

This is the Fifty-Fourth of an occasional series of articles by David Stone about incidents in the history of Swanton Morley and its church

BUILDING THE DERBY SILK MILL

The role of George Sorocold

George Sorocold is a shadowy figure, but some people maintain that he was the first true professional civil engineer in Britain. He is important to us because he was heavily involved in the development of the machinery for silk mills (including that for the Lombe's mill). He probably came from Lancashire but we do know that he got married in Derby in 1685. He made his name through the development of urban water supply systems; he used waterwheels to drive pumps and he distributed the supply through a system of wooden pipes. The first such system was installed in Derby in 1692, but he soon went on to install systems elsewhere – including Norwich. In 1694 Richard Barry and George Sorocold laid water pipes in Tombland, and he went on to install a pumping system in Norwich, which was completed by about 1700.

It seems highly likely that during his time in Norwich he met the Lombe family who, as we saw last time, were making a success of their worsted weaving business.

The silk industry

The silk industry in England at this time was based on individual hand-weavers, usually working in attic workshops. Italy had a monopoly on the technical advances of that period, so the higher quality silk thread wanted by the British market had to be imported. Raw silk originally came from China, but it was later produced in Italy, where they had developed water-powered machinery for “silk throwing” which is the process of taking silk that has been reeled into skeins, twisting it and winding it onto bobbins. The yarn with the greatest degree of twist, which is known as organzine, was used as the longitudinal (warp) thread in the weaving of silk materials. Now, the nature of the ‘throwing’ machinery used to create organzine was a closely guarded secret.

If you want to know more about silk throwing, there is a useful article on Wikipedia.

Cotchett's Mill

Sometime between 1702 and 1704 a London-based solicitor called Thomas Cotchett started to build a silk mill in Derby. He located it on the west bank of the River Derwent, close to Sorocold's operational water pumping ‘engine’. It is generally accepted that Sorocold designed the waterwheel and the associated machinery needed by the mill. Now the mill had three stories and the idea was to install eight spinning machines based on a Dutch design and driven by Sorocold's machinery. A Dutch design was chosen because details of the much more efficient Italian ones were still unknown in Britain. However, despite Sorocold's undoubted mechanical genius, the venture came to nothing. *But it had attracted the attention of Thomas Lombe.*

Industrial espionage

Thomas Lombe was a specialist in silk and he was wide-awake to the need for a powered silk-throwing industry. One story even says that he sent his younger half-brother, John to work as an apprentice in Cotchett's Mill. The events that followed the failure of Cotchett's business are also cloaked in legend; it is said that Thomas then sent John to Italy, disguised as a workman, to obtain employment in a throwing mill and to make drawings of the secret Italian machines. The story goes on to say that after two years he returned to England only to meet his death at the hands of a beautiful temptress who gave him a slow-acting poison.

There is little doubt that he did indeed go to Italy; he appears to have gone to Leghorn (Livorno) in 1715, but precisely what his assignment was can now only be a matter of conjecture. It has even been suggested that Sorocold went with him. Anyway, he returned to England in 1717 accompanied by some Italian workers. Whatever the motives behind his mission, John seems to have produced the results that were required for, in the same year, work started on the new mill, which was partially financed by their Uncle William.

In 1718 Thomas and John obtained a patent for 'three sorts of engines nevermore made or used in Great Britain, one to wind the finest raw silk, another to spin and yet another to twist the finest Italian raw silk into organzine in great perfection, which had never before been done in this country.' Not surprisingly, the Italians reacted badly to the commercial challenge and put an embargo on the export of raw silk; there was even speculation that it was they who were later responsible for John Lombe's death. Whatever the truth, Thomas Lombe took over Cotchett's mill, drew up plans to expand it, and engaged George Sorocold on the work of construction.

Lombe's Mill

The task that faced Sorocold was formidable and it was very different from the construction of waterworks, the field in which he had most experience. In particular it involved the making and fitting of an enormous number of small parts such as toothed wheels, spindles and bearings – it has been calculated that the machines themselves required over 10,000 spindles. Furthermore, all these parts had to be made with sufficient precision to do their task correctly.

Another technical requirement (explained in the patent) arose from the fact that the silk could only be processed properly if the temperature and humidity were high. The correct conditions were presumably found in Italy, but in Derby not only did the mill have to be heated but the heat had to be evenly distributed. It has been reported that the Lombes used a steam engine to achieve this.

The mill was completed by 1722, the year of John Lombe's death and, apart from a brief period at the end of the century, it continued to be used for silk manufacture until 1890, when part of the structure collapsed because the piles had rotted through. It was arguably the first successful powered continuous production unit in the world, and it was a prototype for Richard Arkwright's much later cotton mill at nearby Cromford. John Lombe himself is not forgotten in Derby. When the new Exeter Bridge across the Derwent was built in 1931 he was selected as one of the four famous 'Derbeians' to be portrayed in bas-relief sculptures, and these are still there.

In Thomas Lombe's time the mill proved to be a remarkable success and Thomas himself was knighted in 1727. However, the patent ran out in 1732 and when Thomas Lombe applied for it to be extended the Patent Office turned down his request. This was the result of the opposition of other manufacturers who were determined to install the Italian machines in their own mills. However, in recognition of his achievements, he was awarded a lump sum of £14,000 on the understanding that he displayed models of his machines in some public place – Lombe chose the Tower of London. But from then on other men started to build silk mills, not only in Derby but elsewhere.

When Thomas died in 1739, his widow sold the building to William Wilson and Samuel Lloyd who continued to use it for the manufacture of silk. In his will he named his wife Dame Elizabeth Lombe as his executrix. Thomas left a fortune of £120,000, which was bequeathed in equal shares to his wife and his two daughters, Hannah and Mary. He also requested that his widow should set aside some £600 to be shared among the principal workers at the mill. Lady Lombe died on 18 November, 1753.

Did the money come back to Norfolk?

It is sometimes said that it was this fortune which was eventually used to build Bylaugh Hall, but I have found no evidence of this. In 1740 his daughter Hannah married the widowed Sir Robert Clifton, Bart., of Clifton Hall in Nottingham, but they had no children. His other daughter Mary married James Maitland, seventh earl of Lauderdale in April 1749 and it is noted that 'he thus obtained a large fortune'. They had twelve children.

So, this branch of the Lombe family was effectively subsumed into these other families and, although contact may have been maintained with some other branches it seems unlikely that any of Thomas Lombe's fortune returned to Norfolk.

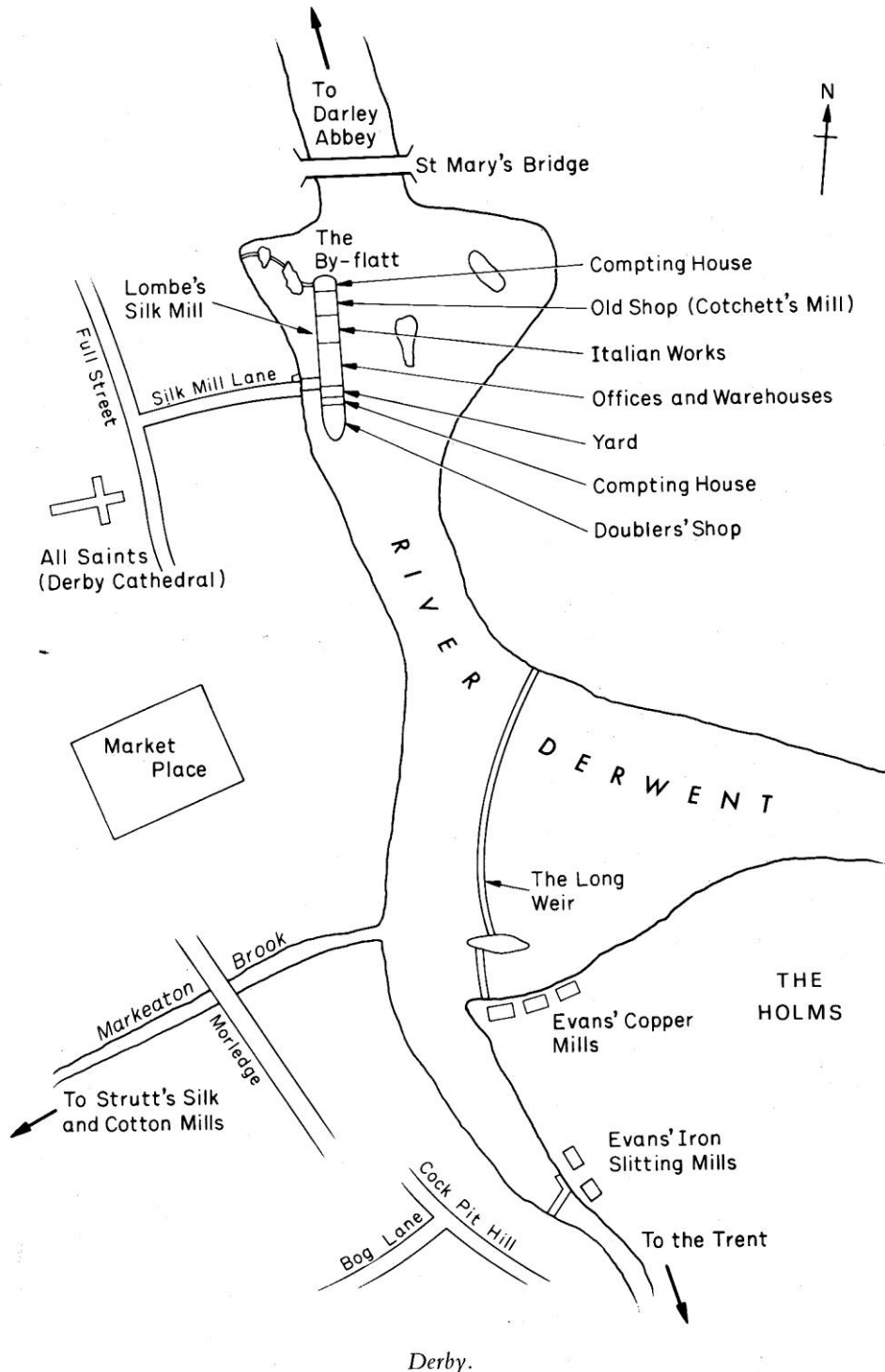
So, having thoroughly enjoyed this little foray into the start of industry in the Derwent Valley, I shall next turn my attention to the very different – and sometimes rather complicated - history of the Lombe family in Norfolk.

A brief explanation of the layout of Lombe's Mill

The machines were of three different kinds, for winding, twisting and doubling the silk. The winding and twisting machines were both housed in the 'Italian Works' and they were both driven by the same 23 ft. diameter waterwheel. Now the Italian Works was a five storey building which stretched for 110 feet along the river, and it was set upon 26 river arches which can still be seen today. (They are clearly visible in the photograph in last month's article.)

The doubling process is where threads from three or more bobbins are wound together; the machines for this were operated by hand and were housed in a separate building.

The whole complex extended for 120 yards along the By-Flatt Island, as shown below.



This map is taken from *Transformation of a Valley: the Derbyshire Derwent* by Brian Cooper, Scarthin Books (1991)