

George Green 1793-1841

George Green was a British mathematician and physicist. He was the first to introduce the term 'potential'. In 1828 he published a paper entitled An Essay on the Application of Mathematical Analysis to the Theories of Electricity and Magnetism, containing what are now known as 'Green's theorem' and 'Green's function'.

Green's theorem relates the *integral of one quantity taken over a volume with another taken* over the surface enclosing that volume. Green theorem is widely applied in the study of the properties of magnetic and electric fields.

George Green was born in Nottingham, England, in 1793. He was the only son of a baker, who was also called George. At the age of eight Green was sent to Mr. Goodacre's Academy in Nottingham. Young George spent only four terms at the Academy before his father set him to work in the bakery. Green's bakery business appears to have prospered. In 1807 the baker built a windmill in Sneinton, a village just outside the town. (The mill still stands and is open to the public). George worked hard as a miller and developed into a strong man.

When Green was thirty, he joined the Nottingham Subscription Library (known as Bromley House), a gentleman's club and the centre of cultural activity. There, George most probably acquainted himself with the books of leading French mathematicians. Five years later he published his famous 'Essay'. There were 51 'subscribers' who each paid seven shillings and six pence for a copy.



Green's theorem is widely applied in the study of magnetic and electric fields

The young George Green worked hard at the windmill. dxdydz U δV + d σU dxdydz V δU + Green's theorem

> After the death of his father, in 1829, Green inherited sufficient money to devote all his time to science. Following the advice of his sponsor, Sir Edward Bromhead, in the autumn of 1833 he went to Cambridge to pursue his mathematical studies in Caius College. It was not easy for a 40 year old man to study together with the young students. Nevertheless, Green finished as fourth 'Wrangler', and was elected to a fellowship of Caius in 1839, by which time he had published 6 more papers in Cambridge and Edinburgh.

> Six months or so after his election, Green took the coach home to Nottingham. He returned with failing health and never recovered; he died at the age of 47.

> Green left a commonlaw wife, Jane Smith, the daughter of his father's mill manager, and seven children. The story tells that Green's father did not approve of the liaison and threatened to disinherit him if he married. But why did he not marry Jane after his father died? Maybe because later Green completely changed his life from that of 'miller' to 'scientist' and thought it unimportant!?

> Green died in obscurity, and apparently his work was soon forgotten by Cambridge colleagues until Lord Kelvin, the famous British physicist, came across a copy of the Essay in 1845 and was so impressed that he arranged for it to be reissued in Crelle's Journal, in Paris. Green's function and theorem soon became useful for the solution of many problems in physics.

Green's mill was restored and opened to the public in 1979.