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Review : Nitpicking Newton

By **Ray Scott Percival**

Pierre-Simon Laplace. by Charles Coulston Gillispie and others, Princeton, ISBN 0691011850

ONE of the most celebrated mathematical physicists, Pierre-Simon Laplace is often remembered as the mathematician who showed that despite appearances, the Solar System does conform to Newton's theories. Together with distinguished scholars Robert Fox and Ivor Grattan-Guinness, Charles Gillispie gives us a new perspective, showing that Laplace did not merely vindicate Newton's system, but had a uniquely creative and independent mind. He even sometimes criticised Newton: for example, he rejected Newton's assumption that gravitation travelled instantaneously, and calculated its speed.

Given that Laplace was responsible for the clearest statement of scientific determinism—the so-called Laplacian demon, who could predict any future state of the world using Newton's laws, given precise initial conditions—I was surprised to find little on this. But there are revelations for mathematicians, including the history of the Laplace Transform up to its classified use for waveguide design during the Second World War.

Laplace's achievements include a theory of probability, the foundations of statistical inference and the derivation of planetary orbits, shapes and eccentricities. He was as adventurous in ideas as he was conservative in politics. Asked to sign a bill for freedom of the press after the French Revolution, Laplace declined. He always dedicated his work to the current political authority.

He returned to probability later in life to show how it could be applied to the assessment of the reliability of witnesses, and the statistical treatment of meteorological data. With chemist Claude-Louis Berthollet, Laplace contributed to the success of the mathematical approach to physics. After his death, this school disintegrated in the face of assaults by Fresnel's work on the wave theory of light and by Maxwell's failed attempts to understand electricity and magnetism in terms of a mechanical ether.

(One of the authors, Grattan-Guinness, speaks at the Karl Popper Conference on 14 March.)