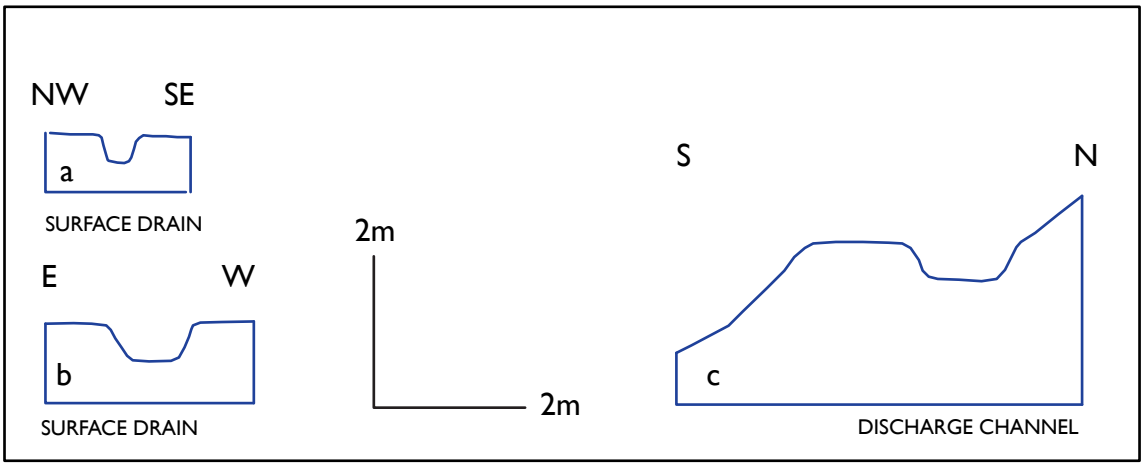
Fig 74 (above) Surface drain on Hangley Cleave (1m scale) (Hazel Riley)

Fig 76 (above right) Discharge channel on north side of Hangley Cleave (1m scale) (Hazel Riley)

Fig 77 (right) Ironstone prospecting trench cuts through a surface drain on Hangley Cleave (Hazel Riley)

Fig 75 (below) Long Holcombe and Hangley Cleave drainage system: profiles

Fig 78 (left) Surface drains on Long Holcombe seen as rush-filled channels under a light covering of snow (Hazel Riley)



5.6.5 Drainage at the heads of streams was also carried out across Exmoor Forest under the Knights' management. Some of the best examples occur on the north side of the Forest where headwater streams of Badgworthy Water drain into Long Combe (Fig 79). These are often known as 'herringbone' drainage systems, due to their layout which is planned to channel water into the tributary stream, which is itself often dug to make the water flow away more rapidly as it collects water from the drains. A typical example is on the west side of Swap Hill, where the main drain is a well-defined channel, 3.5m wide, 1m deep, with a break of slope on the sides, indicating cleaning out of the ditch. The feeder drains are smaller: 1.7m wide, 0.5m deep (Figs 80, 81, 82).

5.6.6 The landscape evidence for the date of the herringbone drainage systems on the Pinfords, Beckham and Swap Hill shows that they were all constructed after the Tythe Allotment Water Carriage which was dug in 1819/1820 (5.3). The herringbone drainage channels cut straight through the leat and may have assisted in the irrigation process (Fig 83). A reference to cleaning drains on Swap Hill in 1836 could well date the construction of that system to sometime in late 1820s or early 1830s (WRO 10470/899:310/122 Accounts of John Knight 1835 and 1836).

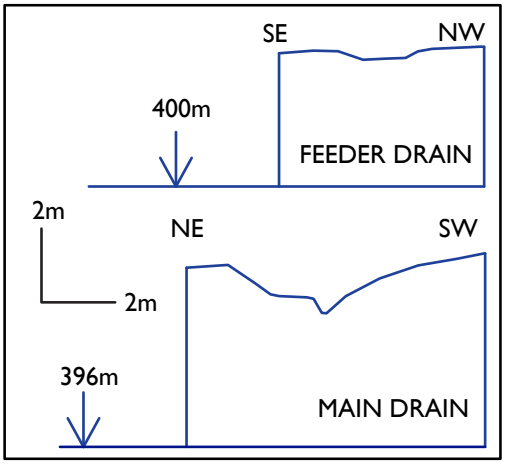
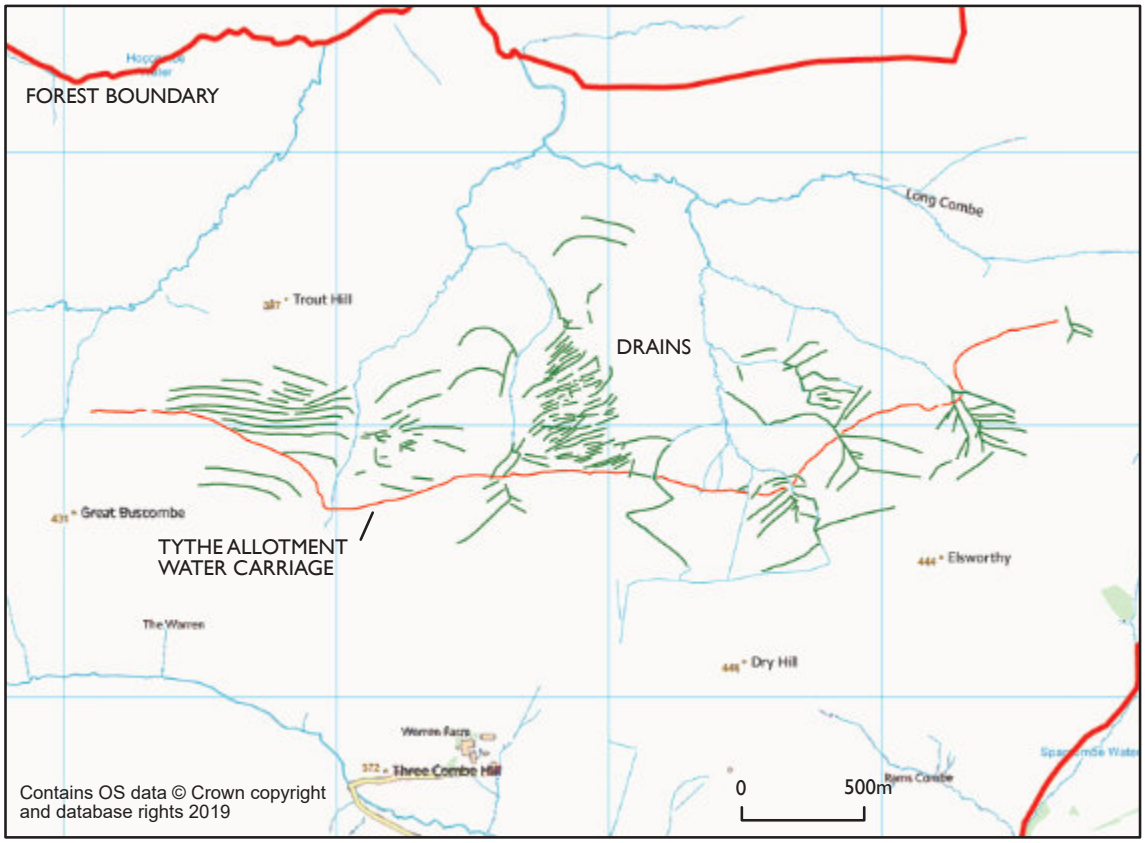


Fig 79 (below) Herringbone drainage systems and surface drains on the Pinfords and Beckham (from Lidar © Geomatics)

Fig 80 (right) Herringbone drainage system, Swap Hill: profiles 1: 100 scale



5.7 Palaeoenvironmental evidence for the reclamation of Exmoor Forest

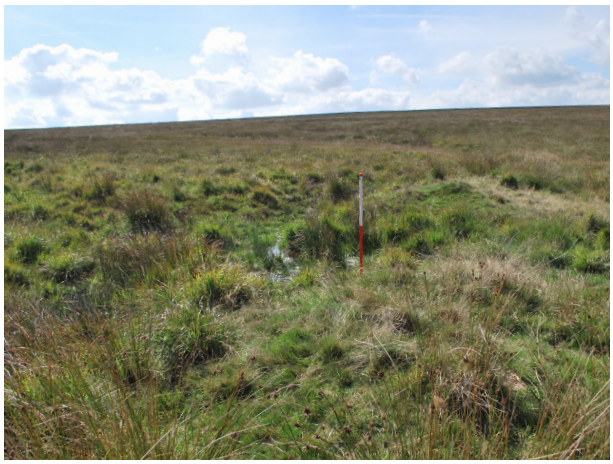
5.7.1 The work commissioned by the EMP included a number of palaeoenvironmental studies which established the potential of several valley mires for the study of prehistoric and historic vegetation change and land management within Exmoor Forest. Further detailed analysis was carried out on selected sequences following this initial assessment (Bray 2015, 63-66). Detailed work on a peat sequence from a small valley mire at Ricksy Ball, SW of Cornham Farm, revealed a complex history of moorland use over the past 1000 years. Four main phases of landscape management were apparent: before c AD 1500, the landscape around Ricksy Ball was largely grass dominated, with episodes of localised burning. In the 15th-16th centuries AD there was a cessation of indicators of burning, with scrub development and the first appearance of *Sphagnum* mosses. This was followed by renewed scrub clearance, with improved moorland grass in the 16th and 17th centuries AD, reflecting high stocking levels during summer grazing on the Royal Forest. The final episode was catchment disturbance, related to moorland drainage, which changed both the wider landscape and the vegetation and ecology of the mire, in particular the loss of *Sphagnum* mosses, probably through flushing of nutrient-rich water. This episode was dated to the mid-1940s (Fyfe *et al* 2014; Bray 2015, 65).

5.7.2 There is direct evidence for early 19th-century management of the moorland vegetation on Exmoor Forest in the form of swaling from July 1839, when 29 men were paid for 5 days 'Burning Forest' (Knight Archive Osmond Lock's Accounts 1839 – 1840). The identification of changes in mire deposits due to sediment influx and flushing of nutrient-rich water from drainage suggests that the widespread irrigation of the moorland carried out in the 1820s and 1830s could be evident in peat deposits and may even provide corroborative dating evidence for palaeoenvironmental sequences.

Fig 81 (left) Main drain of herringbone drainage system, Swap Hill (1m scale) (Hazel Riley)

Fig 82 (below) Feeder drain of herringbone drainage system, Swap Hill (1m scale) (Hazel Riley)

Fig 83 (below left) John Knight's Tythe Allotment water carriage is cut by herringbone drainage system on Beckham (1m scale) (Hazel Riley)



6.0 JOHN KNIGHT'S VISION FOR EXMOOR

6.1 Simonsbath

This study has concentrated on examining the extensive remains of John Knight's reclamation work across Exmoor Forest. At the same time as the reclamation began, work started in and around Simonsbath to build a new house for John Knight and his family, set within the dramatic natural landscape (Wilson-North 2017). He laid out a deer park, stocked with fallow and red deer on the hill to the south of his new house; the steep descent into Simonsbath was marked by a circular tower (Figs 84, 85). John Knight laid out gardens at Whiterocks in Ashcombe and established plantations at Flexborough and around Simonsbath: 'The vegetation at Simonsbath is finer than I last saw it and I think that the Birch Cleave plantation has at last got on its legs – there is a large rookery in the trees you planted behind the foundation' (Letter FWK to JK July 10th 1846, Knight Archive Exmoor Abstract 1819; Letters 1841 to 1850).

6.2 Cornham and Honeymead Farms

John Knight built two farms on his estate, Cornham and Honeymead, to the west and east of Simonsbath. These were the centres of John Knight's reclamation of the southern slopes of the Barle Valley by ploughing: bullock teams with subsoil ploughs which broke up the iron pan, with the aim of providing winter fodder for his large herds of cattle. The farms were provided with reliable water supplies to provide water power for crop processing. Both farms had granaries and the surviving original buildings are of a scale to suggest that both Cornham and Honeymead were planned as model farms. The early 19th-century barn at Cornham Farm is a large, two-storey aisled building, with characteristic round-headed arches, feed shutes and a ventilation system (Fig 86), and is similar to the one at Honeymead (information from R Wilson-North).

Fig 84 (left) Deer Park: John Knight's deer park seen from Little Ashcombe (Hazel Riley)

Fig 85 (below) The circular tower at the northern approach to Simonsbath (Hazel Riley)

Fig 86 (below left) The early 19th-century aisled barn at Cornham Farm (Courtesy of Exmoor Forest Farms) (R Wilson-North) (© ENPA 2019)

Cornham was equipped with winnowing, threshing and chaff cutting machines. By 1840, Cornham Farm had a catchwater meadow to provide an early bite of grass in the spring and improve the hay crop. The farm house at Honeymead was a striking building, set to look across the valley with the farm yard and buildings behind it (Fig 87).

6.3 Exmoor Forest

Surrounding it all was the unenclosed moorland of Exmoor Forest, grazed by John Knight's cattle, ponies and deer, with the moorland grasses improved by extensive drainage and catchwater irrigation systems: the ultimate in landscape parks? (Fig 84)

6.3.1 It is clear from John Knight's letters that his vision for the reclamation of Exmoor Forest was more than the creation of a profitable agricultural estate: he saw it as a place to establish his large family:

I should never have bought the Moor, had I not thought that I could establish my Family there – in which I appear to have failed, nevertheless it must turn out a most valuable estate and not a failure in that respect (Letter JK to CAK December 30th 1841, Knight Archive SRO A\BAZ/1/5).

The tension between the need to make a financial return from Exmoor Forest after the loss of the Payne-Knight inheritance in 1840 and John Knight's plans for Simonsbath, his new house, his estate farms and his teams of men working on his ambitious reclamation projects, became increasingly apparent after Frederic took over the management of Exmoor Forest from his father. In 1851, after ten years running the estate, he wrote: 'When my father entrusted me with the management of the Forest it was merely a large plaything' (Letter FWK 1851, Knight Archive Letters 1850s).

6.3.2 Several studies of John Knight's Exmoor reclamation have stressed his failures: his failure to complete the new house at Simonsbath, the failure to keep deer in the Deer Park, the failure to grow enough winter fodder for his livestock (Orwin 1929; Wilson-North 2017; Burton 1989). This study of the landscape of John Knight's reclamation, combined with the access to a range of documentary evidence from that period, has redressed that balance and shown that John Knight's reclamation project was centred on the improvement of the vast moorland grazing resource by an extensive irrigation and drainage scheme.

Fig 87 Honeymead Farm c 1900
(Reproduced with the kind permission of the South West Heritage Trust SHC A/BAZ/4/10)

7.0 THE SIGNIFICANCE OF JOHN KNIGHT'S EXMOOR LEGACY

7.1 Political context of improvement

At the heart of John Knight's plans for Exmoor Forest was the improvement of the moorland grazing by drainage and irrigation. The late 18th and 19th centuries saw the expansion of floating into new areas – eastern England and the uplands of England, Wales and Scotland – and the use of the technique in novel ways within the agricultural economy, with the creation of more complex and sophisticated irrigation schemes. This expansion was fuelled by the prosperity of the Napoleonic War and High Farming years, and by the development of an increasingly capitalised agriculture, of large tenant farms on large landed estates. Irrigation schemes could be seen as an expression of a fashionable interest in improvement on the part of large landowners. Active involvement in agricultural innovation and land reclamation demonstrated - in the face of rising radical opposition – that established landowners were the proper custodians of the countryside (Cook and Williamson 2007, 65).

7.2 Exmoor Forest

John Knight's legacy is visible in the landscape of Exmoor Forest. His extensive drainage schemes and water carriages, particularly those on the North Forest, show the ambition of his vision, which eclipsed elaborate irrigation schemes laid out on the home farms of large estates, like that at Clipstone (3.2.1) and within landscape parks, as at Woburn where the Duke of Bedford's water meadows were fed from the Temple Reservoir (Brown and Williamson 2016).

7.2.1 Exmoor Forest was one of the last – and largest – reclamation projects carried out in England (3.2). The physical remains of the earliest phase of the reclamation are extensive: drainage systems, irrigation systems, enclosure boundaries and drystone walls. They also include two model farms with inventories of their buildings and equipment, parts of John Knight's new house at Simonsbath, now incorporated into the Simonsbath House Hotel, and his gardens at Whiterocks and Ashcombe (Blaylock 2017b, Riley 2014). Combined with the well-documented later tenanted farmsteads and enclosures, Exmoor Forest contains a nationally important resource for the study of early 19th-century moorland reclamation techniques.

7.3 The social context of John Knight's vision

The large amount of documentary material which is associated with the Knight's management of Exmoor Forest contains a wealth of information about social attitudes and the conditions under which the people who powered John Knight's reclamation in the early 19th century lived, from the problems of providing dry clothes and bedding for the workmen to heart rending descriptions of the sale of the worldly goods of a bankrupt tenant at Larkbarrow and the problems of the itinerant mining agent accommodating his family. Henry Scale was determined to work on the Exmoor mines but needed a home for his family: 'As I have lost every farthing in the world my Eight children will be like Exmoor ponies in a snow storm' (Letter H Scale to FWK April 10th 1856, Knight Archive KN_CORR_023).

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9.0 APPENDICES

9.1 Transcriptions of selected Knight family correspondence

March 2nd 1833
My dear Frederic
I am much pleased to find that you are learning German and think your Uncle very kind in taking the trouble to teach you.
Your brothers are quite well and seem contented at Mr Parks of Ilfracombe where they witnessed a terrible storm last week.
Since you went I have been offered the Challacombe Lime Rock. The quality is excellent, and as the rock is traced into the Moor but has not been tried for and comes thro' the Barle near Edgerley Stone Gate it services hopes almost extinct of possessing the calcareous pineapple within the Ring Fence.
Your friend T Acland has persuaded Lord Poltimore to set his face against the Road to Lynmouth and as their agents are principal persons at S Molton – the business is I consider given up.
Ogilvy turns out to be an excellent shot: never misses a snipe; and supplies us with plenty. I sent him out twice to kill rabbits, and each time he bought in 5 couple.

He seems quite charmed with the Chains and says that Red Grouse will do perfectly well there and on the Commons. I am trying to get some to turn out this season, and am satisfied we shall have plenty in a short time, if as Ogilvy says: <u>they are not too much shot at.</u>
I wrote an answer to one of your letters from P Place – which has been returned to me lately in a parcel.
I am delighted with the thoughts of the Fallow Deer becoming an object of sport – if you can discover how the proper hounds are bred, we can easily obtain an efficient pack. I imagine from Greyhounds and large Fox Hounds: a most [? ?] of mine married a near relation of Lord Wichehalse, but alas 'Poor Fellow he is dead or I should easily have obtained the Breed of Dogs. But cannot see how any [??] the Deer on these hills without hunting by scent.
I still see frightful accounts of the cholera in Ireland and hope you will avoid infected places and the water. However go on gaily. I shall be getting on with 800 acres this summer.
My affectionate best wishes to Lord and Lady Headley and believe me ever your affectionate Father J W Knight
(Letter JK to FWK March 2nd 1833, Knight Archive KN_CORR_002)

19 March 1841
My dear Mamma
It is long since I wrote to you but I do hold it a principle that when one has nothing agreeable to say or communicate it is best to be silent, and neither speak or write – I have now however a good deal of news for you- the unhappy writer after much mature consideration on his circumstances, his family and what is more to the purpose his fate, finds it adverse, and finds himself morally compelled to remain for the present in England – Exmoor! Downton! What the Devil is to be done?
I were Farmer? Deuced disagreeable – go into Parliament? Uncommon stupid- and yet, fate is fate and the man who was born ???" – So then in the first place, how shall I get the power of doing any good on Exmoor? Well, having formed a plan, down I come – know a man who wants a farm, who after some discussion turns out to be me – But where shall it be? Long Holcombe, Badgeworthy, Emmets or where? After 3 days discussion I find myself installed as plenipotentiary? at ?Great Cornham, from Challacombe Two Gates to the West Gate – I have not yet got a bailiff but Bennett is going to get me one from Wiltshire – He has got us the most admirable one, 'Wooldridge' for Honeymead. He was head bailiff of a large Wiltshire hill farm. His master paid £2000 a year ?? besides £300 taxes and lambed 1000 ewes. He offered to raise Wooldridge's wages £10 a year if he would stay with him. He is very good indeed.
We had the most tremendous winter I remember in England, and the cows got the distemper just as 2 ½ months skating set in – you may suppose how the hay went, and how from 4 to 500 head of cattle were sent off the Moor to eat hay at £4 10s a ton or they would have died – Well they stayed out 5 weeks and this week I have brought them almost all home – We have had the most wonderfully fine weather and the moor is covered with grass like May – I brought all back this week but 150 of the weakest who stay to finish the bought hay – they are doing perfectly, blow themselves out and look quite happy – out of about 230 calves wintered at Brendon we have lost one and we have been almost equally fortunate with the lambs – Wooldridge has entire charge of the ewes with several Wiltshire people and I do not doubt on having a large proportion of lambs – I am determined if it is profitable or not, to buy another flock of ewes in Scotland this year – We have a capital stock of more than 300 cows, and 10 bulls of the best sort from Scotland - I must have cattle and will have food for them.
(Letter FWK to Jane Knight March 19th 1841, Knight Archive Letters 1841 to 1850)

23rd October 1841 (to FWK from CAK)
I should think Adams would suit you very well, farming is his hobby he will therefore

give his whole attention to it and his object in going there will not only be to see what he can get out of you.
I think it may be worth your while to supply to your herdsmen etc, or to have sold on the moor good waterproof coats if you can find among the new inventions anything sufficiently good and cheap.
Take care not to have any lambs and calves before the Grass (May) when you have water meadows or other green food you can have young animals earlier which will be much better – you must be aware how very difficult it is for a young animal to recover after its growth has once been checked. The few accidental early animals for which they find warm spots only show the advantage of better keep – you must also be aware of the greatly increased difficulty of wintering the stock when heavy with young or when the mothers are young (these should always be the latest).
The lambs after they are weaned must have some of those steep northern banks to shelter them from the cold storms otherwise each storm kills a good many. When the calves are weaned they must not be driven after they are separated from the cows or they get heated and in a few days have loose diarrhoea etc .
Take care to have Adams shown the way to collect hay into small ricks with two ropes and two horses. Threshing machine should be on wheels and then on a fine day you thresh out your ricks and restack the straw, by this means you save carriage and large barns and also so great a danger from fire which is so tempting when all the ricks are collected.
Of course you do not give up subsoiling which on dry ground must pay if it only prevents the rain from carrying away the top or best soil and the manure - it also prevents the ploughs from being broken afterwards. Dry grassland can be subsoiled by putting a coulter to the subsoil plough without a plough proceeding. A paring plough for the peaty land must have a rolling coulter a sharp pointed share and not above 9 in wide so as to obtain a very acute angle otherwise it will not cut the fibres -1 horse. In subsoiling when there is a place too deep trench a ditch 2 feet wide across the furrows and when it has rotted down then the subsoil plough will enter the plough will go much deeper the 2nd time. The cheapest way is to leave the ground for three years.
(Letter from CAK to FWK October 23rd 1841 SRO A/BAZ/1/5).

1849 November 3rd 1849
Emmetts Grange, Exmoor
Sir
Mr Knight having wished me to furnish him with a few results of our farming operations for your information. I am glad to embrace the opportunity of addressing you upon the subject being sanguine as to the ultimate result of this important undertaking.
Being familiar with the best cultivated districts in England, and which have been redeemed from their original or natural state by enterprise, skill, and capital, have been induced to undertake your agency with a farm of some extent to employ my Capital, and practice to the best of my ability the present improved husbandry with a view to making my occupation, that of a Meat producing farm, rather than that of corn but at the sometime taking a crop of corn (in most cases) on the way to grass – which by the use of Water power will be profitably turned to account, as cut chaff for the cattle when eating roots , drawn from the land. It being far better to consume the produce of the farm for the production of Meat, than to draw it over the hills of this neighbourhood – and in the case of cattle or sheep it would walk to market.
Dairy farming has been found to answer well upon this estate, which is another branch of my plan, and an important one when taken in connection with the breeding and rearing of calves and pigs – still I would venture a remark that at the end of a moderate lease, the Dairy farm would be much lower in condition than the farm treated upon the grazing principle of sheep and beast.
Mr Knight will give you Sir a more detailed account of our movements at Exmoor than

I am enabled to do on paper still I have the satisfaction and pleasure to state that as regards my own occupation (during the short space of time I have been here) any expectations have been fully realized and the produce of my farm has been the subject of surprise to many leading agriculturalists of this and other districts.
My crop of this year consisted of about 70 acres of corn, all of which has been sown with grass and clover seeds, which are now the admiration of every one and I fully anticipate a good result from them during the next summer - as I intends to feed the whole, being no friend to snowing – among the varieties of oats I tried, I find a new sort of Black Oat to suit my purpose best, they are very large and ripen easily – I did not try the small potato oat in a plot to itself – but observed that they ripened easily amongst other oats.
The leading feature in the growth of oats is to have the land properly prepared for them previous to Xmas, and when the season suits after Candlemas to put them in. I estimate the produce of my oats upon an average of the whole 60 acres at 60 bushels per acre some of them upon land that had been burnt, drained, and subsoiled were early surfacing in strength of growth but not so good in quality of grain.
Being desirous to try various sorts of grain I procured one sack of the B Barley or what is termed Barley Big – some call it Winter Barley. This grain has answered admirably, especially on the dry land and am induced to think that it will ere long become the chief crop of the forest, particularly on the dairy farm for the pigs and I purpose growing it to some extent next year. My crop of this year would yield about 40 bushels per acre but owing to the small quantity of seed I had procured it was sown over rather too much land and consequently was not so thick on the ground as I could have wished – considering the ? of the plant as from its earliest growth it does not ?? in the leaf but seems to spindle at an early ? hence its value on Exmoor? Instead to sow my own and to procure all that is wanted for the use of the Tenantry
My winter wheat was thin (having lost plants) and late, still it ripened pretty well. I am fully satisfied that it cannot be grown to a profit on these hills, and have discontinued it.
My Spring Wheat (sown in April) was very good upon the dry land but bad upon the Black Land, although the whole had been subsoiled. I think of giving it another trial upon a small scale.
I have sown one acre of White Mustard seed to advantage, it yielded 14 bushels and is worth 10s per bushel – a much heavier crop may be grown?
My Swedish Turnips are excellent, the land after being pared and burnt, was limed at the rate of 4 per acre they were then drilled on the flat 21 inches apart and hoed out about 12 inches in the rows, the men observing to leave the leading plants – after which they were carefully horse hoed from time to time as required, and kept perfectly clean. We are now taking them up, and find from calculation that the crop will yield about 30 tons per acre – some parts of the field are much heavier. The Hybrid Turnips (of various sorts) are also first rate and of beautiful quality – we are taking them up also – they are about 10 tons per acre.
I intend to consume them all with cattle in the sheds and fields, , in the latter case I shall continue to throw them upon the dry unbroken land and erect temporary sheds for the winter under which I shall give the cattle a supply of oat straw in addition to the turnips. For this purpose I have purchased the Exmoor sorts, thinking them better calculated to stand the storms than the Devon Breeds. I have been using the Common turnips upon the above plan the last 2 months and the Devon Cattle have done well but the weather having changed I shall now remove them to the Home Sheds, to give ??
You will be pleased to learn that I have grown the Rape this year to perfection, the general crop being 3 feet high and very strong in its growth it is all (12 acres) consumed by sheep which have done remarkably well upon it and the land left in a beautiful state for the next crop. I may add that Mr Pearson (the Horsen tenant) had 35 Exmoor Wethers in London last Monday, they fetched the top price (per lb) in the market - next to the Downs – and as a proof of his opinion of the result, he has given directions for 35 more to be sent off for next Monday they are to be sent by horses to the Tiverton Station, thence by Rail; to London 35 being the compliment for a wagon

load. This result established a great principle – that rape may be grown and eat off to advantage before the winter season commences and lastly that the sheep are eagerly sought after at the London Market. I had always anticipated this result. As regards the growth of roots I am convinced that any variety may be grown, and to a profit if properly taken care of and continued with judgement especially if the land be sown with roots a second time as such a process would clean the land and remove the native grass, previous to being laid down to pasture, or in some cases a second crop of corn might be taken previous to grass but in such case an extra or second dressing of lime should be applied.

As regards the leading feature for the improvement of an Exmoor farm, they require to be well watered according to situation, soil etc The first step being to improve the climate, and temperature of the soil, by causing the water to flow downwards rather than be thrown off by evaporation – this I have successfully accomplished so far as I have gone – by draining and subsoiling – the next thing is small enclosures with planting in favoured spots etc for shelter. But nature's chief dictate is the Water Meadow – few Estates have such natural facilities for their formation.

I hope to have some good ones upon my farm, but it is a work of time. The Kentisford [Kinsford] Water can (and will) be brought to my yard for water power, thence pass through the courts etc and water the land in front of the house.

I have drained the bog leading to Emmetts House and am using the water to irrigate some native grass, by way of an old water carriage, which passes the Emmetts Stone Quarry.

9.2 Table of archaeological features discussed in text

ENPHER	NAME	DESCRIPTION	DATE	LOCATION
MSO6847	The Pinkery Canal	Canal north of River Barle	1819 to 1820	Pinkery Pond to Three Combe Hill
N/A	The Warren Canal	Canal north of the River Exe	1819 to 1820	Exe Head to Rams Combe
MSO7119	Pinkery Pond	Reservoir for Pinkery Canal	By 1830	West of The Chains
MSO7906	Simonsbath to Porlock railway	Trackbed of unfinished railway	c 1860	Warren Farm to Porlock Common
N/A	Linear earthwork on Dure Down	Trackbed of unfinished railway	c1850s	North side of Dure Down
MSO7020	Tythe Allotment water carriage	Contour leat	1819 to 1820	Great Buscombe to Larkbarrow
N/A	Linear earthwork on Elsworthy	Contour leat	? 1819 to 1820	North side of Elsworthy
MSO10888; MSO10129	Pinkery, Hearlake, Goat Hill & Driver water carriage	Contour leat	1819 to 1820	Pinkery to Driver
MSO10888; MSO10129	Water carriages on Great and Little Ashcombe	Contour leat	1819 to 1820	NE of Simonsbath
MEM22499	Woolcombe and Halscombe water carriage	Contour leat	1819 to 1820	Woolcombe to Mount Pleasant
MMO2347	Contour leats on Dure Down	Contour leat	1835 to 1836	SW side of Dure Down
MMO2339	Drainage system, Ashcombe	Catchwater system	1835	NE of Simonsbath
MMO2899	Catchwater meadow, Cornham Farm	Catchwatwer system	1840	East of Cornham Farm
MMO2160	Cornham Farm water supply	Leat	c 1820	Titchcombe to Cornham Farm
MSO10955	Honeymead Farm water supply	Leat	1819	Clovenrocks to Honeymead Farm
MMO459	Birchcleave Reservoir	Reservoir	1819	SE of Simonsbath
MSO7104	Surface drains, Lanacombe	Extensive drainage system	1839 to 1840	Lanacombe
MMO2341	Surface drains, Great Buscombe	Extensive drainage system	1839 to 1840	Great Buscombe
MMO2885	Surface drains, Long Holcombe	Extensive drainage system	c 1830 to 1840	Long Holcombe
MMO2886	Surface drains, Hangley Cleave	Extensive drainage system	c 1830 to 1840	Hangley Cleave
MSO7071	Mineral prospecting trench	Large trench and spoil bank	c 1850s	Hangley Cleave
MMO2476	Herringbone drains, Swap Hill	Extensive drainage system	c 1830s	Swap Hill
MMO2475	Herringbone drains, Beckham	Extensive drainage system	c 1830s	Beckham
MMO2473	Herringbone drains, East Pinford	Extensive drainage system	c 1830s	East Pinford
MMO2338	Herringbone drains, West Pinford	Extensive drainage system	c 1830s	West Pinford
MSO6903	Simonsbath Tower	Stone tower	c 1820s	North of Simonsbath
MEM22434	Ashcombe garden	Gardens	c 1820s	Ashcombe

9.3 Stage 1 Project Report

THE LANDSCAPE OF THE KNIGHTS ON EXMOOR
A CASE STUDY FOR THE EXMOOR MIRES PARTNERSHIP

STAGE 1 REPORT ON DESK-BASED ASSESSMENT
27th April 2018

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1 INTRODUCTION

1.1 This report sets out the results of a desk-based assessment undertaken as the first stage of a project which aims to investigate the processes and chronology of the land reclamation scheme of the Knights on Exmoor, with particular reference to drainage and other water-related features (Gillard 2018). It then puts forward several areas and themes for research and field assessment which will serve to answer the questions posed in the project brief.

2 THE MATERIAL

2.1 The archaeological mitigation strand of the Exmoor Mires Partnership (EMP) has produced a considerable body of information resulting from archaeological walkover surveys, watching briefs, metric surveys, palaeoenvironmental investigations and thematic studies (Bray 2012). This material refers to the archaeology and palaeoecology of Exmoor Forest and its immediate environs from the prehistoric and historic periods and, apart from the thematic studies, is focussed on the particular areas where mire restoration has taken place. The results of this work up to 2014 were summarised in The Past and the Peat (Bray 2015). The reports relevant to this project are listed in Appendix A.

2.1.1 The metric surveys at Halscombe and Little Ashcombe, and the walkover surveys carried out in 2017 at Larkbarrow Farm and on Long Holcombe considered the 19th-century reclamation features in their landscape setting as an integral part of the project designs (Riley 2013; 2015; 2017a,b).

2.2 The Exmoor National Mapping Programme (NMP) carried out for the Exmoor National Park Authority by English Heritage transcribed the archaeological features from air photographs for the whole of the National Park. The survey mapped features such as drainage systems and leats at a scale of 1:2500 for the whole of the survey area, giving an overview of the scale of the drainage works on Exmoor Forest for the first time (Hegarty and Toms 2009; Hegarty and Wilson-North 2014).

2.3 Archaeological survey work and historic building assessments within Exmoor Forest not within the EMP remit were also considered. These reports are listed in Appendix B.

2.4 The Exmoor Historic Environment Record (HER) contains summary records for all of the above material, together with information about their spatial location. The dataset from the HER considered here is based on a search with the following parameters:

WITHIN: EXMOOR (PARISH), WEST SOMERSET, SOMERSET

MONUMENT TYPE	NUMBER OF RECORDS
CANAL	01
DRAINAGE DITCH	53
DRAINAGE SYSTEM	31
LEAT	44
POND	04
WATER MEADOW	22

2.5 The Light Detection and Ranging (LiDAR) datasets in the form of geo-referenced raster images, for the study area, collected by Geomatics with a spatial resolution of 50cm, provide a complementary dataset to the aerial survey (Anderson and Cowley 2011). These will be used for detailed transcriptions of areas set out below (3.4.2) and as the basis for the rapid field assessments in conjunction with the NMP records.

2.6 A collection of correspondence, estate accounts and other material relating to the Knight's Exmoor Estates has recently been made available for study (Wilson-North 2017). It includes correspondence between John Knight and his son, Frederic, and a large collection of letters to Frederic Knight from Robert Smith and Frederick Smyth, successive land agents for the Estate, which give detailed information about the farms and their tenants in the latter part of the 19th century (Kn/Corr/010; 012 - 020. The No 1 Exmoor Abstract sets out the reclamation process as instigated by John Knight for the years 1819 and 1820 (Kn/Exm/003: No 1 Exmoor Abstract).

2.7 Contemporary accounts of the reclamation of Exmoor Forest include publications by Thomas Acland and William Sturge (1851), Robert Smith (1851; 1856) and Samuel Sidney (1853; 1878). *The Reclamation of Exmoor Forest*, written from an agricultural historian's perspective, remains the standard reference book (Orwin 1929).

3 DEVELOPING A CHRONOLOGY FOR THE RECLAMATION OF EXMOOR FOREST

3.1 The No 1 Exmoor Abstract provides two sorts of information about the reclamation process instigated by John Knight. It draws a distinction between the following features:

Canal
Water Carriage: narrow
Water Carriage: wide
Water carriage: small
Open Drain

The Abstract also sets out the work carried out on various features across Exmoor Forest in 1819 and 1820 giving the location, length and cost of each feature.

3.2 The following features will be assessed in the light of the dating evidence and distinctions between 'canals,' 'water carriages' and 'open drains' provided by the No 1 Exmoor Abstract:

3.2.1 Canals

Warren Canal (rapid field survey and assessment)
Pinkery Canal (survey work already carried out: Barrett 2004)

3.2.2 Leats

HER MSO7020 Leat from Great Buscombe – Larkbarrow (rapid field survey and assessment).
Relationships to examine:
Leat and the extensive drainage system on Trout Hill, West and East Pinford (HER MMO 2338; 2340)
Leat and the drainage systems on Swap Hill, Beckham and East Pinford (HER MMO 2473; 2475; 2476)
Leat and the bank/ditch (?) of unknown function/date which runs from the Warren Canal to the leat (HER MMO2406)
HER MMO625 Long leat(s) at Duredon Farm noted as similar in morphology to the Pinkery Canal by NMP
HER MMO2156 Long leat on Goat Hill noted as similar in morphology to the Pinkery Canal by NMP
HER MMO2347 Two leats on Dure Down, south of and parallel to, the Pinkery Canal: form and function
HER MMO2365 Long leat on Lanacombe: form and function
HER MMO2493 Long leat on East Pinford: form and function

3.2.3 Open drains and drainage systems
The form of John Knight's 'Open Drains' on Hearlake, the Chains and at Exe Head will be investigated (No 1 Exmoor Abstract). The nature of Robert Smith's 'Open Drains,' dug to drain boggy valley sides, is recorded in a contemporary account (Smith 1851, 147). They are 3-4 feet deep, V-shaped trenches, cut through peaty soil into the subsoil or rock and lined with stone at the bottom. A possible example was identified on Long Holcombe (Riley 2017b, 24). The drains cut on the North Chains in 1839 are called 'surface drains' (Kn/Corr/Exm/003 Osmond Lock's Accounts Jan 26 1839 – Feb 28 1840).

A study area to try to resolve some of these issues is to the NE of Pinkery Farm where examples of several different forms of drainage systems can be seen close to the Pinkery Canal and on the Chains to the NE. A herringbone drainage system close to the Pinkery Canal, and possibly contemporary with it, may be part of John Knight's 'Open Drains' on the Chains (HER MMO2146); a small area of intersecting drains (HER MMO2147) has similarities to the complex drainage system recorded at Little Ashcombe which now appears to be one of the earliest features of reclamation (Riley 2015; 1819 Exmoor Abstract). The large area of narrow drainage channels on the north of the Chains (HER MMO2141), above Long Chains Combe, may well be part of that reference to surface drains being cut in 1839.

The complex drainage features at Little Ashcombe and on Halscombe will also be re-assessed from the published material in the light of 1819 Exmoor Abstract (Riley 2013; 2015).

These drainage systems, chosen as they have relationships with features noted in the No 1 Exmoor Abstract, will also be assessed by rapid survey in the field. These are:

HER MMO2473; 2475; 2476 Drainage systems at Beckham, West and East Pinford (with leat HER MSO7020)

HER MMO2352 Drainage system at Limecombe (association with Pinkery Canal)

HER MMO2732 Drainage system on Hearlake (? Open Drains on Hearlake in No 1 Exmoor Abstract)

3.3 Water supply to farms
3.3.1 The supply of water to the two farms established by John Knight in the1820s – Honeymead and Cornham - has not been considered from an archaeological perspective. Some of the features are mapped by the NMP and some are visible on LiDAR images. Field investigation of the water supply features at Honeymead and Cornham Farms aims to characterise this phase of reclamation and could also show relationships between the water supply and drainage features. There are accounts of waterwheels and water-powered machinery at both Cornham and Honeymead Farms (HER MSO10955; Burton 1989, 91).

3.3.2 The No 1 Exmoor Abstract shows that the Birchcleave Reservoir in Simonsbath was one of the first structures John Knight built. The earthworks at this site will be assessed in the light of this new dating evidence (see HER MMO459 for various interpretations).

3.3.3 Pinkery Pond has been the subject of a recent archaeological study which concluded that it was part of a system designed to ensure a steady supply of water to several Knight Farms (Riley 2012).

3.3.4 A literature search for evidence of water powered machinery and chronology of any specialised buildings contained within the Knight Farms will put the Honeymead and Cornham evidence in context.

3.4 Robert Smith and reclamation
3.4.1 The importance of the work of Robert Smith in the later phases of reclamation overseen by Frederic Knight has been recently highlighted in a study of Emmett's Grange, where he farmed from 1850-1866 (Bray *et al* 2011). The moorland of Hangley Cleave and Long Holcombe to the south and east of Emmett's Grange contains large and complex drainage systems. A recent study of the system on Long Holcombe suggested that it was laid out under the supervision of Robert Smith and may date from the 1850s (Riley 2017b).

3.4.2 The drainage systems on the eastern part of Hangley Cleave and Long Holcombe will be recorded by transcribing from the LiDAR data. Selected areas on Hangley Cleave will be the subject of rapid survey and investigation following this transcription; the drainage systems on Long Holcombe have been the subject of an archaeological investigation (Riley 2017b). A field visit by the ENPA field team suggested that some of the features on Hangley Cleave were contemporary with the Pinkery Pond and Canal (HER MEM2336). The extensive drainage system on Great Buscombe, with radial drains and areas of intercutting ditches, has parallels with the Long Holcombe systems and a rapid field assessment of this system will be carried out.

3.4.3 The transcription and field investigation, combined with evidence from Robert Smith's correspondence, will aim to establish these drainage systems in the context of reclamation in Exmoor Forest. It may also add to the idea put forward that Emmett's Grange was seen as a 'model' Model Farm, set out to impress prospective tenants and neighbouring landowners (Bray *et al* 2011, 404).

3.5 Catch water meadows and Knight Farms
The NMP transcription recorded the remains of catch water meadows on 11 of the Knight farms; the catch water meadows at Emmett's Grange and Larkbarrow have been studied in some detail (Francis 1984; Bray *et al* 2011, Jamieson 2001; Riley 2017a). The catch water meadows at Cornham and Honeymead Farms will be included in the strand of this work which considers the water supply to these farms, with the aim of establishing a relative chronology for these features (3.3.1). The catch water meadows at Cornham are isolated from the farm and supplied with water from a long leat which may itself date from the 1820s. The catch water meadows at Honeymead are associated with the farm.

3.6 Other features
3.6.1 Burton's map in *The Heritage of Exmoor* (1989) shows the 'bed cut for proposed railway' at Exe Head which he suggests may be part of Frederic Knight's plan to build a standard gauge railway to open access to Exmoor from the coast. A clear, linear feature visible on LiDAR tiles SS7541_45_60 and SS7541_225_60 in this location, which clearly overlies medieval and post-medieval hollow ways, will be investigated.
3.6.2 Several ponds recorded by the NMP but not investigated in the field may relate to the reclamation process. A rapid assessment will be made of the significance of these features:
MMO2326 Ponds on West Pinford within extensive drainage systems.
MMO2328 ? Pond on Great Buscombe
MMO2333 Pond on Dure Down

3.7 The Knight Archive held at the Somerset Heritage Centre and catalogued by the Exmoor Society's Archivist contains much information relating to the very early years of the reclamation of Exmoor, and to the 1850s and 1860s when most of the farms

were tenanted and enclosed. Roger Burton refers to Exmoor estate accounts from 1835 and 1836 which give information about reclamation including drainage work on Ashcombe, the Chains and Blackpitts (1989, 72). These references come from 'John Knight's Labour and Small Bills Accounts 1835/1836' in the Knight Archive at the Worcester Record Office (G Wills, pers comm.). It is proposed to research this material with the aim of developing the chronology of the early years of reclamation.

3.7.1 Collections at the Somerset and Devon archives will also be considered as appropriate (Papers of R J Sellick Somerset A\BAZ; Fortescue of Castle Hill Devon 1262M).

ACKNOWLEDGEMENTS
Catherine Dove provided access to material from the Exmoor National Park HER and Martin Gillard provided information about EMP project work. Rob-Wilson North and Graham Wills helped with access to the Knight archive material.

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Riley, H 2017b *Archaeological Walkover Survey: Long Holcombe, Exmoor Exmoor Mires Partnership ELH17*

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Smith, R 1856 'Bringing Moorland into cultivation' *Journal Royal Agricultural Society England* **17**, 349-394

Wilson-North, R 2017 *John Knight of Wolverley and Simonsbath: An Outline Biography*

APPENDIX A RELEVANT EMP REPORTS

Bray, L S 2013 *Results of Archaeological Walkover Surveys and Post Mire Restoration Monitoring on Spooners, Exmoor May 2012 – June 2013*

Bray, L S 2013 *Archaeological Walkover Surveys on Deer Park*

Bray, L S 2013 *Warren Farm, Exmoor. Archaeological Walkover Survey*

Bray, L S 2013 *Archaeological Walkover Surveys on Burcombe May-October 2012*

Ferraby, R 2017 *The Warren Historic Environment Post-restoration Report*

Fyfe, R Gehrels, M and Vickery E 2008 *Palaeoenvironmental analyses from MIRE project sites: Comerslade and Long Holcombe, Exmoor*

Fyfe, R, Anderson, P Daley, T, Gehrels, M and Smith, D 2013 *Environmental change over the last millennium at Spooners and Ricksy Ball, Exmoor*

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McDonnell, R 2008 *Hangley Cleave. Report on an Archaeological Walkover Survey*

Morris, B and Bampton 2013 *Warren Farm, Exmoor. Results of a Walkover Survey*

Passmore, A 2013 *Exmoor Mires Project: Burcombe, Somerset. Results of an archaeological watching brief*

Riley, H 2012 *Metric Survey of Pinkery Pond and its Environs Exmoor Mires Project ECH12*

Riley, H 2014 *Metric Survey in the Environs of Pinkery Farm, Exmoor Forest Exmoor Mires Project EDF13*

Riley, H 2013 *Metric Survey of Halscombe, Simonsbath, Exmoor Exmoor Mires Project EDP13*

Riley, H 2014 *Metric Survey of part of West and East Pinford, Exmoor Forest Exmoor Mires Project EWF14*

Riley, H 2016 *Archaeological Walkover Survey: Horsen, Exmoor Exmoor Mires Project EHF16*

Riley, H 2015 *Metric Survey of Little Ashcombe, Simonsbath Exmoor Mires Project EAC15*

Riley, H 2017a *Agricultural Reclamation at Larkbarrow Farm, Exmoor Exmoor Mires Partnership ELB17*

Riley, H 2017b *Archaeological Walkover Survey: Long Holcombe, Exmoor Exmoor Mires Partnership ELH17*

Walls, S and Morris, B 2012 *The Chains, Exmoor. Results of a Walkover Survey*

Walls, S and Morris, B 2012 *Deer Park, Exmoor. Results of a Walkover Survey*

Walls, S and Morris, B 2012 *Spooners, Exmoor. Results of a Walkover survey*

APPENDIX B OTHER REPORTS OUTSIDE THE EMP REMIT

Barrett, N 2004 *The Pinkery Canal, Exmoor*

Blaylock, S 2017 *Historic Buildings Assessment of Duredon Farm, Simonsbath, Exmoor*

Blaylock, S 2018 *Historic Buildings Assessment of Driver Farm, Simonsbath, Exmoor 2017-18*

Bray, L S, Green, T, Wapshott, E and Walls, S 2011 *Emmett's Grange, Exmoor, Somerset. Management Plan and Archaeological Assessment*

Jones, B V 2000 *Historic Buildings Report Horsen Farm, Exmoor, Somerset*

Lawrence, G 2014 *Exmoor National Park: Rapid Condition Survey of listed buildings 2012-13*

McDonnell, R 1998 *Pinkworthy Estate. An Archaeological Assessment for Management Purposes*

McDonnell, R 1985 *Recommendations for the Management of Archaeological Sites in the Exmoor National Park at Warren, Pinford, Tom's Hill and Hayes Allotment*

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9.4 Project brief

BRIEF FOR: "THE LANDSCAPE OF THE KNIGHTS ON EXMOOR"
A CASE STUDY UNDER THE EXMOOR MIRES PARTNERSHIP (EMP)

1.0 – Aim

1.1: This brief has been prepared by the Historic Environment Officer (HEO) of the Exmoor Mires Partnership (EMP) on behalf of the Exmoor National Park Authority (ENPA).

1.2: Its purpose is firstly to detail the objectives and parameters of a study to investigate the processes and chronology of the land reclamation project of the Knights on Exmoor. Secondly, it invites submission, from suitable qualified contractors, of fully reasoned, costed project designs for undertaking this study. *Project designs should be submitted to the HEO by email noon on Friday, 9th February 2018.*

1.3: Submitted project designs should be accompanied by brief CVs of the personnel who will be involved which should include details of any relevant experience and qualifications.

2.0 - Background

2.1: The Knight family came to Exmoor from Worcestershire in 1820 and set about a campaign of agricultural improvement. They transformed the moorlands of the former Royal Forest by draining it and turning substantial areas into productive farmland. Their legacy is hundreds of kilometres of drains across the moors and a host of other poorly understood features.

2.2: Mires restoration has been carried out within ENP since 1998. The features altered by this process have largely been the drainage ditches and related features that were originally created by the Knights' agricultural improvement works. This case study aims to enhance our knowledge and understanding of the historic landscape most impacted by the EMP.

2.3: Survey by the National Mapping Programme (NMP) and fieldwork by EMP has expanded the known corpus of evidence; furthermore, a substantial archive of the Knights' papers has recently been discovered and is now held by the South West Heritage Trust. However, little interpretative work regarding the efforts of the Knights has been undertaken to date. The work described in the brief will address this, collating the available data from a variety of sources, assessing its significance and developing interpretations using a range of methodological techniques.
It is anticipated that this will make a significant contribution to our assessment of their achievements but also – by selective examples – to shed light on the aims, processes and chronology of reclamation and in so doing to help us understand the thinking of the Knight family and to better comprehend its historical significance..

2.4: The study focuses on the area of the parish of Exmoor Forest, as disafforested in 1815 and bought by John Knight in 1820 (Figure 1).

2.5: It should be noted that alongside this research a study may be commissioned examining the hydrological functioning of the drainage/water control schemes of the Knights' from the point of view of a modern water engineer (MWE) – provided that a suitably qualified researcher in this field can be found. The two researchers should liaise during the course of their study and both their results should feed into the final report.

3.1: Objectives

3.1: The purpose of this study is to selectively explore aspects of the Knights' landscape of reclamation to better understand it. It will set out a series of examples that illustrate:

i. The processes of reclamation – how was it achieved? what methods were used? This will be investigated by looking at areas where surviving features on the ground can be linked to documentary material.
ii. Chronology of reclamation (through defining and illustrating stratigraphic relationships in the field and relevant morphologies) and,
iii. The function of different features - using archaeological field data combined with historical records (drawing especially on correspondence and also the 'Exmoor Abstract No 1' in the recently discovered Knight Archive; copy in Exmoor National Park Authority files).

3.2: Submitted project designs should detail which techniques and methodologies will be employed to address these and any other important questions and fulfil the objective of the study.

4.0 - Methodology

4.1: It is anticipated that the study will consist of several elements:

4.2: Assess and analyse the Knight archive, especially letters and the 'Exmoor Abstract No 1' in terms of the drainage features, carriages and canals as well as other agricultural activities that are listed (e.g.: 'straightening watercourse at Little Cornham' and 'Fence Flexbro'). This will involve selecting examples that are listed and comparing them in detail with the surviving field evidence for areas of drainage. The document is careful to distinguish between 'canals', 'water carriage' and 'open drains' etc. and listing how much it costs to make a given length of each. Careful fieldwork is required to see what this looks like on the ground and to record features in such a way that they can be related to the document. These features can then be ascribed a date, providing some degree of fixed chronology within the wider landscape. The assessment of the survival of such features on the ground should also form part of this study.

4.3: Several specific features or areas should be addressed:

i. To recognise on the ground and archaeologically record the feature described in 'Exmoor Abstract No 1' as the 'Warren Canal' (which runs on the north side of the Exe from near Exe Head to Warren and then splits with one arm running round the north side of Elworthy to Lark barrow Corner). To define the extent of what is meant by the Warren Canal and identify and record any associated features. This should be achieved through mapping it on the ground, making detailed profiles and through photography to illustrate its form. An illustrated condition assessment of the feature will also be made. This data will be closely compared, as part of this study, with that gathered by Barrett in the survey of the Pinkery Canal (2004). This case study will offer a new assessment of the purposes of the canals in the light of the information in 'Exmoor Abstract No 1'.

ii. The water supply features to Cornham and Honeymead farms will be defined, recorded archaeologically and fully explained in terms of their operation.

iii. The drainage systems on Long Holcombe represent some of the most extensive and complex of those associated with the Knight reclamation of the Forest. The documentary evidence for the reclamation and improvement of the Knight farms on the southern part of the Forest should be carefully studied to provide a detailed chronology for this. Since current aerial photographic transcriptions are incomplete an adequate record of the Long Holcombe drainage systems should be made from a detailed transcription of the LiDAR data.

iv. The contractor is encouraged to select further areas for survey and detailed analysis should the desk-based study suggest that this would be productive in fulfilling the objectives of the project.

4.4: Note that numerous walkover surveys have been carried out in Exmoor Forest as part of the Exmoor Mires Project/Partnership –these should be referred to in advance of additional fieldwork. If possible, the features recorded in these surveys should be related to the documents in the Knight Archive. At the very least, the existing survey reports should be treated as a resource to direct further field survey. In addition, the full corpus of supporting data held by ENPA should be studied as appropriate: LiDAR, aerial photography, the Historic Environment Record (HER) etc. The HEO will cooperate in supplying the necessary data.

4.5: The research should take the form of two stages. The first will consist of all the desk-based studies into the data already held: the Knight Archive, the HER material, LiDAR and aerial photography, walkover and metrical survey already carried out by the EMP etc. An interim report setting out the results of this desk-based study and proposing what fieldwork is required will be produced and sent to the HEO by 23rd April 2018. The contractor, MWE and the HEO will meet by 11th May to discuss the proposals for further fieldwork and how the research will proceed. This meeting will take place at the EMP offices in Dulverton and should be costed accordingly.

4.6: The contractor and MWE will stay in contact during the fieldwork stage of the research in order to inform their respective studies. It is anticipated that there would be at least one liaison meeting during this time.

4.7: A draft report will be submitted to the HEO and the MWE by 3rd August 2018. This will be returned with comments by both the HEO and MWE 17th August 2018.

4.8: A final report including any necessary amendments and an appropriate contribution from the MWE will be submitted to the HEO by 5th October 2018.

4.9: The schedule for the study is summarized in Table 1 below:

Item	Deadline
Project Design Submission	Noon, 9th February 2018
Appointment of Contractor	23rd February 2018
Project Start	5th March 2018
Submission of Desk-Based Interim Report	23rd April 2018
Meeting between Contractor, MWE and HEO	11th May 2018
Submission of Draft Report	3rd August 2018
Feedback on Draft Report	17th August 2018
Submission of Final Report	5th October 2018

Table 1: Summary of study schedule

4.10: Submitted project designs should contain a detailed breakdown of project tasks and how time will be allocated to them.

5.0 –Deliverables

5.1: The following will be deliverable at the end of the study:

1 –Digital copies of the report in MS Word and pdf formats.
2 –A single unbound copy of the report and two bound copies. A major focus of the report should be high quality, appropriate, colour graphic presentation.
3 –Any digital data including GIS datasets (QGIS compatible) and photographs should be included on an appropriately labelled CD with each report.

5.2: Individual digital image files should be labelled as follows:

FeatureIdentifier_ImageOrientation_Date_ContractorName

5.3: The contractor will complete an online OASIS form describing the study, including a digital copy of the report before completion of this contract. The report will contain the appropriate OASIS number.

5.4: The total budget for the study, including all incidental expenses, is up to **£9,000**.

5.5: Please note; it is anticipated that the products of this study, including text, maps, images and digital data will be used, with appropriate acknowledgement, for purposes such as the dissemination of the results of the Exmoor Mires Partnership and public engagement. Relevant permissions will be required before a contractor is appointed.

6.0 –Assessment of Submissions

6.1: Project designs for this study will be assessed based on the following criteria though not necessarily in this order of priority:

a: Relevant experience of key personnel.
b: Understanding of the relevant issues.
c: Justification of the approach taken and of the techniques proposed to fulfil the project objective and answer the questions presented in 3.1.
d: Cost effectiveness of time allocation.
e: Ability to adhere to the project schedule.
f: Provisions made for dissemination of the project results.

7.0: Health and Safety at Work

7.1: The contractors shall at all times comply with the requirements of the Health and Safety at Work, Etc., Act 1974, and any other Acts, Regulations or Orders pertaining to the health and safety of employees. All personnel will conduct themselves in an appropriate manner in accordance with relevant CIfA guidelines (http://archaeologists.net/codes/cifa).

7.2: ENPA's Conservation Manager shall be empowered to suspend the work or provision of the Service or part thereof in the event of non-compliance by the contractors with this condition or with its legal duties in health and safety matters. The contractors shall not resume provision of the Service or such part until the Authorised Officer is satisfied that the non-compliance has been rectified.

7.3: A full risk assessment will be submitted to the HEO and agreed by him in advance of any fieldwork. Any variation to working practices set out in the risk assessment must be agreed by the HEO.

7.4: It is emphasized that conditions on Exmoor's moorlands can be unpredictable and extreme. Accordingly contractors are expected to be appropriately equipped and have access to a mobile telephone with reasonable coverage in the region if lone working or employ multiple personnel to undertake the work. It will also be advantageous for surveyors to be experienced in working under upland and/or wetland conditions.

8.0: Insurance

8.1: The contractor shall satisfy ENPA that he (the contractor) during the whole period of this Contract has an insurance policy with an Insurance Company of good repute covering himself and all persons deriving right from him against claims by the owners, his officers and employees and by third parties. This is in respect of any claim for damages caused by accident or negligence arising out of this Contract, it being understood that the amount of the insurance shall not in any way limit the liability of the contractors to the owners. The contractors shall on request produce for inspection by ENPA the policy and premium receipts.

9.0: Termination

9.1: In the event of a breach of any of the conditions of this Agreement, ENPA may terminate the Agreement on seven days' notice in writing and may by other means carry out or complete the work specified herein, and recover the cost or any additional cost thereof from the contractors.

10.0 Disputes

10.1: Any dispute arising between ENPA and the contractor shall be referred to a single arbitrator to be appointed by agreement, or failing agreement to be appointed by the President of the Royal Institution of Chartered Surveyors, the award of such arbitration to be final and binding upon both parties.

Figure 1: Case study area