Review for *Technology and Culture* of Bruce J. Hunt, *Pursuing Power and Light: Technology and Physics from James Watt to Albert Einstein* (Baltimore: Johns Hopkins University Press, 2010). Pp. I+182 $45.00/$20.00

This short but excellent book provides a history of science and technology intended for undergraduate students, and is well-tailored to explore how technology relates to physical science.

This is not a survey text, although it is at least as accessible as one. It focuses on the nineteenth century and on domains that overlap both technology and physics. Bruce Hunt argues that during that century new technologies and knowledge transformed human powers and daily life, and also introduced a new relationship between science and technology.

The book explores two extended cases, illustrating the complex relationship between science and technology and problematizing whether technology is merely 'applied science', or whether, on the other hand, science is more frequently a by-product of the demands of new technologies. The first case is the steam engine, and its relationship to heat and energy; the second is the telegraph, and the study of electrical currents and waves. Hunt discusses these technologies to explore how they entwined practice with novel concepts to influence the development of physics.

The writing style is straightforward and accessible without being patronizing for the intended readership. There is a good mixture of technical detail – e.g. differences between steam pump designs – and scientific concepts. For the Savery steam pump, for example, the author is able to sketch the operating procedure (a sequence of valve openings to admit water and steam), the required skills (putatively attainable by a 13 year old boy in half an hour), the speed (at best about four cycles per minute, and heavily dependent on the busy operator) and the spectacle (spurting some 40 feet in the air in London demonstrations). Similarly, in describing James Watt's design two generations later, Hunt emphasises that University of Glasgow professor Joseph Black provided not just advice on latent heat, but also an equally important loan for Watt to develop his design, and that Watt's progress was guided by his own experimentation. Such descriptions bring the technology to life and embed the subject in its wider social context.

About twenty illustrations, some reproduced from the original papers and texts, clearly show apparatus, diagrams and the occasional graph, map and lithograph. The brunt of explanation, though, is carried by the flowing narrative. The more abstract concepts, such as engine efficiency, entropy and ether, are discussed without equations (except for brief displays of entropy relations and Maxwell's equations) but nevertheless in a style that enables a good grasp of the essential points. About half a dozen footnotes per chapter (supplemented by a thorough Further Reading section) cite a wide range of well-chosen sources, ranging from primary published texts to recent historical journals.

Coverage moves to France via Laplacian physics and Sadi Carnot's engineering mechanics; the multiple contributors to the concept of conservation of energy and kinetic theory; developing explanations of electricity; commercial telegraphy; electromagnetism; electric power; and, at the beginning of the twentieth century, ray phenomena.

Throughout the book engineers, scientists, their environments and products are well represented. A recurring theme is the contention surrounding most technological and scientific innovations. William Thomson (Lord Kelvin) receives considerable coverage, first relating to the conservation of energy, and later for improvements in telegraphy. Similarly James Clerk Maxwell makes dual appearances in relation to kinetic theory and electromagnetism, as do his followers. But patents, applications, engineering training and institutions also vie for attention. Capping this refreshing balance is an epilogue devoted to Albert Einstein's work while a patent clerk, with insights "rooted... in the practical technologies that brought the world power and light" (p. 167).

The book is valuable in allowing undergraduates to examine the interface between technology and physics by focusing on arguably its two most important nineteenth century subfields. It provides a happy medium between the broad but cramped coverage of an introductory survey, and the deep but inaccessible coverage of a monograph. Its selective and careful coverage nevertheless deals with one of the most general questions of our field: the relationship between technology and science or, as Hunt puts it, between 'doing' and 'knowing'. Best of all, it portrays the seamless connections between the technical, economic, social and professional dimensions. As a means of introducing and enthusing undergraduates, it is much to be recommended.

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