

Eugene N. Parker's *Cosmical Magnetic Fields* (Oxford U. Press, 1979), and *Lectures on Solar and Planetary Dynamos*, edited by M. R. E. Proctor and A. D. Gilbert (Cambridge U. Press, 1994).

Solar and Stellar Magnetic Activity is highly recommended for solar-stellar graduate students, for solar physicists wanting to learn more about other stars, and for stellar astronomers who are unfamiliar with recent developments relating to our Sun.

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Laser: The Inventor, the Nobel Laureate, and the Thirty-Year Patent War

▶ Nick Taylor
Simon Schuster, New York, 2000.
\$27.50 (304 pp.).
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The brief title, *Laser*, is not descriptive of the contents of Nick Taylor's book. The extended title, *Laser: The Inventor, the Nobel Laureate, and the Thirty-Year Patent War*, doesn't quite do it either. The contrast between the motivation of the inventor, R. Gordon Gould, and the scientist-scholar and Nobel laureate, Charles H. Townes, is emphasized throughout this book. But the book's main purpose seems to be to tell the story of the life of Gould—one piece of the laser story remaining to be told.

Joan Lisa Bromberg wrote a well-balanced, scholarly account of laser history, *The Laser in America* (MIT Press, 1991). The life story of Townes is readily accessible in two recent autobiographical volumes, *Making Waves* (American Institute of Physics, 1995), and *How the Laser Happened* (Oxford U. Press, 1999). They carry the main historical line very well. But it is interesting and important to augment the historical perspective with Taylor's account. It is not a scholarly work, but is rather a fast-moving story of the life of Gould, the inventor of the laser, who, in his mid-thirties, was an older-than-average graduate student at Columbia University in the mid-1950s. Gould was working on a doctoral thesis involving optical pumping of thallium atoms, under the supervision of Polykarp Kusch.

In November 1957, Gould had his original ideas about a laser, a word he first coined at that time, and of many possible applications of such a device.

He had those ideas witnessed and notarized. He quit Columbia University in the spring of 1958 without obtaining a doctorate and joined forces with a small research company known as TRG. On the basis of Gould's ideas, TRG obtained a major research contract from the Advanced Research Project Agency to develop one or more types of lasers. This project was classified because of the laser's many potential military applications. On the basis of Gould's previous involvement with communist ideas, mainly inspired by a former girlfriend, he was denied security clearance and effectively barred from working on his own invention.

The story continues with a somewhat bewildering array of venture capitalists, patent lawyers, and several companies intent on purchasing Gould's patent rights. Gould was never embittered by the lack of recognition, but he firmly believed in his invention and continued, over three decades, to fight for financial remuneration. He managed to remain actively employed, first at the Brooklyn Polytechnic Institute and later with a small technology company. He enjoyed sailing and traveling. The description of a succession of female friends and wives provides a welcome break from the continuous string of legal and financial issues. The later court proceedings, during which Townes and Peter Franken appeared as witnesses, are described in some detail. It must have been a source of great satisfaction to Gould that, at age 80, he could celebrate, with his early colleagues from TRG, both his final patent-court victories and the publication of Taylor's book.

The book is easy to read, if one is not perturbed by a number of obvious inaccuracies. On page 40, one reads, for example, "The American Physical Society, a sort of Royal Academy for physicists. . . ." On page 51, it is stated that James Gordon, Herbert Zeiger, and Townes published the first successful operation of their ammonia beam maser in *Physical Review Letters*. Actually it was a letter in *Physical Review* of 1954; *Physical Review Letters* was started several years later. There is a one-liner on I. I. Rabi on page 41 that reads, "Rabi was short, about fifty-two, but in no other way was he diminutive." One wonders what is so diminutive about that particular age.

Other well-known scientists who played a role in laser history are mentioned briefly, but usually not more than a few random tidbits are provided.

And it seems odd to me, at least, that I was unable to find even one tidbit about my own electromagnetic pumping patent on the three-level maser. The book is aimed at a wide general audience interested in the scientific endeavor and in the social, human, and legal aspects of the pursuit of patents. Laser specialists, physicists, and other scientists will also enjoy reading the story of Gould, which simply had to be told.

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An Introduction to Turbulent Flow

▶ Jean Mathieu and Julian Scott
Cambridge U. Press, New York,
2000. \$90.00, \$39.95 paper
(374 pp.). ISBN 0-521-57066-2,
ISBN 0-521-77538-8 paper

Some 20 years ago, an instructor of a turbulence course had a limited choice of textbooks. Even the selection of monographs that could be used to supplement one's notes was not very large. Now a number of books are available. I count that number to be between 20 and 40, depending on how generously I include some special-purpose books. One explanation is clearly that this vast subject is getting further attention because of the strengthening of its ties to mainstream physics and modern mathematics.

Turbulence has excited—though sometimes only fleetingly—the interest of diverse groups of people, ranging from field theorists to practicing engineers, and it is no longer possible to include in a single book all the major developments that have resulted from this interest. Another intrinsic reason for the multiplicity of books is that consensus regarding the significant and essential topics does not exist among those familiar with the field. Different books, emphasizing different aspects of the subject that are at different levels of maturity, are therefore an inevitable consequence.

The authors of *An Introduction to Turbulent Flow*, Jean Mathieu and Julian Scott, have had extensive research and teaching experience in turbulence at their home institution (L'Ecole Centrale de Lyon) and elsewhere. They have drawn on that experience to produce a textbook meant primarily for graduate students in engineering, applied science, and applied mathematics. Their aim is to provide the students with solid grounding in physical ideas, orders of