

STEPHEN GRAY (1666-1736)

Canterbury dyer and amateur scientist

© 2015 David R Lewis

The influx of French Protestant silk weavers in the 17th century brought with it a growth in allied trades, including that of the dyeing of fabrics. Mathias Graye (buried Canterbury 1683), son and grandson of blacksmiths, became a dyer¹. Mathias married Anne Tilman in 1658² and had four boys and three girls. One of the boys, Stephen, born in 1666³, the year of the Great Fire of London, is the subject of this article. His older brother Thomas (baptised at All Saints Canterbury 1659) took over the family dyeing business but died in 1695, when the business passed to Stephen. Another brother, Mathias (baptised All Saints Canterbury 1661) became a grocer and served twice as city mayor⁴.

We know nothing certain about Stephen's education. Records of King's School make no reference to him, but this apparently does not rule out the possibility that he attended to school as a 'Commoner'. The school conducted at Poor Priests Hospital is another possibility, but there is no evidence to confirm this either⁵.



Gray's dyeing business started in Best Lane



and moved to Stour Street (now Canterbury Cycle Centre)

The family dyeing business was conducted initially in Best Lane but later in Stour Street. An image reproduced in Clark (1979B) clearly shows the south east side of Best Lane (by the Thomas Becket pub), but this seems implausible as the Stour backs the properties on the other side of the street - that shown in the image above. The Canterbury Cycle Centre premises were used for dyeing work up until recent decades (Beasley and Son dyers is shown in Kelly's 1961 town directory).

For much of his career, Stephen fitted his scientific work around the requirements of the dyeing trade. The dyeing work was demanding and unpleasant. It involved lifting heavy bales of fabric, and prolonged contact with harsh

¹ married Anne Tilman at St Margaret's Canterbury 8 July 1658 NB changed surname to Gray by this time

² 8 July 1658 in Canterbury Cathedral NB Find My Past have erroneously transcribed Anne's surname as Pilman

³ Stephen was baptised 26 December 1666 at All Saints Canterbury - his date of birth is surmised to be earlier that year

⁴ in 1692 and 1700 - see <https://www.canterbury.gov.uk/media/678220/City-of-Canterbury-Portreeves.pdf>

⁵ Clark (1979B) includes an intriguing footnote (p 355) referring to his correspondence and discussions with Dr Urry, 'who was the archivist at Canterbury Cathedral Library' - this has not yet been traced but would no doubt explain the sources used by Urry for the interesting family details not available from parish registers; to confuse matters further, a 1977 Kentish Gazette article reporting a talk by Dr Urry places Stephen Gray in Beer Cart Lane!

chemicals used in the various dyes. Throughout his life he complained of pains in his back and hips, but somehow found the energy to engage in his spare time in scientific experiments. He was always short of money, and his research reports show how he had to rely on everyday objects. His work on protozoa started using water but moved on to wine, brandy, vinegar, beer, spittle and urine⁶. His experiments on conduction of electricity relied greatly on silk threads (surely available through his day job in the dye works), but also on human hair, 'fine hair of a dog's ear', feathers, chickens (unplucked and plucked), a suspended servant boy, and 'gilded ox guts'⁷.

Stephen was active in a variety of scientific fields, including fossils, astronomy, protozoa and optics. But by far the most important contributions were on the transmission of electricity. He was the first investigator to understand the difference between conductors and insulators, and the first to show that electricity can be transmitted over long distances. These advances paved the way for all future developments in telegraphy and the telephone - in short, they changed the world.

Proof that electricity could pass along long conductors relied on experiments carried out in July 1729 at Otterden Place near Lenham, first in the panelled grand gallery and then, to achieve longer lengths of thread, in the barn nearby. Here, they managed to transmit signals over distances of 200 feet and more, and the era of modern communications was born.



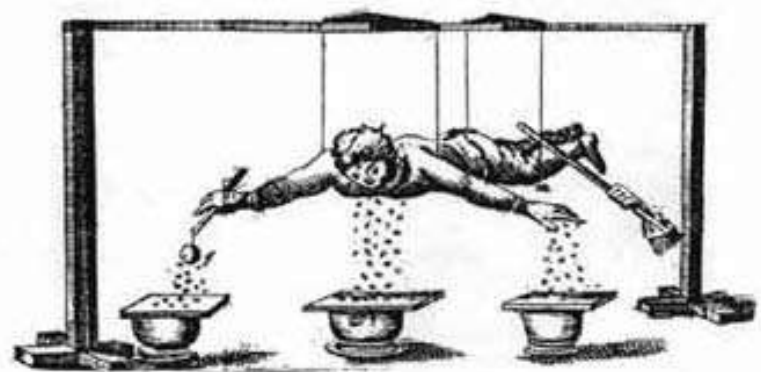
Otterden Place



grand gallery



Otterden Place barn

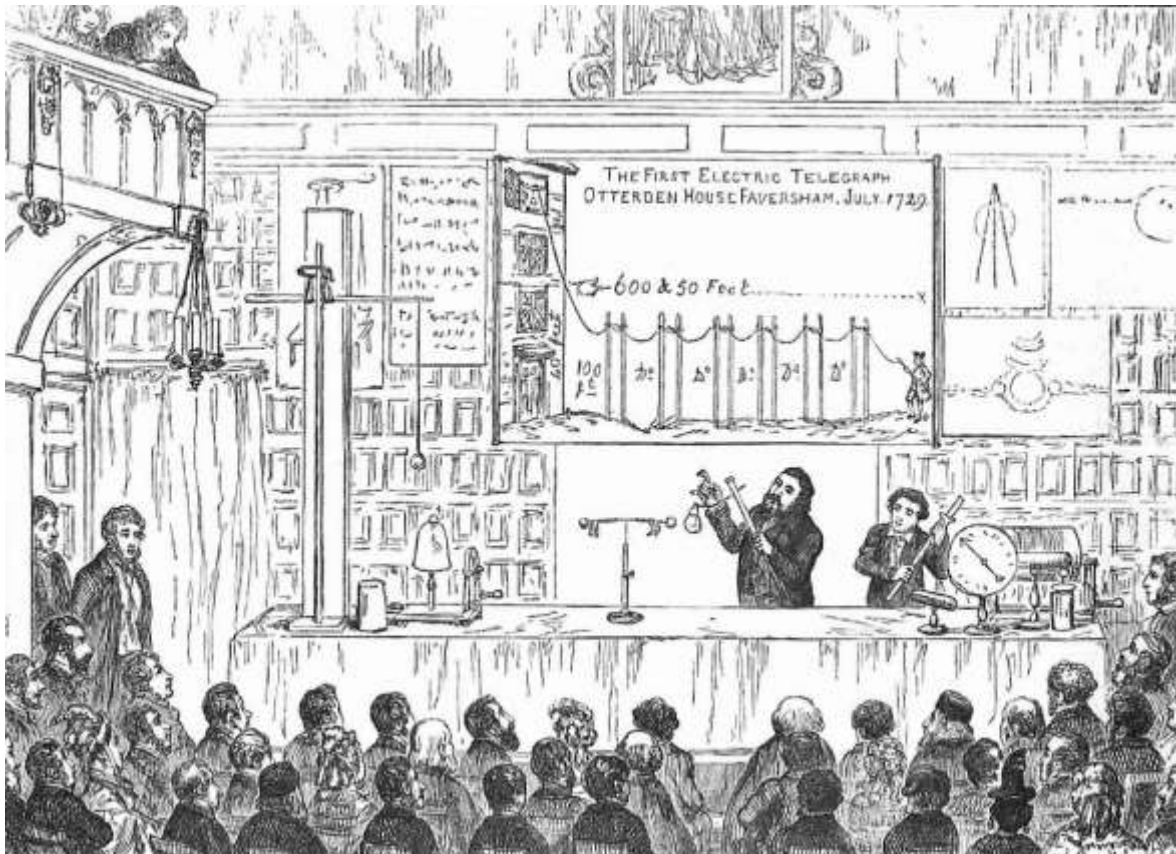


experiment on a servant boy⁸

⁶ see Clark (2001) p24

⁷ see Gillispie (1972) p516 and Clark (1979B) p394

⁸ Elsenaar (2002) p18 who cites original as from Johann Gabriel Doppelmayr, *Neu-entdeckte Phaenomena von bewunderswürdigen Wirkungen der Natur* (Nuremberg, 1774)



experiments with a soap bubble at Otterdern Place 1729⁹

A striking experiment with a suspended boy, supported by insulating cords, showed how the electrically charged human body could attract small pieces of brass leaf.

Recognition of Stephen's scientific work was slow in coming. For 25 years of his life, Gray was studiously ignored by the Royal Society and in particular by Isaac Newton, its President. The reason seems to have been rather petty on Newton's part - Gray enjoyed a close friendship and working partnership with a younger scientist, Rev John Flamsteed, and Flamsteed had disputes with Newton over astronomical observations. The result was that most of Gray's papers during this period went unpublished. The turning point came in 1727 when Newton died and the Presidency passed to Sir Hans Sloane. Gray's papers were accepted for publication, and in 1731 he became the first recipient of the Copely medal, awarded by the Royal Society for 'outstanding achievements in research in any branch of science'. Future recipients were to include household names of science, including Michael Faraday, Charles Darwin, and Albert Einstein. He became a Fellow of the Royal Society in 1733.

What we know of Stephen Gray's life relies heavily on 63 manuscript letters which survive in the British Library, Greenwich Observatory and Royal Society. For several key periods we are unsure where he lived and what exactly he was doing. For a brief period in 1707-1708 he appears in Trinity College Cambridge assisting in astronomical observations. In his 50s he gave up the Canterbury dyeing business and moved to London, where from 1720

⁹ Illustrated London News 1874

onwards he lived as a pensioner in the Charterhouse charity near the modern Barbican. He died in London in 1736 but the place of his burial is unknown. It is possible but unproven that his remains were returned to Canterbury for burial in All Saints church where he had been baptised. No portrait or drawing of him survives - quite possibly none ever existed.

This remarkable man initiated a field of science that later revolutionised all our lives. In his native city he remains almost totally unknown.

BIBLIOGRAPHY

- Atherton, W A (1988), Pioneers I Stephen Gray (1666-1736) discoverer of electrical conduction, in *Electronics and Wireless World*, January 1988
- Clark, H and P H (2001), *Newton's Tyranny*, Freeman and Company New York
- Clark, Dr David, and Murdin, Lesley (1979A), The Rehabilitation of Stephen Gray, in *New Scientist* 24 May 1979
- Clark, Dr David, and Murdin, Lesley (1979B), The enigma of Stephen Gray Astronomer and Scientist (1666-1736), *Vistas in Astronomy*, vol 23 pp 351-404
- Cohen, I Bernard (1954), Neglected Sources for the life of Stephen Gray, *ISIS* 45 (1954) pp 41-50
- Elsenaar, Arthur and Scha, Remko (2002), *Electric body manipulation as performance art - A historical perspective*, Pergamon
- Gillispie, Charles Coulston (1972), *Dictionary of Scientific Biography*, vol V
- no author (1906) Stephen Gray FRS, in *Notes and Queries*, 1906, pp 161-3
- no author (1874) A Lecture at Charterhouse, in *Illustrated London News*, 21 February 1874 p 167
- no author (1977) article on Canterbury ecclesiastical courts (talk by Dr William Urry) in *Kentish Gazette* 7 October 1977