James Clerk Maxwell

James Clerk Maxwell, born on 13th June 1831, at 14 India Street, Edinburgh, Scotland, was destined to become one of the 19th century's greatest scientific figures. He died at the early age of 48, on 5th November 1879, but only after he unified electricity and magnetism through his modification to one of the laws of magnetism and predicted the phenomenon of electromagnetic wave propagation, thereby ushering in the field of electromagnetics, defined by the four equations, known as **"Maxwell's Equations."** He put an end to speculation as to the nature of light with his discovery that it is a form of wave motion, by which electromagnetic waves travel through a medium at a speed, which is determined by the electric and magnetic properties of that medium. This is still the basis for explanations of all the phenomena of light and accompanying optical properties. He was unable to test his theory, but the follow-up developments by others have given the world the electromagnetic technologies the impact of which has become so common place in our daily lives in numerous ways.

In 2004, PHYSICS WORLD magazine conducted a poll asking its readers to send their short lists of the greatest equations ever and also asked them to explain why their nominations belonged on the list and why, if at all, the topic matters. They received about 120 responses -- including single candidates as well as lists -- proposing about 50 different equations. They ranged from obvious classics to "overlooked" candidates, personal favorites and equations invented by the respondents themselves. The result was published under CRITICAL POINT in the October 6, 2004 issue.

The Result and Explanation: ***Maxwell's equations of electromagnetism and the Euler equation top a poll to find the greatest equations of all time.*** The article said: Although Maxwell's equations are relatively simple, they daringly recognize our perception of nature, unifying electricity and magnetism and linking geometry, topology and physics. They are essential to understanding the surrounding world. And as the first field equations, they not only showed scientists a new way of approaching physics but also took them on the first step towards the unification of the fundamental forces of nature.

To honor Maxwell, in August 2009 IEEE unveiled a Milestone Plaque on Maxwell's Equations (see front cover image) at his family home, Glen Air House, in Kirkcudbrightshire, Scotland. A second identical plaque was unveiled at King's College, London, where he was Professor of Natural Philosophy.

In the words of Albert Einstein: "*The work of James Clerk Maxwell changed the world forever.*" More tributes by Einstein and other notables are reproduced below from the Web site of the Maxwell at Glenair Trust:

"*One scientific epoch ended and another began with James Clerk Maxwell.*" - Albert Einstein

"*The special theory of relativity owes its origins to Maxwell's equations of the electromagnetic field.*" - Albert Einstein

"*There can be little doubt that the most significant event of the 19th century will be judged as Maxwell's discovery of the laws of electrodynamics. The American Civil War will pale into provincial insignificance in comparison with this important scientific event of the same decade.*" - Richard Feynman

"*He achieved greatness unequalled.*" - Max Planck

"*One of the most penetrating intellects of all time.*" - R.A. Millikan

"*The discovery of electrical waves has not merely scientific interest though that alone inspired it. ... it has had a profound influence on civilization...*" - Sir J. J. Thomson

"*Maxwell's importance in the history of scientific thought is comparable to Einstein's (whom he inspired) and to Newton's (whose influence he curtailed).*" - Ivan Tolstoy

"*...when he crossed the bridge from Astronomy to Physics he left behind him forever the prospect of becoming a great astronomer - but only to become the greatest mathematical physicist the world has seen since Newton.*" - Sir James Jeans

"*Maxwell's equations have had a greater impact on human history than any ten presidents.*" - Carl Sagan