

James Clerk Maxwell

1831–1879

lems too. In particular, it is not clear whether many of the nice results of the MIT bag for hadronic properties will be lost. A great deal of challenging work lies ahead for both experimentalists and theorists. At question is the whole understanding of atomic nuclei at the microscopic level, but that is the sort of question that Weisskopf and de Shalit had in mind when they instituted this series of Conferences.

Earlier this year saw the centenary of the birth of Albert Einstein. It is highly apt that 1979, which has been marked by further consolidation of the unified theory of weak and electromagnetic interactions and its recognition in the award of the Nobel Prize to Glashow, Salam and Weinberg, is also the centenary of the death of the great Scottish physicist who first formulated a unified theory of electric and magnetic fields. We are grateful to Abdus Salam for drawing our attention to the Maxwell anniversary.

Maxwell's equations might have been called Clerk's equations instead. Maxwell's paternal ancestors had the family name of Clerk, and the name was only changed when the physicist's father inherited an estate, eventually named Glenlair, after marrying a Miss Maxwell.

Maxwell was born in Edinburgh on

13 June 1831, but soon went to live at Glenlair. At the age of ten, he returned to Edinburgh to begin his formal schooling, where his unfashionable clothes and rustic manner were mocked by his schoolfellows. The genius who was to shape much of physics apparently earned the name 'Dafty'.

By fourteen, he had developed a method for constructing geometrical figures which was read as a paper to the Royal Society of Edinburgh. His evident interest in physics led his uncle to introduce him to William Nicol, of prism fame.

Maxwell entered Edinburgh University when he was sixteen, and during this time he worked on the application of optical techniques to the study of elastic solids. This paper was presented to the Royal Society of Edinburgh in 1850.

He entered Trinity College, Cambridge, on the strength of his

Hertz corner at the Deutsches Museum, Munich. It was with this apparatus that Heinrich Hertz discovered the electromagnetic radiation predicted by Maxwell's equation.

(Photo Deutsches Museum, Munich)



And God said:

$$\nabla \cdot \mathbf{E} = \frac{\rho}{\epsilon_0}$$

$$\nabla \cdot \mathbf{B} = 0$$

$$\nabla \times \mathbf{E} = - \frac{\partial \mathbf{B}}{\partial t}$$

$$c^2 \nabla \times \mathbf{B} = \frac{\mathbf{j}}{\epsilon_0} + \frac{\partial \mathbf{E}}{\partial t}$$

—and there was light

College Maxwell supervised an ambitious project for the standardization of electrical units, the forerunner of the system we now use.

Strain and illness began to take their toll, and in 1865 he resigned from King's College and went back to Scotland, there to continue work on his monumental treatise on electricity and magnetism.

At this time, the Cavendish Laboratory was being established at Cambridge. Both William Thomson and Helmholtz were offered the new chair, but declined. It seems bizarre now that Maxwell was only third choice, but his great treatise on electricity and magnetism was not published until two years later.

At Cambridge, he put the finishing touches to his book. Subsequently, he wrote a whole series of short articles and reviews, and edited an account of the researches of Cavendish.

In the summer of 1879 he was working on a new edition of his book when his health gave way. He died of cancer on 5 November 1879, only 48 years old.

published papers. His tutors reported his knowledge as immense, but in an appalling state of disorder. In 1854 he came overall second in the final examinations, beaten only by E.J. Routh (of Routh's Rule for calculating moments of inertia).

He was immediately given a staff position at Cambridge. Released from the pressures of formal examinations, Maxwell threw himself into original work. Geometrical optics and colour vision first occupied his attention, but also at about this time, urged by William Thomson (later Lord Kelvin), he began to take an interest in electricity. In particular, he carefully studied the work of Faraday.

He remarked that while there were mathematical formulations of individual electric and magnetic phenomena, no general theory had been developed.

In 1856, Maxwell became Profes-

sor at Marischal College, Aberdeen. Here he made an epic study of the stability of the rings of Saturn, which led on to important contributions to the kinetic theory of gases.

In 1860, Marischal College was incorporated into the new University of Aberdeen. As there was room for only one Professor of 'Natural Philosophy', Maxwell lost his job. He was also passed over for the chair at Edinburgh, and went back to Glenlair, where he worked on his famous treatise on electricity and magnetism.

He soon found a post at King's College, London, where he came into contact with Faraday. At London, he published many of his most famous papers, including his Dynamical Theory of the Electromagnetic Field in 1864 which included the famous equations. The Dynamical Theory of Gases followed soon afterwards. Also during his five years at King's