

Heavy Water and the Wartime Race for Nuclear Energy by Per F Dahl, Institute of Physics Publishing 0 7503 0633 5 (£35).

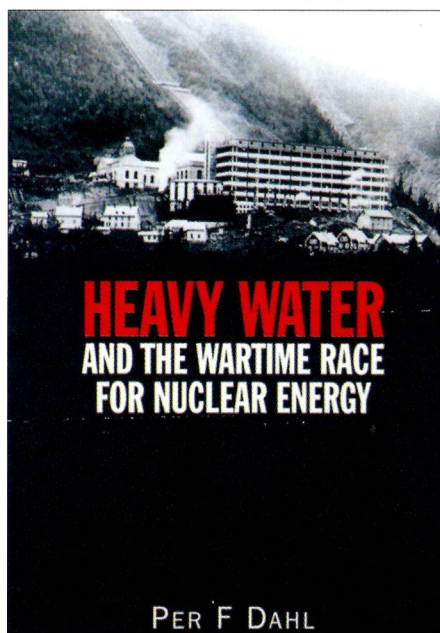
Per Dahl is a physicist who has made significant contributions to the design and development of superconducting magnets for particle accelerators. He also has a burning interest in the history of modern science. It is not surprising that he has already written a book on the history of superconductivity (1992 *Superconductivity: Its Historical Roots and Development from Mercury to the Ceramic Oxides* American Institute of Physics).

Continuing on his history beat, Dahl is also the author of *The Flash of the Cathode Rays* (1997 Institute of Physics Publishing). Advertised as a history of J J Thomson's electron, it is in fact a careful documentation (with nearly 100 pages of footnotes) of many other developments in fundamental physics, from time immemorial up to the early 1930s, where the book stops. Dahl is also the son of CERN pioneer and colourful Norwegian scientific personality Odd Dahl (1898–1994).

In Dahl's new book, heavy water is the hero of a saga that unfolds where Dahl's previous book left off, and it continues up to 1945. In the early 1940s, just after the discovery of nuclear fission, many people were convinced that heavy water was the key to new nuclear physics progress. With little of the substance around, attention was soon focused on Norway, which had an abundance of hydro-electric power for manufacturing processes.

With the outbreak of the Second World War, both sides were eager to get a supply of heavy water and to prevent it from falling into enemy hands. In 1940 the French cornered 185 kg of Norwegian deuterium, which was spirited to Paris via the UK in an elaborately planned operation. With the invasion of France, the heavy water had to be smuggled out again. It eventually found a temporary home in Windsor Castle, England, before being used in wartime Cambridge and then in Montreal, with Lew Kowarski and Hans von Halban playing leading roles.

In 1942 and 1943, allied commando raids and air strikes on the heavy-water plant in occupied Norway attempted to put the factory out of business. This culminated in the famous 1944 Norwegian Resistance operation, which intercepted a ferry carrying tons of deuterium-rich material *en route* to Germany and sank it in Lake Tinnsjø. Eighteen lives were lost. In 1965 the episode was made



into a film called *The Heroes of Telemark*, which starred Kirk Douglas.

Dahl manages to combine scientific accuracy with a compelling storyline that keeps the pages turning. Like his cathode-ray book, the volume is meticulously researched, particularly with regards to Norway (although this time the footnotes have been abridged to a mere 57 pages). It is a remarkable read. Gordon Fraser, CERN.

Handbook of Accelerator Physics and Engineering edited by Alexander Chao and Maury Tigner, World Scientific ISBN 981 02 3500 3 (hbk £58, pbk £32).

World Scientific approached Alex Chao some four years ago and asked if he would be willing to do a book for them. Chao had the idea for some sort of handbook and got in touch with me to ask if I would be interested in joining him. In the course of making that decision we explored many ideas. One approach was that we should write it ourselves. The other route involved trying to convince the real experts in the community to share their wisdom.

It soon became clear that the only economically feasible way of carrying this out was as a community project and a labour of love. No book royalties could possibly repay the kind of effort that would be required of more than 200 authors.

A key feature is that the money goes to the two accelerator schools (at CERN and in the US) for fellowships for students from institu-

tions that are unable to support them. I'm sure this made the difference to many of the authors who toiled after hours and on weekends to meet our strict deadlines.

Having decided to go that way, we compiled a "straw man" table of contents and sent it around to many of those that we hoped would contribute, together with suggestions on which topic(s) we hoped they would write on. To our great joy and surprise, most agreed and we were off.

We tried to be very precise about the level, style and length of articles and, by and large, the authors entered into the spirit of the thing. Even with the best of wills, however, it was impossible for everyone to keep to their space allotment and we had an enormous amount of work to help the authors cut back.

Space was felt to be very important as we insisted that the book should be portable in emulation of previous outstanding examples. Other considerations included uniform notation and style (at which we were only partly successful). The final text is about half the total of the original submissions.

Naturally, now that the work of four years and thousands of person-hours has borne its fruit, we have had many suggestions for improvement. Some of these suggestions and corrections have already appeared on a special Web page.

Maybe someday there will be another edition in which all of these contributed ideas and corrections can be incorporated. At any rate, we profoundly hope that the book will prove useful and stand as an example of the underlying unity of our community and what can be done when there is a will.

See "www.wspc.com.sg/books/physics/3818.html" for more information. Maury Tigner.

Elementary Particles and the Laws of Physics by Richard P Feynman and Steven Weinberg, Cambridge University Press, ISBN 0 521 658622 4 (110pp, pbk £9.95/\$11.95)

The text of the 1986 Dirac Memorial Lectures, long available as a slim hardback, is now available in paperback. Feynman dismantles field theory to find the real reason for the existence of antiparticles, then puts the theory together again. Weinberg's compelling prose "Towards the final laws of physics" examines how quantum physics can be reconciled with gravity. Over a decade later, the messages in these lectures remain fresh.

The New World of Mr Tompkins

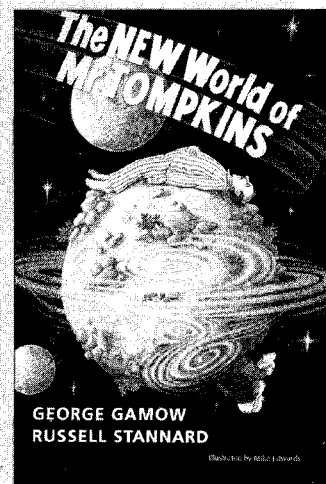
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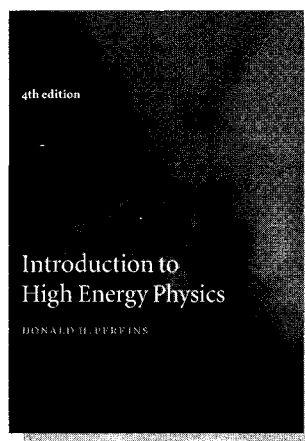
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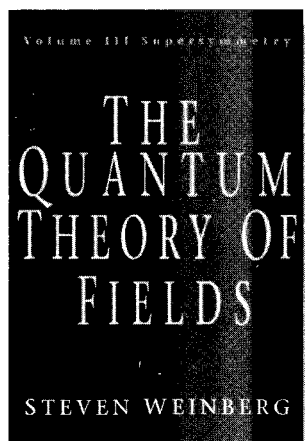
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