

On the 150th anniversary of the birth of James Clerk Maxwell

From the Editorial Board

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This year marks the 150th anniversary of the birth of James Clerk Maxwell, one of the most outstanding physicists of all time. His contributions to the development of physics are both varied and profound but, above all, his name is linked with the creation of the theory of the electromagnetic field and the formulation of the equations of electrodynamics. He was also one of the founders of statistical physics, and established the statistical distribution which, like the electrodynamic equations, bears his name. His researches in many other branches of physics are widely known. He planned the Cavendish Laboratory and was its first director. In 1931, Einstein wrote that the work of Faraday and Maxwell on electromagnetic phenomena resulted in the greatest changes in the theoretical foundations of physics since the time of Newton. The introduction of the idea of a field as a physical reality was a crucial step in the development of physics. Maxwell was able to bring together and describe in a unified way the phenomena of electricity and magnetism which, until then, had been regarded as essentially different. This tendency of physics to reach an understanding of all the interactions in nature from a common point of view can be seen clearly today in current attempts to unify electromagnetic and weak interactions, and to develop a unified theory of all natural forces.

Maxwell used his electrodynamic equations as a basis for predicting the existence of electromagnetic waves and suggested that light was electromagnetic in nature. Maxwell's theory showed that the velocity of these waves was equal to the velocity of light. This theoretical prediction has been one of the most outstanding achievements in physics. It had an enormous effect on the subsequent development of physics (for example, in relativity) and has led to a huge number of practical



James Clerk Maxwell

applications (one of the first of which was the transmission of radiofrequency signals).

The great creative legacy of James Clerk Maxwell cannot be adequately reflected in a brief introduction. As a gesture of homage to a great scientist, this issue of *Uspekhi Fizicheskikh Nauk* presents a number of papers intended to help the reader to achieve greater familiarity with Maxwell's achievements.

Translated by S. Chomet