

## **PAPER AND PAPERMAKERS ROUND WELLS**

### **Introduction**

Paper<sup>1</sup> has a long history. Its first manufacture in China in about 100AD is near mythical. The knowledge of its making spread westwards to Moslem lands and thence via the territories now known as Spain (about 1000AD), Italy, France and Germany to England<sup>2</sup>. John Tate of the Mercers' company built the first paper mill in England in 1488. It went out of business a few years later, thus providing an early demonstration of one of the principles of papermaking – it is a risky and uncertain venture. Although historians have been taking paper for granted for hundreds of years, paper history is a relatively modern 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.

Paper history attracts many disciplines – historians, technologists, conservators, criminologists, even papermakers – and is comprised of many subjects. The doyen of British paper historians was Alfred Shorter of the University of Exeter who studied the subject from the late 1930s to his death<sup>3</sup>. 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. Had the phrase then been invented he would have agreed that technological transfer, the use of a technique developed for one industry and transferred to another, is also of importance. The serious study of watermarks began in the 19<sup>th</sup> century as an aid to the authentication of documents (for example in criminal cases) as well as for their intrinsic interest. Briquet<sup>4</sup> studied 60,000 watermarks, selecting 16,000 for publication, and his study reached only the year 1600. It is estimated that there are millions of marks, many of which will never be recorded.

### **Papermaking**

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 19<sup>th</sup> century by English investors, the Fourdrinier brothers, and engineer Bryan Donkin, on the basis 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 historian's attention should be drawn to the difficulty of the dating of paper machines: a machine may have been installed in 1960, had a new head box in 1970, new drive in

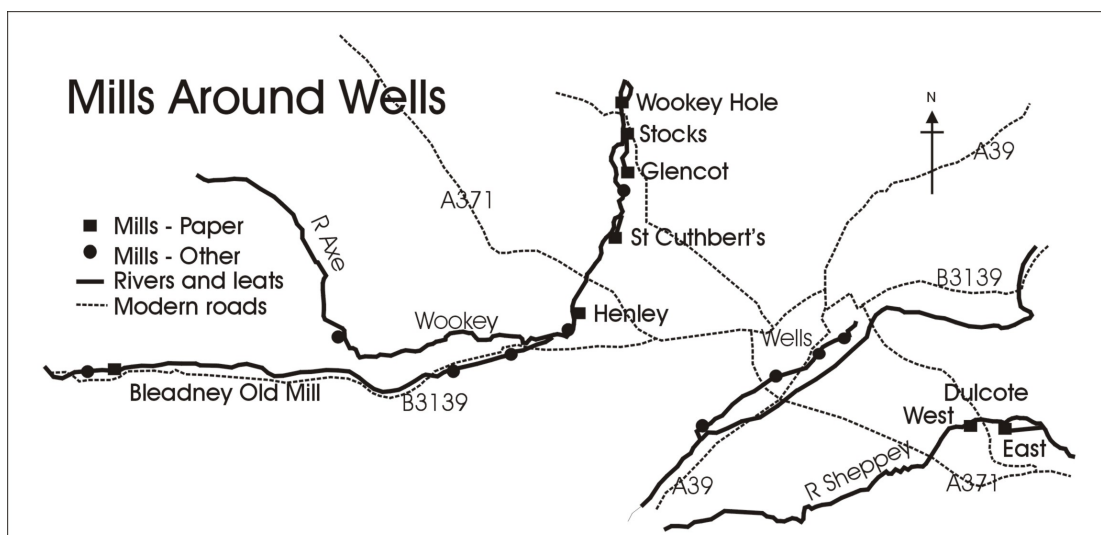
1980, new drying train in 1990 and electronic measurement added in 2000. It resembles George Washington's father's axe!

### Mills near Wells

Wells is not usually seen as an industrial centre. Nevertheless, besides its ecclesiastical and commercial activities, that is what it was. 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, 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, to present tastes, more unpleasant materials – the urine of old men was said to be particularly good. 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<sup>5</sup>. 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 between uses.

A direct transfer of technology, 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 18<sup>th</sup> 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 in discarded clothing supplemented by imports, and sites with ample water power. These are shown in the map below, although the full complexity of the leats serving the mills and of the multiple channels through Wells<sup>6</sup> cannot be shown at this scale.



### The Axe Valley

As the project of writing the Wookey parish history<sup>7</sup> began, it was decided to tackle one topic at a time. One such was the mills of the Upper Axe<sup>8</sup>. On the first four miles of the Axe and the

accompanying Wookey mill leat now known erroneously as the “Lower River Axe” lie the sites of twelve mills. Six of these were at one time paper mills. The table below gives a summary of their histories and this article 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<sup>9</sup> 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 of the *Wells Journal*, whose first proprietor, Samuel son of Benjamin Backhouse, was also involved in the paper industry.

Mill name	Wookey Hole	Stocks	Lower Wookey Glencot	Lower Wookey or Kingston's Mendip from 1862 St Cuthbert's from 1886	Lower Wookey Henley	Bleadney
Grid Ref: ST	532478	532476	532471	531466	527459	486454
Excise No	366	nk	365 to 1829	364	365 from 1829	486
Parish	Wookey, later Wookey and St Cuthbert Out, later St Cuthbert Out	St Cuthbert Out	St Cuthbert Out	St Cuthbert Out, later Wookey and St Cuthbert Out, later St Cuthbert Out	St Cuthbert Out, later Wookey	Wookey
Papermakers and years in operation	Bartholomew Cox 1610 John Rendell pre 1728 John Sherborne 1728 - 1736 Edward Band 1736 - 1786 John Band 1786 - 1797 John Golding 1797 - 1808? J Golding & James Snelgrove 1808? - 1819 James Snelgrove snr and jnr 1819 - 1830 James & John Snelgrove 1830 - 1833 Robert B Coles ? with Joseph T Coles 1833 - 1839 Benjamin Backhouse ? with J F Lawrence 1846 - 1852 FIRE 1855 Wm S Hodgkinson (I) 1856 - 1874 Wm S Hodgkinson (2)	James Snelgrove 1823/24	James Coles prob snr then jnr 1758 - 1803 James K Coles 1803-1829	Joseph Mussock White pre 1738 Edward Band 1738 - c 1770 Joseph Coles 1788 - 1826 Joseph T Coles 1826 - c1832 J T Coles & Thos Barratt c1832 - 1840 T Barratt, J W Williams and Robert B Coles 1840 - 1842 T Barratt & R B Coles 1842 - 1845 Wm Wood & John Beauchamp 1845 - 1847 John Williams, Jas Holmes and Wm Simpson 1847 - 1848 J Williams and J Holmes 1848 - 1850 J Williams 1850 - 1853 Edward Burgess & ? Ward 1856 - 1862 Burgess & Co 1862 - 1878 Nicholas B Downing 1878 - 1880 Mendip Paper Mills	James K Coles 1829 - 1837/8 Henry Coles 1837/8 - 1868	John Band 1784 - ?1786 John Golding and James Snelgrove ?1786 - 1819 Richard Clarke and Wm Horsington 1819 - 1835 Wm Horsington 1835 - 1850

1874 - 1883		1880 - 1886	
Wm S Hodgkinson (2)		Dixon, Horsburgh & Co	
& T A Hodgkinson		1886 - 1896	
1883 - 1904		Pirie, Wyatt & Co	
Thos A Hodgkinson		1896 - 1923	
1904 - 1910		St Cuthbert Paper Works Co	
Guy A Hodgkinson		1923 - 1931	
1910 - 1920		St Cuthbert Paper Works Co	
W S Hodgkinson & Co		(reconstituted)	
1920 - 1950		1931 - 1938	
Inveresk Paper Co		Inveresk Paper Co	
1950 - 1973		1938 - 1981	
Mme Tussauds		Georgia-Pacific	
1973 - ?		1981 - 1990	
Wookey Hole Caves		Inveresk Ltd then plc	
to present		1990 - present	

The table adopts the usual 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<sup>10</sup>. The recurrence of family names is apparent: some also appear again at Dulcote.

*Wookey Hole* is the earliest known paper mill in Somerset and its documentary record is good because, for 400 years, it was the property of Wells Old Almshouses. By the end of the 18<sup>th</sup> century it consisted of a typical three-storey mill, driven off the west leat from the river, an additional drying loft, the maker’s house and various other sheds. The picture below left, an etching from a painting said to be by Michelangelo Rooker, shows the mill right of centre and another loft to the left.



Wookey Hole Mill c1800



Wookey Hole Mill 2000

After Edward Band came from Dulcote to take the lease of this and St Cuthbert’s (the latter’s modern name is used for reference), he introduced beaters to increase output and productivity. Many of these were made, later, by Sheldons of Wells whose business also originated in another Axe valley mill – the Lower Wookey grist mill south of Glencot. After the disastrous fire in 1855, W S Hodgkinson (1) bought the freehold, dug the east leat (thus revealing the famous Hyena Den) to power turbines while the mill buildings, finally holding a maximum of thirteen vats, were expanded successively to the size seen today. 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 writings. 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<sup>11</sup>. Under the Hodgkinson family the mill provided a classic example of a refusal to accept that times were changing and that new technology, machine-made paper, would prevail except for small niche markets. 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. Inveresk 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 today's tourist attraction developed.

*Stocks* mill is known only from a few documents. It was short-lived, a late conversion of a previous mill site. Its remains now lie under the Wookey Hole Caves car park.

*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 and burnt down in 1829 when J K Coles moved his operation (EGL 365) to Henley (qv).

*St Cuthbert's* mill is now the only one of the eight paper mills around Wells still in commercial production. It too was a Band mill, Edward Band taking over the lease from J Mussock White in 1738. Band's original lease contains a detailed description of an 18<sup>th</sup> century mill, or rather two mills, one either side of the leat system, describing the hammers and troughs used for beating. Band soon installed a beater here but then passed the lease to the Coles family who bought the mill from the widow of Rev Kingston of Wells. Coles was producing good quality writing paper. An unusual development took place in 1832 when J T Coles was joined by Thomas Barratt from Kent. When a significant idea is put into practice inventors try to emulate it – consider the examples of motor cars, typewriters and sewing machines, all of which had many makes. 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. The invention was a technological dead end and 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 Burgess and Ward who installed the first Fourdrinier machine. In addition they started making paper from straw and in 1863 from esparto grass, a peculiarly British source for paper, 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 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.<sup>12</sup>

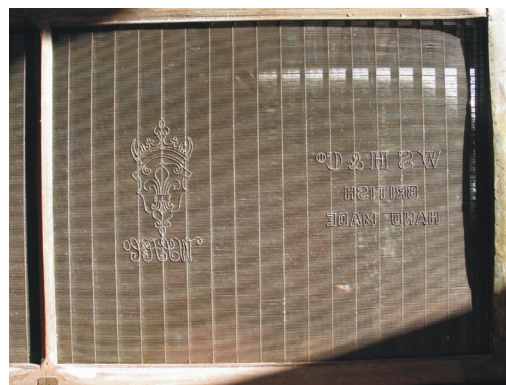
The next owners extended the mill to build the handsome façade seen today – it led to the nickname of the “Buckingham Palace of Paper Mills”. Pulping of wood began. After another failure, a further rescue itself failed in a welter of speculation contrary to the articles of association, followed by another rescue. Eventually the mill was taken over by the first Inveresk company who took it through to 1978. After shutting down Wookey Hole, moving hand made paper to this site, and installing 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.



Inveresk 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<sup>12</sup>.



St Cuthbert's Mill, 1990



Hand mould, WSH&Co, WM and CM

One of the pleasures of compiling a detailed company history is making the acquaintance of the employees who wondered what this stranger was doing, venturing into the old water wheel pit and measuring the windows and walls. One such acquaintance was Fred Cook, retired, whose memories provided a fascinating insight into the operation before the Second World War<sup>13</sup>.

In 2006 Inveresk 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 (picture above, right) to the Somerset Museum<sup>14</sup>, these latter items being its first holding to represent what had been a major industry in Somerset, employing many hundreds, men and women, the latter in the rag sorting and cutting rooms and in the "salle" or finishing room, cutting, sorting and packing finished paper.

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



Henley Mill, c1960



Bleadney Old Mill, c1900

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 paper making by John Band of Wookey Hole. It was run by a succession of papermakers until 1850, notably the Horsingtons, influential in

Wookey parish. The picture, from a painting about 1900, faintly shows the vertical timbers of the added top floor drying loft embedded in the walls. They are still there today.

### Dulcote<sup>15</sup>

The two mills at Dulcote were either side of the main road from Wells to Shepton Mallet. Earlier historians had been in some confusion because both were referred to as “Dulcote”. It is hoped that this has been resolved although the dates of papermakers are still not comprehensive – see the table below. The commonality of names with the Axe mill operators may be noted.

Mill name	Dulcote West	Dulcote East
Grid Ref: ST	563449	565449
Excise No	368	367
Parish	St Cuthbert Out	St Cuthbert Out
Papermakers and years in operation	unknown at 1686 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 1787-1793 at least James Cripps 1803 Charles Gumm 1816 Walter Gumm 1819 Walter Fussell 1822 Charles Gumm 1830-2	John Hawkins 1748-'51-? John Day 1785 John Snelgrove 1816-1830 Mary Snelgrove 1830-2 Benjamin Backhouse and John Snelgrove 1832-1842 B and Samuel Back- house and John Andrews 1842-1855 FIRE 1850 W S Hodgkinson(1) 1855-1864 Henry Coles and Richard Palin 1864-1866 Richard Palin 1866-1868 William Dawton & son 1871-1874 FIRE 1875 James Black (asstd Henry Minns) 1876-1890 Dulcote Leatherboard Co 1896-1904 FIRE 1904

Dulcote West mill's origins are unknown. It was a paper mill by 1686. It was this mill that Dr Claver Morris visited with his “niece Leigh” in 1709<sup>16</sup>. The ownership of the mill is complex, but it ended up in Tudway hands in 1842 after which it became a saw mill. It is distinguished by having a two storey drying house of about 1740 separate from the mill and, unusually for mills round Wells,

did not use a leat to give the head for water power, but had a millpond that extended both sides of the main road.



Dulcote West Mill, drying house, 2005

Dulcote East Mill, house, 2005

*Dulcote East* was a grist mill prior to conversion to paper in 1748 by John Hawkins under a lease from the Earl of Warwick. It became Tudway property in 1771. This mill was notable for a succession of fires, the last one of which closed the mill in 1904. 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 then, 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. The John Snelgrove, co-founder of department store Marshall and Snelgrove, was born in Dulcote in 1818. He was a wise man to get out of papermaking.

## 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, as, for example, "Britannia" on English paper, and paper was often folded in two to make book leaves, the watermark (WM) 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" (CM). The marks of makers from the mills around Wells turn up in many places. For example the Lending Out book in Canterbury Cathedral library is Hodgkinson 1859. More locally, the Wookey Church Book, still in use, is made from Band paper of about 1788 (when it was bought from Mr Will, stationer in Wells) with one leaf of Joseph Coles tipped in. While researching the history of the Dulcote mills, nine papers were identified: four were local, 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. One single volume of the *Transactions of the RSA* (1820-1) contains 137 papers, mostly made in Kent, but also four from Wells, two by Snelgrove and two by Joseph Coles<sup>17</sup>.

The Wells city archives contain the Corporation Act Books in 14 volumes for 1378 to 1835<sup>18</sup>. They 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. The papers come from Italy, France, the Rhine valley, Holland and, in the last volume, a local mill, the Britannia mark, shown below, 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 14<sup>th</sup> 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" and is also shown below.



Other city records do, however, contain some local paper of an earlier date, by Band and dated between 1786 and 1797<sup>10</sup>.



“Hand” Italian WM, 14<sup>th</sup> century



“Britannia” WM 1819, Snelgrove

A visit by the BAPH to the Wells cathedral library stimulated another investigation<sup>19</sup>. The earliest book in the library is the *Clementine Constitutio*<sup>20</sup>, a theological/legal work in Latin in four sections in five different hands, written in England in the 14<sup>th</sup> century. The watermarks confirm this as all the paper is Italian of that date but seems to have been assembled from different suppliers. Several folios are missing. Watermark 1 (there are no countermarks) is a bow and arrow and it recurs in sections 1, 3 and 4, all in different hands. Watermark 6 (one of three different bull’s heads in the book) is used twice in section 2 with two different hands. The novelty is watermark 7, crossed pins, which has not been previously recorded.

Brian Luker

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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 to the archivists and librarian of Wells Cathedral and City.

### Note and References

1 “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.

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