



# Maxwell on Molecules and Gases

By James Clerk Maxwell

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**Maxwell on Molecules and Gases** By James Clerk Maxwell

James Clerk Maxwell (1831-1879) is generally considered the most important mathematical physicist in the period between Newton and Einstein. His work, like theirs, exhibits range as well as depth and extends from his grand synthesis of electrical, magnetic, and optical phenomena in the theory of electromagnetic fields to his contributions to the kinetic theory of gases and its generalization into statistical mechanics. *Maxwell on Saturn's Rings* (The MIT Press, 1983) focused on the early work that confirmed Maxwell's scientific promise. The present volume deals with the evolution of Maxwell's overview of atomic and statistical physics and with his work on the kinetic theory of transport phenomena in gases. It includes 92 documents and papers spanning the years 1859-1879. Among these are previously unpublished notes, drafts, and calculations and correspondence with Peter Guthrie Tait, William Thomson (Lord Kelvin), Herbert Spencer, George Gabbriel Stokes, Simon Newcomb, and others. The reader can trace Maxwell's insights from their inception to their fruition in the fully worked-out formal papers and shorter communications to *Nature* that are also included. The documents reveal the stages through which key concepts passed - such as the idea that diffusion, viscosity, and heat conduction in gases are parallel dynamical processes expressed in terms of the transfer of mass, momentum, and energy - and show Maxwell's skill in balancing abstract philosophical generalization with concrete practical detail. The editors have provided a comprehensive introduction that places the material in historical context. A forthcoming volume on thermodynamics and statistical mechanics will conclude their presentation of Maxwell's scientific development. Elizabeth Garber and Stephen G. Brush are historians of science affiliated with the State University of New York at Stony Brook and the University of Maryland, respectively. C. W. F. Everitt is a physicist and historian of science associated with Stanford University.

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### Editorial Review

#### About the Author

Elizabeth Garber is the author of two books of poetry, *Listening Inside the Dance: A Life in Maine Infused with Tango* (2005) and *Pierced by the Seasons: Living a Life on the Coast of Maine* (2004) and a chapbook *The Mayor and Other Stories of Small Town Life* (2007). Three of her poems have been read by Garrison Keiller on *The Writer's Almanac* and *Feastings* was included in his *Good Poems for Hard Times*. As 2007 Poet Laureate of Belfast, Maine, she coordinated monthly poetry readings, and wrote a weekly poetry column published in three Midcoast papers highlighting Maine poets. She is the founder of the Illuminated Sea Press supporting the independent publishing of fine Maine poets, including Baron Wormser, former Poet Laureate of Maine. For six years, she's helped put on The Belfast Poetry Festival including the Poetry and Art Walk. Garber graduated from the Stonecoast Low Residency MFA program in Creative Writing. Her chapter, *Stones*, from her unfinished memoir *The Architect's Daughter*, won the Maine Writer's and Publishers Alliance 2009 Literary Award for unpublished Non-Fiction.

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