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Before the photocopier

Although better known for his improvements to the Newcomen steam engine, James Watt (1736-1819) was also a pioneer of office technology. He had moved from his native Scotland to Birmingham in 1774 in order to collaborate with Matthew Boulton, the engineer with whom he developed the Boulton and Watt steam engine. Both were members of The Lunar Society, a group of friends who met regularly to discuss technical matters of mutual interest and which included Joseph Priestley, James Keir and the two grandfathers of Charles Darwin, Erasmus Darwin and Josiah Wedgwood. Those who were in business were frustrated by having to write out longhand a second copy for their records of any letter they had prepared. In 1780, James Watt was awarded a patent for 'his new method of copying letters and other writings'.

The principle of his method was that a piece of very thin and unsized paper was moistened and placed on top of the fresh writing. The two layers were squeezed together either in a screw press or in the roller press which Boulton built. A portion of the ink was transferred from the original paper to the thin tissue; the writing was reversed as a mirror image, of course, but could easily be read from the other side as the paper was so thin. The patent specified iron-gall ink as the copying ink, though it was to be a more concentrated preparation than was used for non-copying purposes and which had been used with quill pens from medieval times. This was a solution of gum arabic in water which also contained the two components, copperas, i.e. iron (II) sulfate, and an extract of oak galls, which reacted together to give the iron compounds which oxidised in air to give the black colour of iron-gall ink.

The method was originally devised for making single copies of individual letters and could be used with the Watt copying machine which was marketed by James Watt and Co. (Watt, Boulton and Keir). This was a mahogany and brass case containing all a businessman might need for writing and copying letters, including an integral roller press. It was marketed widely; even Thomas Jefferson used one during the early years of his presidency of the United States.

Modifications to letter writing and copying took place throughout the 19th century. The steel pen gradually replaced the quill pen from the 1820s and copying ink was modified by the adding sugar or glycerine in order to slow down its drying. This alleviated the urgency of making a copy while the ink was still wet and enabled more than one copy to be made. Inks other than iron gall-inks were used but the principle remained the same. For example, logwood dye and some of the early (post-1860) synthetic dyestuffs were all tried in copying inks. But the greatest modification was the transition from making copies on single sheets of paper to making copies in a copy book or wet letter book.

A typical book might contain up to 1000 sheets of very thin and unsized paper bound into a hard cover. The paper had to have a good mechanical strength when damp, so needed to be based on long fibres (e.g. mulberry) and, from the 1860s, much of this paper was imported from Japan for just this purpose. With the book open, sheets of waterproof (oiled) paper were placed behind both the right-hand and left-

hand pages. The letter to be copied was placed, with the ink uppermost, on the right hand page, while the left-hand page was dampened so that it would take the copy. The book was then closed and the entire book was squeezed in a screw press (copy press, letter press), the hard covers ensuring an even distribution of pressure. When removed from the press, the book was opened, the original letter retrieved and the copy allowed to dry.

The use of such copy books became standard practice in offices from the 1870s. While the advent of the typewriter and carbon paper around the turn of the century made the copy book redundant for some business correspondence, its use for copying handwritten letters is said to have continued until the 1950s.

The accompanying illustrations show a letter book which was in use in 1907 in the practice of Evans, Thomas and Jones, solicitors of Llandysul and Newcastle Emlyn (Ceredigion Archives, Ref. ETJ, Acc. No. 2370).

1. The open letter book shows the 1000 numbered quarto sheets (11" x 9") bound in the hard cover.

2. When the book is opened at sheets 843 and 844, the top face of 843 is the surface which took the copies of two original letters, with the writing visible as the mirror image of the originals. In the case of sheet 844, the copy is on the hidden face but is easily readable through the thin paper. .

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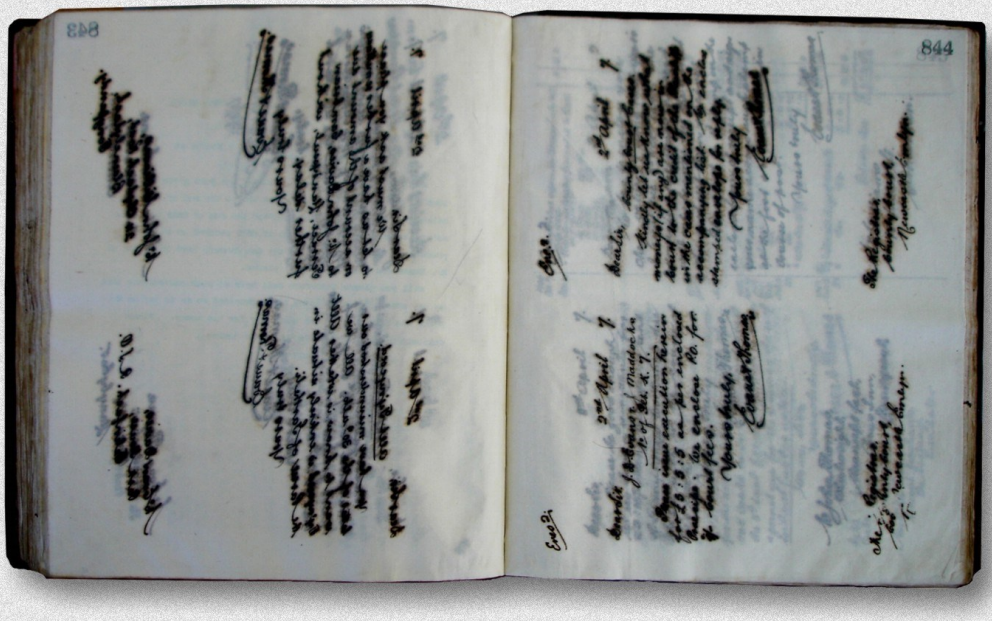

3. Sheet 812 is a copy of one of the few letters in Welsh; some of the following pages can be seen through the very thin paper.

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