PAPER AND PAPERMAKERS AROUND WELLS

BRIAN LUKER

INTRODUCTION

Before looking at papermaking mill sites around Wells, a brief history of paper and papermaking, and a description of the technologies involved is necessary. Paper has a long history. 'Paper' is not the same as 'papyrus' although having the same linguistic roots. Papyrus is made directly from papyrus reed by soaking the pith, interweaving it and then pressing so that the material is stuck together by its natural sugar. Paper is also made from plants but physical or chemical processes are used to disintegrate the cellulosic raw material before the paper is formed, when hydrogen bonding of the fibres takes place to give it its strength. The first manufacture of paper was in China *c.* AD 100. The knowledge of its making spread westwards to Moslem lands and thence via the territories now known as Spain (*c.* AD 1000), Italy, France and Germany to England (Hills 1988). The first papermill in England was built in 1488 by John Tate of the Mercers' company.

The study of the history of paper is a relatively recent subject. The first congress of the International Association of Paper Historians (IPH) was held in 1959 and the British Association of Paper Historians (BAPH) was founded in 1989 holding its second annual conference in 1990 at Wookey Hole. The doyen of British paper historians was Alfred Shorter of the University of Exeter who published numerous books and articles from the late 1930s to the 1960s (Shorter 1957; 1971; Hills 1993). As an historical geographer, Shorter emphasised the influence of location – the proximity of markets and sources of raw material (initially linen and hemp rags, then cotton ones, followed by other materials especially wood), of water of suitable quality and quantity, and of communications. As will be seen below, technological transfer – the use of a technique developed for one industry and transferred to another – is also of importance.

To make paper, a cellulose material must be cleaned, softened, macerated ('beaten') and diluted to make a weak suspension in water. This suspension, the 'stuff', is spread evenly on a very porous surface, usually a web of wire, to drain. It is then separated from the wire, pressed to remove more water and dried. Most paper contains additives to give properties such as gloss or colour and these may be added during beating or after manufacture. Bleaching of the stuff for white paper usually occurs at beating. For centuries the wire web was about the size of the required sheet of paper (larger to allow for shrinkage) secured to a wooden frame, this whole being the 'mould'. Any watermark was usually of wire, in reverse, and sewn to the mould, to make a permanent impression in the sheet. Two moulds and a 'deckle', a frame fitting round the mould, formed a set, each mould being used to dip stuff from the vat of stuff by the papermaker, the 'vatman'. The latter removed the deckle, passed the mould to the 'coucher' to lay the wet sheet in a pile, and meanwhile used the second mould to make the next sheet. The pile of sheets, separated by felts, was pressed before separation to hang for drying in a loft.

This process was mechanised at the beginning of the 19th century by English investors, the Fourdrinier brothers, and Bryan Donkin, an engineer, on the basis

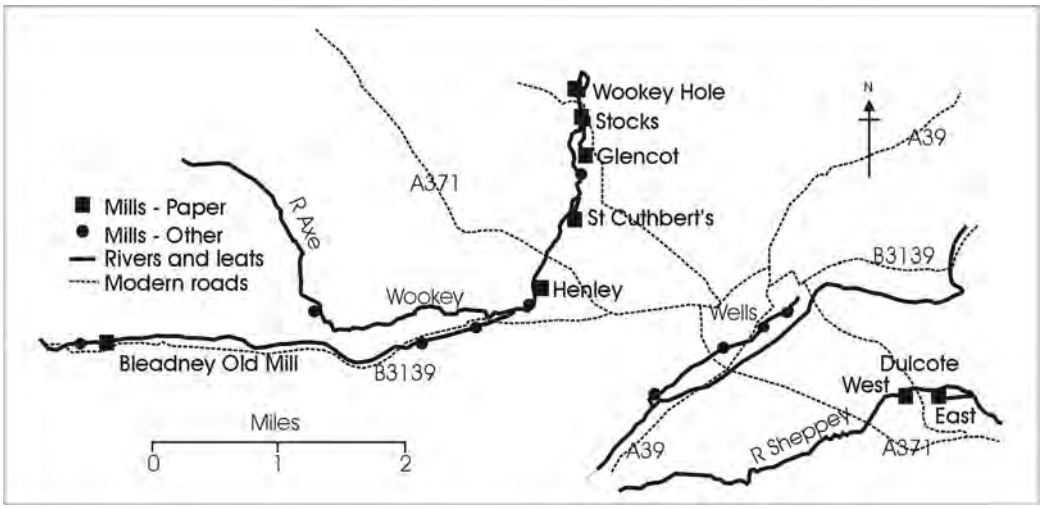

Fig. 1 Mill sites on the Rivers Axe and Sheppey

of a French invention. The process involved the continuous casting of the stuff on a moving wire. An English inventor, Dickinson, used a vacuum to form the sheet on a rotating wire cylinder dipping into a vat – this machine is otherwise known as a mould making machine. These two methods, vastly improved, dominate paper production today.

The serious study of watermarks began in the 19th century as an aid to the authentication of documents (for example in criminal cases) as well as for their intrinsic interest. Briquet (1907; Stevenson 1968) studied 60,000 watermarks, selecting 16,000 for publication, and his study covered only papers before 1600. It is estimated that there are millions of marks, many of which will never be recorded.

MILL SITES NEAR WELLS

Besides its ecclesiastical and commercial activities, Wells was also an industrial centre. It was a thriving medieval wool-manufacturing town, with all the processes involved in cloth making. The dominant figures in this cottage industry were the clothiers who had the capital to finance working capital and buildings. Amongst the processes was fulling, or 'tucking' – hence Tucker Street in the city – cleaning the cloth pieces and partially felting them. Originally, this was by treading them underfoot in the 'stocks' with natural detergents like fullers' earth or human urine. After fulling, the cloth, if it were not dyed in the wool, was either left white or dyed in the piece and in any event was stretched out in the open on tenterhooks to dry and ensure standardisation. The fulling mill, using waterpower to drive a shaft with cams on it operating hammers to do the stamping, replaced the manpower as part of the medieval industrial revolution (Gimpel 1992). The clothiers owned many fulling mills around Wells. There was abundant power in these and other mills (corn, edge tool, etc) all of which were readily convertible to different uses.

A direct transfer of technology from the earlier cloth making, using cammed shafts driving hammers, occurred for papermaking. The hammers pulped the rags in troughs, the pulp becoming finer as it was passed from trough to trough. This process was succeeded by an 18th-century Dutch invention, the Hollander beater, which gave increased quality control and greater productivity. Beaters were often in tandem, a 'breaker' or 'potcher' doing a coarse cut and then a fine beater completing the stuff preparation. These machines have in turn been superseded but beaters are still used in some mills.

Ecclesiastical, commercial and administrative activity in Wells provided a demand for paper for writing and packaging. A supply of raw material came from discarded clothing supplemented by imports, and sites were readily available with ample water power. These latter are shown in Figure 1, although the full complexity of the leats serving the

mills and of the multiple channels through Wells (Scrase 1982) cannot be shown at this scale.

Although layout variations are found, a typical 18th-century hand made paper mill was of three storeys. The top floor was the drying loft, with louvred sides, the middle floor was for rag reception and cleaning, and for finishing, while below were the beaters, stuff storage tank, vats and presses.

River Axe mills

On the first four miles of the Axe and the accompanying Wookey mill leat now known as the Lower River Axe, lie the sites of twelve mills (Luker 1991) of which six were at one time paper mills. Table 1 gives a summary of their histories while the accompanying text does no more than note some of the significant events in these mills. It will be seen that each mill has an Excise General List (EGL) number. These are the numbers allocated by Customs and Excise to mills (and indeed to other sources of taxed commodities) so that the records of duty might be organised efficiently. Taxation played an important part in the history of paper in England (Dagnall 1998) and its removal in 1861, together with the reduction in, and then removal of, the newspaper duty from 1836, produced a surge in output which was felt in Wells with the founding in 1851 of the *Wells Journal*, whose first proprietor, Samuel Backhouse, son of Benjamin Backhouse, was also involved in the paper industry.

Tables 1 and 2 adopt the convention that the 'papermaker' is the owner or leaseholder whose name appeared in the paper or ran the business. There is one exception: Bartholomew Cox was the leaseholder of Wookey Hole mill but he was Town Clerk of Wells and not a papermaker (Nott and Hasler 2004). The recurrence of family names is apparent: some also appear again at the River Sheppey sites at Dulcote.

Wookey Hole

Wookey Hole is the earliest known paper mill in Somerset with its first documented lease for papermaking dated 1610 (Table 1). Its documentary record is good because, for 400 years, it was the property of Wells Old Almshouses. By the end of the 18th century it consisted of a typical three-storey mill, driven off the west leat from the river, with an additional drying loft, the maker's house and various other sheds. An etching of *c*. 1800 (Fig. 2) from a painting said to be by Michelangelo Rooker, shows the mill right of centre and another loft to the left.

Fig. 2 Wookey Hole mill c. *1800*

After Edward Band came from Dulcote to take the lease of the Wookey Hole mill and of St Cuthbert's (known then as Lower Wookey), he introduced beaters to increase output and productivity. In the 19th century many of these were made by Sheldons of Wells whose business also originated in another Axe valley mill – the Lower Wookey grist mill south of Glencot. After a disastrous fire in 1855, the first W.S. Hodgkinson bought the freehold and dug the east leat to power turbines (revealing the famous Hyena Den in the process). The mill buildings were expanded successively to the size seen today, holding 13 vats at the time of maximum use. Wookey Hole mill made many papers and was well known in later years for security and bank note (though not Bank of England) paper as well as many writing papers. The production of many different papers in a variety of sizes required the purchase or production of many moulds. The Wookey Hole moulds have been studied revealing the intricate detail of their construction and sources of manufacture (Hills 2006). Under the Hodgkinson family new technology was not installed despite the arrival elsewhere of machine-made paper. After peaking in 1891, profit declined into loss. In 1915 ten vats were operating and by 1932, after G.A. Hodgkinson gave just under half the company away to his four senior managers in 1920, only five. The Inveresk Paper Company bought out the mill in 1950 and in 1973 the property was sold to Madame Tussauds. Production of hand-made paper was transferred to St Cuthbert's and Wookey Hole was developed as today's tourist attraction.

Stocks

Stocks mill named after an earlier papermaker is known only from a few documents recording James

TABLE 1: PAPERMAKING MILL SITES AROUND WELLS: RIVER AXE MILLS

Wookey Hole

NGR:	ST532478
EGL no.	366
Parish	Wookey, later Wookey and St Cuthbert Out, later St Cuthbert Out
Papermakers	Bartholomew Cox 1610; John Rendell, pre-1728; John Sherborne 1728–36; Edward Band 1736–86; John Band 1786–97; John Golding 1797–?1808; J Golding & James Snelgrove ?1808–19; James Snelgrove snr and jnr 1819–30; James & John Snelgrove 1830–33; Robert B. Coles ?with Joseph T. Coles 1833–39; Benjamin Backhouse ?with J.F. Lawrence 1846–52; [Fire 1855]; Wm S. Hodgkinson (I) 1856–74; Wm S. Hodgkinson (2) 1874–83; Wm S. Hodgkinson (2) & T.A. Hodgkinson 1883–1904; Thos A. Hodgkinson 1904–10; Guy A. Hodgkinson 1910–20; W.S. Hodgkinson & Co 1920–50; Inveresk Paper Co 1950–73

Stocks

NGR	ST532476
EGL no.	not known
Parish	St Cuthbert Out
Papermakers	James Snelgrove 1823–4

Lower Wookey, Glencot

NGR	ST532471
EGL no.	365 to 1829
Parish	St Cuthbert Out
Papermakers	James Coles probably snr then jnr 1758–1803; James K. Coles 1803–29

St Cuthbert's

NGR	ST531466
EGL no.	364
Parish	St Cuthbert Out
Papermakers	Joseph Mussock White pre-1738; Edward Band 1738–*c*. 1770; Joseph Coles 1788–1826; Joseph T. Coles 1826–*c*. 1832; J.T. Coles & Thos Barratt *c*. 1832–40 ; T. Barratt, J.W. Williams and Robert B. Coles 1840–42; T. Barratt & R.B. Coles 1842–45; Wm Wood & John Beauchamp 1845–47; John Williams, Jas Holmes and Wm Simpson 1847–1848; J. Williams and J. Holmes 1848–50; J. Williams 1850–53; Edward Burgess & ?Ward 1856–62; Burgess & Co 1862–78; Nicholas B. Downing 1878–80; Mendip Paper Mills 1880–86; Dixon, Horsburgh & Co 1886–96; Pirie, Wyatt & Co 1896–1923; St Cuthbert Paper Works Co 1923–31; St Cuthbert Paper Works Co (reconstituted) 1931–38; Inveresk Paper Co 1938–81; Georgia-Pacific 1981–90; Inveresk Ltd then plc 1990 – present

Lower Wookey Henley

NGR	ST527459
EGL no.	365 from 1829
Parish	St Cuthbert Out later Wookey
Papermakers	James K. Coles 1829–1837/8; Henry Coles 1837/8–68

Bleadney

NGR	ST486454
EGL no.	486
Parish	Wookey
Papermakers	John Band 1784–?1786; John Golding and James Snelgrove ?1786–1819; Richard Clarke and Wm Horsington 1819–1835; Wm Horsington 1835–1850

Snelgrove as its owner in 1823–4. It was short-lived, a late conversion of a previous mill site. Its remains now lie under the Wookey Hole Caves car park.

Glencot

Glencot mill stood at the end of the impressive leat running from the Axe just below Stocks mill. It was operated by the Coles family from 1758 and burnt down in 1829 when J.K. Coles moved his operation to Henley.

St Cuthbert's

St Cuthbert's mill is now the only one of the eight paper mills around Wells still in commercial production. It was originally two mills one on either side of the leat system. When Edward Band took over the lease from J. Mussock White in 1738 (Table 1), Band's new lease gave a detailed description of an 18th-century mill, describing the hammers and troughs used for beating. Band soon installed a beater but then passed the lease to the Coles family who bought the mill from the widow of Revd Kingston of Wells. Under the Coles family, it was producing good quality writing paper. An unusual development took place in 1832 when J.T. Coles was joined by Thomas Barratt from Kent. Barratt had invented a version of the moving wire that incorporated a device for shaking the whole machine, in imitation of the 'shake' given to the mould by the hand papermaker. In addition the wires were removable to change the watermark, another problem on early machines. The machine at St Cuthbert's, driven by the first steam engine in the district, is believed to be the only one ever installed since the invention was neither copied nor developed elsewhere. Its introduction at St Cuthbert's was the likely cause of the subsequent financial problems and rapid changes of partners over the next 20 years. In 1856 new investors appeared in the form of E. Burgess and his partner Ward who installed a Fourdrinier machine. In addition they started making paper from straw and in 1863 from esparto grass, material used only in the British Isles, based on material brought from Spain and Morocco as return cargoes. Both these materials required aggressive chemical treatment before use and the straw in particular set off a series of disputes about pollution downstream. By 1861 there were at least 80 employees and by 1871 there were two machines, the whole operation relying on a large water-wheel and eleven steam engines and also having chemical preparation plant and a gas works. All this was financed largely with borrowed money and a bank failure led to yet another of the many financial crises at the mill.

By the later 18th century papermaking was a major industry in Somerset, employing many hundreds of men and women, the latter in the rag-sorting and cutting rooms and in the 'salle' or finishing rooms, cutting, sorting and packing finished paper. At St Cuthbert's the handsome façade seen today was constructed in 1890. Wood-pulping began alongside the papermaking operation. After another failure, a further rescue itself failed in a welter of speculation contrary to the articles of association, followed by another rescue. Eventually the mill was taken over by the Inveresk Paper Company who took it through to 1978. After papermaking ceased at Wookey Hole, hand-made papermaking was moved to this site. With the installation of a mould making machine, St Cuthbert's became, so far as is known, the only mill in England ever to have had all three methods of making paper in operation simultaneously. After the Second World War the mill continued to produce quality writings, including the familiar 'Basildon Bond', and security papers. Pulping and the associated chemical plant ceased in the 1960s. The Inveresk Paper Company sold out in 1978 but the new owners themselves sold to a management buyout and Inveresk was recreated. The main products are now artists' papers made by a much-reduced labour force (Luker 1991; 1996).

In 2006 Inveresk Ltd deposited all their surviving records at the Somerset Record Office and gave a 'dandy roll' (the roll that impresses the watermark just before the paper leaves the moving wire) and a W.S. Hodgkinson hand mould (Fig. 3) to the then Somerset County Museum (Luker 2007).

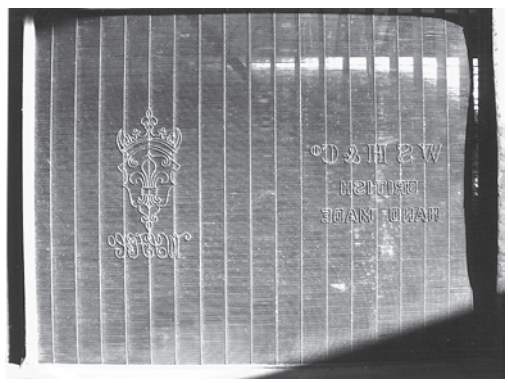

Fig. 3 Hand mould of W.S. Hodgkinson and Co; watermark to left and countermark to right

Henley

Henley is the next paper mill on the Axe. It was to this new mill that J.K. Coles transferred his operation from Glencot in 1829. This was a traditional three-storey mill making hand-made paper (the top floor was removed after 1962), and carried on until 1868 chiefly in the hands of Henry Coles. It was later bought by St Cuthbert's and served for a few years as a hostel for girl workers in the salle there.

Bleadney Old Mill

Bleadney Old Mill was the site of the manor mill of Wookey. Its tenant bought it in 1679 and after a further 100 years as a grist mill it was converted in 1784 to papermaking by John Band of Wookey Hole. It was run by a succession of papermakers until 1850, notably the Horsingtons who were influential in Wookey parish. A painting of *c*. 1900 (Fig. 4) faintly shows the vertical timbers of the added top floor drying loft embedded in the walls – these are still visible today.

Fig. 4 Bleadney Old Mill, oil painting c. *1900*

River Sheppey mills

There were two paper mills at Dulcote lying on either side of the main road from Wells to Shepton Mallet. Earlier historians have been in some confusion because both were referred to as 'Dulcote' but it is hoped that this has been resolved although the dates of papermakers are still not comprehensive (Table 2; Luker 2005). The commonality of names with the Axe mill operators may be noted.

Dulcote West

The mill's origins are unknown. It was a papermill by 1686. It was this mill that Dr Claver Morris visited with his 'neece Leigh' in 1709 (Hobhouse 1934, 54). A fire was recorded in 1769. The ownership of the mill is complex, but papermaking ceased in 1842 when it was sold to the Tudway family, well known and influential property owners around Wells, and converted into a saw mill. The two-storey drying house of *c*. 1740 survives as a separate building from the mill (Fig. 5). Unusually for mills round Wells, the mill did not use a leat to give the head for water power, but had a millpond that extended both sides of the main road.

Fig. 5 The drying house at Dulcote West mill

Dulcote East

Dulcote East was a grist mill before its conversion to papermaking in 1748 by John Hawkins under a lease from the Earl of Warwick. It was bought by the Tudway family in 1771. The mill was notable for a succession of fires in 1850, 1875 and 1904, the last one of which closed papermaking at the mill. After the 1875 fire Tudway was close to being refused insurance by the Sun '…had it not been for Mr Tudway's other less hazardous insurances this would not have been accepted'. A Fourdrinier machine was installed at that date, and another in 1884. Around 1890 it was converted into a leatherboard mill (not strictly paper at all) and this closed at the final fire. All that remains is ruinous except for the mill house.

TABLE 2: PAPERMAKING MILL SITES AROUND WELLS: RIVER SHEPPEY MILLS

Dulcote West

NGR	ST563499
EGL no.	368
Parish	St Cuthbert Out
Papermakers	1686 unknown; John Cox, unknown, John Collins 1696; Edward Band and William Treakell 1741; William Dore 1756; Thomas Pearson 1767; Richard Carridge 1768; [Fire 1769]; Henry Reeves 1787–93 at least; James Cripps 1803; Charles Gumm 1816; Walter Gumm 1819; Walter Fussell 1822; Charles Gumm 1830–32

Dulcote East

NGR	ST565449
EGL no.	367
Parish	St Cuthbert Out
Papermakers	John Hawkins 1748–51; John Day 1785; John Snelgrove 1816–30; Mary Snelgrove 1816–30; Benjamin Backhouse and John Snelgrove 1832–42; B. and Samuel Backhouse and John Andrews 1842–55; [Fire 1850]; W.S. Hodgkinson (1) 1855–64; Henry Coles and Richard Palin 1864–66; Richard Palin 1866–68; William Dawton & Son 1871–74; [Fire 1875]; James Black (assisted by Henry Minns) 1867–90; Dulcote Leatherboard Co 1896–1904; [Fire 1904]

Appendix

A promising area of further research on paper and papermaking in the Wells area is the study of surviving paper held in the city and other archives focusing particularly on the watermarks. Watermarks were put on paper from an early date and are an essential tool for the paper historian to identify origin and sometimes maker and date. They were often religious or heraldic symbols. Later, when watermarks became more standardised – for example 'Britannia' on English paper – paper was often folded in two to make book leaves. The watermark was placed on one half of a sheet and the maker's name or initials, often with a date, on the other half as the 'countermark'. The marks of makers from the mills around Wells are known in many places. For example the Lending Out book in Canterbury Cathedral library is Hodgkinson 1859 coming from one of W.S. Hodgkinson's mills (Tables 1 and 2). More locally, the Wookey Church Book, still in use, is made from Band paper made at Wookey Hole (Table 1) of about 1788 (when it was bought from Mr Will, stationer in Wells) with one leaf of Joseph Coles (Table 1) tipped in. Research on the Dulcote mills identified nine papers: two from Dulcote itself, one from Bleadney and one from St Cuthbert's dated 1834 which may indicate it is a rare paper made on Barratt's doomed machine. Bower (2004) has shown that a single volume of the *Transactions of the RSA* (1820–1) contained 137 papers, mostly made in Kent, but also four from Wells, two by Snelgrove and two by Joseph Coles.

The Act Books from 1378 to 1835 in the Wells city archives reveal not only that paper was trusted for the most permanent records from an early date, but also the history of writing paper in England (Luker 2000). The papers come from Italy, France, the Rhine valley, Holland and, in the last volume, a local mill with the Britannia mark countermarked J Snelgrove 1819. Most volumes have one paper throughout but some are of mixed papers. The sequence also illustrates the improvement in wire making in late 14th-century Italy, for the wires in the first volume are coarse and widely spaced in contrast to finer wires of tighter construction used in the moulds for the second volume. The paper for the first volume is watermarked 'Hand'. Other city records do, however, contain some local paper of an earlier date, by Band and dated between 1786 and 1797 (Nott and Hasler 2004).

Watermarks in the earliest book in the cathedral archives – the *Clementine Constitutio* written in England in the 14th century in four sections by five

different hands – show that all the paper is Italian of that date but was assembled from different suppliers. A bow and arrow watermark occurs in three sections, all in different hands, and a bull's head watermark is used twice in one section but coming from two different hands.

Acknowledgments

I must express my grateful thanks to the owners of all the mill sites, to my colleagues in the BAPH and the Wells Local History Workshop, to the webmaster of dulcote.com, to the staff of record offices and libraries, and, finally, to the archivist and librarian of Wells Cathedral and to the Wells Town Hall archivist.

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