Book Reviews

A 19th-Century Figure

Mary Somerville and the Cultivation of Science, 1815–1840. ELIZABETH CHAMBERS PATTERSON. Nijhoff, The Hague, 1983 (U.S. distributor, Kluwer Boston, Hingham, Mass.). xiv, 264 pp. $39.50. International Archives of the History of Ideas, 102.

As the title suggests, Elizabeth Patterson's *Mary Somerville and the Cultivation of Science, 1815–1840* supplies both an account of the work of a remarkable science expositor and a description of largely uncharted parts of the early 19th-century scientific landscape. Anyone concerned with certain other general issues, such as how women gained entry into the inner scientific sanctum or the popularization of science, will also find much of interest in this book.

By thoroughly mining archival and published sources, Patterson paints a detailed portrait of this fascinating Scotswoman who explicated Laplace's system of the world to an English-speaking audience in her *Mechanism of the Heavens* of 1831. Somerville was systematically discouraged from intellectual pursuits by her family and friends. Her second marriage—to her cousin William, an unremarkable medical doctor—presented the first opportunity for her theretofore clandestine study of mathematics and physical science to flourish openly. Even then, Somerville had to sandwich scientific writing between the incessant demands of a busy domestic life and myriad social obligations. Nevertheless, her career blossomed in the fluid, "companionable" scientific circles of London, where learned societies, scientific soirées, and the homes of fellow practitioners were within easy walking distance. With the support of the astronomer J. F. W. Herschel and others, Somerville produced another major treatise, *On the Connection of the Physical Sciences*, in 1834. This "scientific bestseller" went through nine editions and 15,000 copies in her lifetime alone. In William Whewell's review of this work for the *Quarterly Review* the term "scientist" was first coined.

Besides treating Somerville's life and works, Patterson captures the spirit of the stimulating intellectual coterie that nurtured and sustained her. Somerville served as a striking refutation of Charles Babbage's polemic on the decline of science in England, exemplifying the accomplishments of unfettered individualism working without remarkable means. Although she became the darling of the reformist party in British science, only the Continent could attract Somerville away from London high scientific society. She never blessed the British Association with her presence, despite persistent annual invitations from the provincial philosophers.

Patterson also draws a rich comparison of national scientific styles when she describes Somerville's periods of residence in France, where *salon* society was not nearly so receptive to female intellectual attainment. Readers will find other tangential remarks intriguing as well, such as Patterson's discussion of the Scottish contribution to London intellectual life, the politics surrounding the award of a civil pension, the sorry state of English scientific libraries at the time, and the intricate system of editing scientific publications that prevailed during the early 19th century. Because of all the author accomplishes in a work of ostensibly narrow scope, both scholars and lay persons will enjoy reading this book.

SUSAN SHEETS-PYENSON
Science and Human Affairs Programme, Concordia University, Montreal H3G 1M8, Canada

Recollections of Physics

Haphazard Reality. Half a Century of Science. HENDRIK CASIMIR. Harper and Row, New York, 1983. xii, 356 pp. $20; paper, $7.95. Alfred P. Sloan Foundation Series.

The prominent Dutch industrial physicist Hendrik B. G. Casimir joins a growing number of well-known physicists who have generously published their memoirs in the last few years. Others recently moved to memoir include O. R. Frisch, V. F. Weisskopf, W. M. Elsasser, and R. Peierls. All these individuals belong to the generation of physicists that entered the profession during the "golden age" of contemporary physics in the late 1920's, and, though each is outstanding in his own right, none can probably be numbered among the handful of leading physicists of this century.

Casimir's memoirs, as do those of his colleagues, reflect those common factors. Compared with the autobiographies of, say, Planck or Einstein, these scientists' memoirs are much less introspective, deal much less with their own years of "striving and struggle" (Einstein) in physics, and concern almost exclusively their encounters with others and their experiences of the great moments of physics. The authors are quite conscious of having been participants in and observers of a great and bygone era of physics—an era when physics was pursued by a small band of highly select, eccentric young enthusiasts who knew and worked closely with everyone else in the field, and who thus shared a kind of excitement, camaraderie and naïve optimism that survives today perhaps only in the memories of elder statesmen.

Casimir's aim is to set his memories of past encounters on paper for the benefit of younger physicists and lay readers. His memory fastens, however, not only upon physics but upon humorous anecdotes. These may appear trivial and insignificant, he writes, "yet they are important to me because they form part of one great impression that has enriched my life" (p. 89). This is no doubt true, but the emphasis upon anecdote—indeed upon getting the anecdote *right*—suggests that more is at stake here than mere memory. Casimir borrows from Frisch in speculating that the wealth of anecdotes indicates that physics demanded of the sheltered, well-to-do "youngsters" who entered the profession a childlike curiosity that fostered memorable adolescent behavior. Beyond this, the many jokes and pranks indicate an individualism, a disdain for convention, a youthful rebellion against father figures (to wit Bohr) that is all but lost in today's profession of team research, megabuck projects, and weapons of mass destruction. Thus, what better way to convey the pristine innocence and joy of the bygone golden age than through the carefree humor of legendary, youthful innocents?

Casimir was born into an upward-bound academic family in 1909, studied theoretical physics with Ehrenfest, Pauli, and Bohr, taught in Leiden, joined the Philips Laboratory in 1942, survived the World War II occupation of Holland, and advanced to the board of directors at Philips, from which he retired in 1972. His memoirs appear in the Sloan Foundation series of scientific memoirs, initiated with the admirable aim of making science more accessible to lay readers.

The humorous anecdotes on physics before the war convey in this regard a sense of the human side of science; Casimir's essays "Industry and science after the Second World War" and "The science-technology spiral" contain much hard-learned wisdom. One wishes, however, for temporal extensions of both: more about the human side of industrial science after the war, more reflection upon physics and society before and during the war. Casimir apologizes for not fulfilling the first wish: a generation should pass before names are mentioned (or are industrialists less prone to adolescent pranks?). His intriguing chapter on physics in occupied Holland—the only country in which students and faculty struck the universities upon the dismissal of Jewish colleagues—helps to satisfy the second wish. Yet more remains to be known. Passing remarks about Pascual Jordan's Nazi collaboration, about genetics and intelligence, and about "mass murder" weapons (atomic bombs?) are simply too sketchy to allow full comprehension.

Aside from the numerous anecdotes, Casimir actually does write about such informative (and sometimes equally amusing) topics as the nature of the physics profession when he entered it, the pedagogy of his three outstanding teachers, and the expected career opportunities (mainly in secondary school teaching). There are also informative technical appendixes on physics in the '30's as he recalls it. Yet, again, more could be said. There is, for instance, little account of his own research, such as his best-known work on van der Waals forces.

Historians of science will thus desire much more, but physicists and lay readers will nevertheless join them in their immense enjoyment of this personal encounter with a prominent physicist and with the world of physics as he remembers it.

DAVID C. CASSIDY
Einstein Project, Princeton University Press, Princeton, New Jersey 08540

Neoplasia

Chromosome Mutation and Neoplasia. JAMES GERMAN, Ed. Liss, New York, 1983. xxxiv, 452 pp., illus. $96. The Chromosomes Series.

Chromosome Mutation and Neoplasia is the second volume in the Chromosomes Series. The first volume, *Chromosomes and Cancer* edited by German, was published in 1974 and was a success. The new volume is based on the proceedings of a meeting held in New York in 1980 on chromosome breakage and neoplasia, with material added to give improved coherence to the subject, especially in the light of the enormous advances made in the past two years in understanding oncogenes, their chromosomal localization, and their likely role in chromosome translocations in tumors.

The volume is divided into two sections, the first consisting of a straightforward clinical description of inherited disorders in humans that predispose to cancer. These include Bloom's syndrome, ataxia telangiectasia, xeroderma pigmentosum, and Werner's syndrome. These chapters are quite thorough reviews for newcomers to the field but do not offer any new information. A chapter by B. P. Alter and N. U. Potter on Fanconi's anemia is the exception here. The rest of the section offers useful and comprehensive reviews of both the patterns of neoplasia associated with the chromosomal breakage syndromes and the well-known unusual sensitivities of various disorders to different environmental agents.

The second section tries to describe the importance of genomic change in neoplastic development. There are chapters on the effects of ionizing radiation, various chemicals, and viruses on chromosomes, all subjects that have been well reviewed previously. The remainder of this section attempts to provide continuity with the first section on the subjects of inherited chromosomal disorders and specific chromosomal changes associated with various tumor types. R. Sager, J. German, and R. S. K. Chaganti in separate chapters reiterate various schemes for the origin and progression of malignancy. The various postulated steps to malignancy, including generation of genetic diversity by damage to the genome, the production of specific chromosomal translocations, oncogene activation, and specific target cell involvement all are mentioned. Sager's chapter is more general, being partly a review of other work on transposable elements. German and Chaganti speculate more directly on the significance of the quite different chromosome abnormalities associated with Bloom's syndrome and ataxia telangiectasia respectively. Both chapters are thought-provoking. There is a paucity of comments on the significance of chromosomal changes in Fanconi's anemia, and both xeroderma pigmentosum and Werner's syndrome are lost to view. Of course, these chapters in some ways attempt what at present is impossible, to understand the relation to cancer development of chromosomal changes observed experimentally or clinically.

Clearly there are some irritations in a book like this. The main ones in my view are a degree of repetition throughout, the unequal treatment of the significance of the chromosomal changes in the different disorders, and the fairly superficial homage given, in what must be an added chapter, to recent developments concerning oncogenes and their involvement in chromosomal translocation.

Overall, however, the book is a worthy successor to *Chromosomes and Cancer* and is to be recommended as an attempt to bring together the chromosomal and molecular levels of study. The printers have included their own joke by getting pp. 338 and 339 out of sequence in the chapter on genomic rearrangements.

The subject is advancing rapidly, and it is to be hoped that we do not need to wait a further decade for a third volume. This might include both a review section and a section of recent experimental results by some new contributors.

A. M. R. TAYLOR
Department of Cancer Studies, University of Birmingham Medical School, Birmingham B15 2TJ, England

Plants and Pollinators

Handbook of Experimental Pollination Biology. C. EUGENE JONES and R. JOHN LITTLE, Eds. Scientific and Academic Editions (Van Nostrand Reinhold), New York, 1983. xviii, 558 pp., illus. $46.50.

Although pollination biology may seem to be a quite circumscribed and specialized subject, its study encompasses an amazing diversity of approaches. Plant-pollinator systems can be used as models for studying problems of plant genetics, plant reproduction, ecological chemistry, foraging behavior, species interactions, coevolution, and community ecology. The last 20 years have seen an explosion of such studies on pollination biology, and, as in any rapidly growing field, some areas have advanced considerably in isolation from others. This *Handbook of Experimental Pollination Biology* provides a timely and valuable compilation of recent research advances in these diverse areas.

Despite what the title implies, the book goes beyond being a manual of methodologies, although techniques for the analysis of color perception, floral pigments, and fragrances are covered. Some of the 29 papers in the volume