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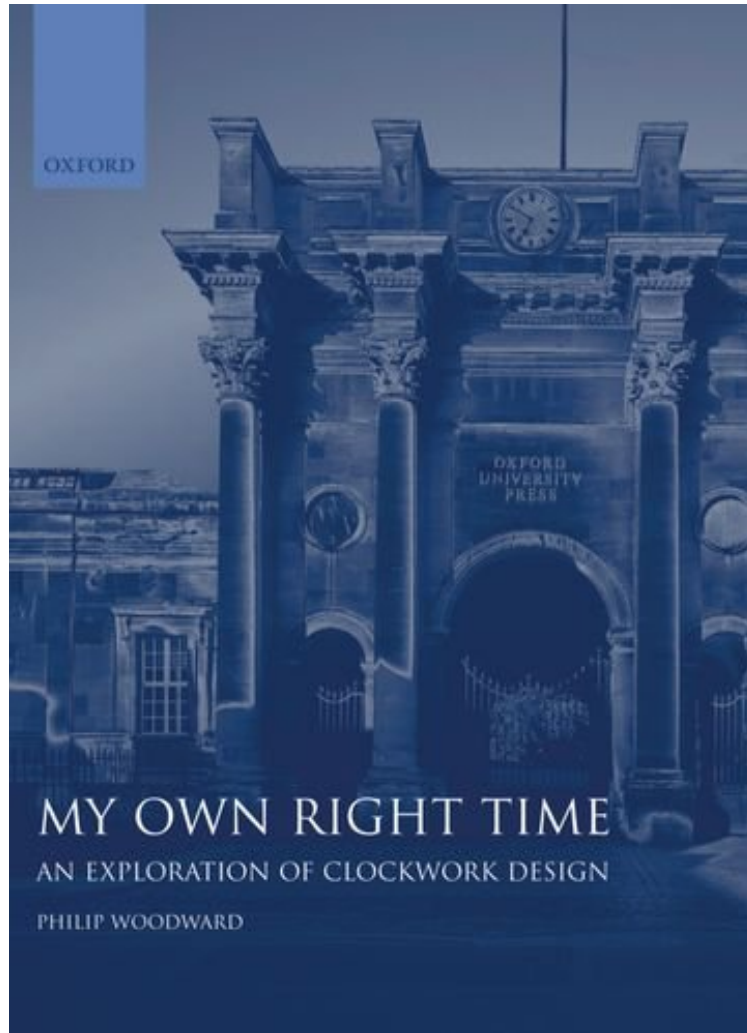
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mechanical trials to design and build the perfect clock. A must read for every horologist. Written like a novel, but containing the information of a first-rate textbook on horological science.

In their most refined form, pendulum clocks keep astonishingly accurate time and are sensitive to the ebb and flow of the tide and even the quivering of the Earth itself. Great inventors such as Galileo, Huygens, and Kelvin devised mechanisms to maintain their even oscillations. Lesser known horologists such as John Harrison, Lord Grimthorpe, and William Shortt, also contributed greatly to the science of time-keeping. By reflecting on his own inventions and achievements, author Philip Woodward gives a highly readable and fascinating history of precision horology before the advent of atomic clocks and the quartz chip that will educate and entertain amateur horologists and scientists and engineers alike.

'... a splendid account... clear and simple words...' Nature, 2 November 1995 'fascinating reading for the horologist who is not totally immersed in traditional designs and concepts ... This is without doubt a book that will be appreciated by the horologist with an interest in precision timekeeping, who wishes to be led through the mathematical and scientific theory of the subject in an informative and stimulating manner. It could open new vistas to those who have to date not given serious thought to this aspect of horology.' Rita Shenton, Clocks, Vol. 18, October 1995 'a story of an obsession. How accurately can a swinging pendulum be made to keep time? This problem led the author to construct several unique clocks, with astonishing results. The delicate and scrupulous operations necessary are illustrated by exquisite drawings.' New Scientist 'he manages in clear and simple words to describe the main types of escapement mechanisms in clockwork right to the latest developments in mechanical art ... we have here a study of great depth of the problems of how to overcome the generally non-conservative damping forces we meet in practice' Paul Foulkes, Nature, Vol. 378, November 1995 'Reading this book, one comes to share Woodward's folly: in a fine clock, his story shows, the clockmaker's pulse beats as strongly as the impersonal drum-beat of time.' The Sciences 'believe me, this book is exciting...' NAWCC Bulletin '... Woodward is a retired professional mathematician with a most unusual talent - he can make his work understandable. This he has achieved not only by his clarity of expression and precision of language, but also by his careful use of analogies and excellently presented and captioned figures.' NAWCC Bulletin '... this book should become one of those relatively few texts which become classics in their field' NAWCC Bulletin

From the Back Cover The pendulum is a constant source of interest to scientists. Great and well-known inventors such as Galileo, Huygens, and Kelvin all devised mechanisms to maintain its even oscillations. Others such as John Harrison, Lord Grimthorpe, and William Shortt are known only in horological circles but contributed as much or more over three centuries. By writing a personal account of his own inventions and achievements in horology the author involves the reader in the history of precision time-keeping before the advent of quartz crystals and atomic clocks. Escapements, the mechanisms that drive pendulums, are a delight to the geometrical mind as well as a delicate and subtle challenge to the mechanical engineer. In their most refined form pendulum clocks not only keep astonishingly accurate time but are also sensitive enough to detect the ebb and flow of tides and even the ceaseless quivering of the Earth itself.

About the Author An amateur horologist and retired Applied Mathematician, for many years Philip Woodward led the mathematical research team at the Royal Radar Establishment in Malvern.