

birthday, he nevertheless acquired sufficient scientific knowledge for his work by reading, attending public lectures and through tutoring by Elihu Robinson of Eaglesfield and John Gough of Kendal. His first major work in meteorology was inspired by these men. In trying to understand his observations on the structure of the atmosphere he was led to the law of partial pressures and subsequently to his theory of atoms and how they combine. Whereas Lomonosov enlarged on a physical theory of atoms, Dalton developed a chemical theory of them. Although Dalton made outstanding contributions to science, "neither was he a gifted experimentalist nor had he refined equipment at his disposal" according to one author. Throughout his life he struggled on a meager income from teaching elementary science and mathematics and from poorly attended subscription lectures.

Mrs Patterson's attention was first

tures that Brewster had attended Dalton was invited to give a second series straightway? Brewster went on to say: "... but the originality and importance of his views, the clearness with which he explained them, and the singularity of a humble, and at that time unknown, member of the Society of Friends coming to enlighten the philosophers of Modern Athens, gave an interest to his lectures which they would not otherwise have possessed."

The picture of Dalton Mrs Patterson would like us to believe is that of a self-made humble man who was "uncompromisingly independent" and hard-working; but kind, loving and in many ways lovable. He was meticulously prompt, simple in tastes, provincial in character but an habitual smoker of tobacco. Ordinarily, he adopted the Quaker habits of simplicity in dress, evenness of living and forbearance, but he bought himself an umbrella, the sign of a dandy, before leaving home for Kendal, had an audience with the Queen and accepted an honorary doctorate from Oxford in colorful scarlet robes (he was red color blind and therefore scarlet to him was as dull as green grass!). In spite of his lowly position, Dalton received many honors and was highly respected by his fellow Mancunians, as Mrs Patterson is fond of labeling the citizens of Manchester where Dalton lived from 1794 until his death in 1844.

The *Biography of a Natural Philosopher* does go beyond "the mere facts of Dalton's life to a consideration of social, economic and scientific environments, and the interplay between the man and his science." Numerous notes and references are placed at the end of the book rather than in footnotes; the notes contain useful explanations or expansions of material in the text.

Allen L. King

Dartmouth College, Hanover, N.H.



LOMONOSOV

directed to Dalton by "an insufferable smug remark appearing some years ago in a physics textbook" to the effect that he, "a clumsy and untrained rural meteorologist had in some still amusingly inexplicable way stumbled upon the atomic theory and unearned minor fame." Her detailed attempt to vindicate Dalton is rather dull reading at times, occasionally repetitive. There is justification for her concern. How does one reconcile Brewster's assessment: "As a lecturer Dalton did not shine. The homeliness of his manner—ungraceful, and even repulsive—the simplicity of his apparatus [his balance was not encased], and the awkwardness with which he used it, were not calculated to rivet the attention of his audience" with the fact that immediately after completing the series of lec-

Progress in Materials Science, Vol. 13

B. Chalmers, W. Hume-Rothery, eds.

404 pp. Pergamon, New York, 1969. \$17.00

The great emphasis on research in all the main countries of the world created such an increase in the flow of scientific articles in the last decade that it seems impossible for one person to follow in detail all the new developments even in one special branch of science. *Progress in Materials Science* tends to give a summary not only of the newest developments, but also to make connections with the facts known before. Thus, each of the seven articles in vol-

ume 13 is terminated by a long list of references.

The articles in the volume, mainly devoted to metal physics, are of very different nature: for example "Binding of solute atoms to dislocations" by Nicholas F. Fiore and Charles L. Bauer is theoretical, while the article of H. J. Axon on "The metallurgy of meteorites" gives simply a description of the results of meteorite investigation, with a more detailed analysis of iron meteorites. There is also an article by the late William Hume-Rothery which explains the Engel-Brewer theories of metals and alloys as well as possible. The volume is useful as it also contains three articles on the mechanical properties of crystalline materials and one on crystalline-structure determination by electron diffraction (by J. M. Cowley of Melbourne). The book makes a good impression.

M. E. Straumanis

University of Missouri-Rolla

Physique 1 Mécanique Physique des Particules

By M. Balkanski, C. Sébenne

415 pp. Dunod, Paris, 1970. 39 F

One of the problems facing an instructor of general physics is convincing the biology majors and the premeds in the course that physics is a "relevant" part of their curriculum. An effective approach is to enrich the lectures and assignments with applications from life sciences—for example, Hill's law of muscle action, centrifugation of red blood cells or the effects of weightlessness. According to its preface, the book under review "addresses itself particularly to students in their first year of medical studies." Accordingly, one would expect to find in it a great deal of such illustrative material. From this point of view this text is a disappointment. The authors completely ignore the fact that their clientele is medically oriented—not the slightest effort is made to cater to these students' special interests.

The above remarks are not meant to imply that anything is wrong with the presentation of physics as such. The approach is cogent, explanations are lucid, and there is a good collection of problems at the end of each chapter. The book constitutes volume one of a two-volume set. The subject matter of the first volume is "physics of particles" while that of the second is "physics of waves." The first 76 pages of the book provide a review of the mathematical tools used in the book; they include a great deal of calculus. The next 150 pages are devoted to standard topics of statics, kinematics and dynamics. Chapter 5 (pages 240–324) on statistical

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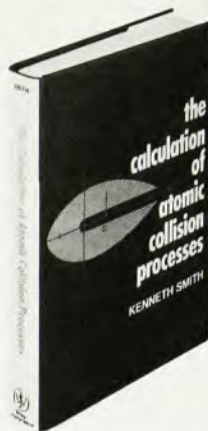
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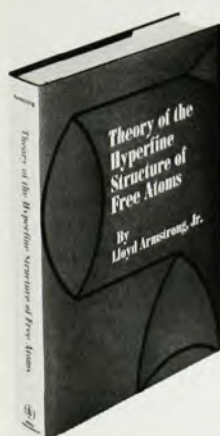
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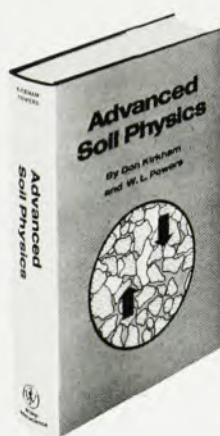


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Foreword by William T. Holser

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January 1972, about 330 pp., \$19.50

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December 1971, about 285 pp., \$18.50

Second Edition

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1969, 379 pp., \$11.50

ELECTRON MICROSCOPY IN MATERIAL SCIENCE

Center for Scientific Culture "Ettore Majorana", 1970 International School of Electron Microscopy, a NATO Advanced Study Institute Sponsored by CNR-MPI, Erice, April 4-18

editor: U. VALDRE

CONTRIBUTORS: P. B. HIRSCH: Opening Lecture. A. SEPTIER, R. CASTAING, A. V. CREWE, U. VALDRE, A. KUBLER: Electron Optics and Instrumentation. A. HOWIE, R. GEVERS, L. M. BROWN, M. J. MAKIN, M. J. GORINGE, C. R. HALL: Diffraction Contrast and Applications. F. LENZ, F. THON, A. C. VAN DORSTEN, C. R. HALL, R. H. WADE, and D. WOHLLEBEN: Transfer of Image Information and Phase Contrast.

1972, about 700 pp., in preparation

ACADEMIC PRESS  NEW YORK AND LONDON
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Solar wind effect. The tail of this comet (Bennett 1969i) is blown by the solar wind, in a direction opposite to that of the sun.

mechanics and thermodynamics is the best of the book. Its level is comparable with that of *Statistical Physics* by Frederick Reif (volume 5 of the Berkeley Physics Course), by which it was admittedly inspired. As such, it is somewhat too advanced for the purpose intended. The last 90 pages of the book concern themselves with "time-independent electrical phenomena," meaning electrostatics, direct current and time-independent magnetism. Again, the level is often too advanced for a first-year physics course, particularly sections involving Laplacians, curls and line integrals.

Still, on balance, my impression of the book is favorable. Clarity of style, the 319 elucidative diagrams, and a typography that is uncluttered and pleasing to the eye, make for a welcome departure from the traditional format of European physics texts.

Olexa-Myron Bilaniuk
Swathmore College, Swathmore, Pa.

Introduction to the Solar Wind

By J. C. Brandt
199 pp. Freeman, San Francisco, 1970. \$10.00

The earth is imbedded in an interplanetary stream of plasma, a nonstatic

extension of the outer atmosphere of the sun—the corona. This "solar wind" is a relative newcomer among astrophysical topics, with a wide range of implications, from space travel to stellar evolution. John C. Brandt, of NASA-Goddard and the University of Maryland, gives a concise account of this phenomenon covering all its observational and theoretical aspects.

Solar wind evolves from an extremely rarefied corona, heated to some two million degrees by turbulent shocks that emanate from the hydrogen convection zone in the outer layers of the sun. Such convection zones must exist in solar-type stars and other stars of not-too-early spectral type. These must possess hot coronas and emit "stellar winds," which lead to considerable, almost complete braking of stellar rotation, and to a less considerable loss of mass (a fraction of 10^{-4} for the sun during its lifetime). Early-type stars do not have convection zones and hot coronas, but even more intense "winds" emitted by superluminous stars are apparently caused by radiation pressure, which depends on the luminosity to mass ratio.

The presence of solar wind has been first clearly demonstrated by ground-based observations of comet tails. Being in extreme cases connected with auroral and ionospheric phenomena, it is now more directly being explored by space vehicles and shown to be always present, though variable. It consists mainly of a stream of protons, with some alpha particles and heavier ions, and with electrons balancing the space charge, traveling with a velocity around 450 km/sec, at a number density of some 5 ions per cm^3 and carry-

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