academic equivalent of ghetto economics (everyone earning a living by taking in each other's dirty laundry, or commenting on each other's work, as the case may be). Only Darwin enthusiasts or compulsive reviewers are likely to read all of the essays in *The Darwinian Heritage*, but those who neglect the volume entirely will miss some sound research and fine writing. My own collection would be half the size, but it would certainly include Sloan on Darwin's invertebrate research, Browne on blushing, Kottler on natural selection, Rachootin on bones, Secord on breeding and Mayr on Darwin's 'five theories'.

In the end, however, the essays are secondary literature, the correspondence is primary. Reading Darwin's correspondence may be more illuminating than reading about him. And on that scale, Darwin's scientific works stand even higher. Like *Middlemarch*, *The Origin of Species* will repay reading each year, from beginning to end. □

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Symmetrical work

Paul K. Townsend

Supersymmetry: A Decade of Development. Edited by P.C. West. *Adam Hilger: 1986. Pp.483. £25, $55.*
Supersymmetry, Superfields and Supergravity: An Introduction. By Prem P. Srivastava. *Adam Hilger: 1986. Pp.162. Hbk £25, $55; pbk £12.50, $28.*
Introduction to Supersymmetry and Supergravity. By P. West. *World Scientific: 1986. Pp.289. Hbk £31.80, $36.80; pbk £18.90, $21.85.*
Introduction to Supersymmetry. By Peter G.O. Freund. *Cambridge University Press: 1986. Pp.152. £20, $34.50.*
Unification and Supersymmetry: The Frontiers of Quark–Lepton Physics. By Rabindra N. Mohapatra. *Springer-Verlag: 1986. Pp.309. DM84, $34.*

CONSIDERATIONS of symmetry are central to much of modern theoretical physics; certainly, symmetry was the guiding principle behind the achievements of elementary particle physics in the 1960s. In the early 1970s it was realized that quantum field theories may possess a new and radically different kind of symmetry — 'supersymmetry'. After an initial phase in which it was seen as something of a mathematical curiosity, supersymmetry caught the imagination of increasing numbers of theoretical physicists and underwent rapid development. In 1976 a supersymmetric generalization of general relativity, 'supergravity', was found. This gave rise to new hopes of a unification of gravitation and elementary particle physics.

Ten years and many man-hours later these hopes are still alive but in the form of 'superstring' theory. The spotlight on supergravity has passed on and it is now time to write a book about it. This is the premise of at least one of these five books on the subject. *Supersymmetry: A Decade of Development* is a collection of invited essays by means of which the editor has tried to achieve a "balanced view" of the subject. The first contribution, by Golfand and Likhtman, can be recommended to those interested in the history of supersymmetry. These authors were early pioneers but their original paper (published in 1971) is hard to read, their methods being very different from those that followed, so the inclusion of this explanatory essay is all the more welcome.

The developments of the following "decade" (really 15 years) were prompted not by experimental support for supersymmetry but by the combination of its aesthetic appeal and the sheer difficulty of solving certain theoretical problems without invoking supersymmetric principles. In fact, so severe are the constraints imposed by supersymmetry that one of the considerable achievements of the period was the construction of supersymmetric theories that are not actually in conflict with experiment. These realistic models, as reviewed in the essay by G. Ross, do yield interesting new predictions but we shall have to wait for the next generation of particle accelerators to test them. Meanwhile, supersymmetry continues to find applications in other fields, such as cosmology and mathematics, the subjects of the two concluding essays. The other contributions are mostly expositions of the technical tools of the trade, many of them well-written. This is an excellent book that physics libraries would do well to acquire but which, by its nature, is not so suitable as a text for the individual student.

Because of its length, organization and choice of topics, P.P. Srivastava's *Supersymmetry, Superfields and Supergravity: An Introduction* invites comparison with *Supersymmetry and Supergravity* by Julius Wess and Jonathan Bagger (Princeton University Press, 1983). Both cover similar material on supersymmetry, but differ in their approaches to supergravity. Srivastava opts for the 'component' approach which is less geometrical than the superspace approach of Wess and Bagger but is more easily grasped on a first encounter and more easily explained. Even so, the 18 pages allotted are insufficient to do justice to the subject and this book really has to be considered as an introduction to supersymmetry alone. As such it does a reasonable job, with plenty of problems for the student at the end of each chapter.

A more detailed and comprehensive account of supergravity is to be found in *Introduction to Supersymmetry and Supergravity* by P. West, which is about a hundred pages longer. The organization is also different in that both supersymmetry and supergravity are first discussed to some depth in the 'component' approach: only then is superspace introduced and the superfield formulation presented. For supergravity, at least, this is the historical route. Whether or not it is the best one, the book is the only one currently available that deals with both formulations adequately. Some material of more recent interest, on two-dimensional models and string theory, is included in the final chapters, but these are subjects that are rapidly evolving and have already moved on to the point that the chapter on strings, in particular, seems premature.

P.G.O. Freund's *Introduction to Supersymmetry* is refreshingly unconventional. Many traditional topics are left out (super-Feynman rules for example) and the treatment of supergravity is skimpy, but to compensate there is discussion of many other things such as Lie superalgebras and eleven-dimensional supergravity. This is also the only one of the volumes under review to present some of the mathematics needed for a rigorous definition of superspace. There is an entire book on this subject (Bryce DeWitt's *Supermanifolds*, published by Cambridge University Press in 1984), but Freund's brief discussion is likely to satisfy the needs of most physicists. His book can be recommended to those looking for a brief and not overly technical exposition of supersymmetry.

Unlike the other four books, *Unification and Supersymmetry* by R.N. Mohapatra is not a text on supersymmetry *per se*. It is rather an attempt to chart the course of theoretical elementary particle physics since the electroweak unification of the late 1960s. The book starts with an exposition of the basic ideas behind the electroweak theory and proceeds, for about two-thirds of its length, through topics such as CP-violation, 'grand-unification' and 'technicolour'. There follows an account of the applications of supersymmetry and supergravity to particle physics models. Despite its brevity, the choice of material here is sufficiently different to make this a useful book on supersymmetry. It is only a pity that the author does not discuss the more recent supergravity models that are currently favoured as 'low-energy' manifestations of superstring theories. □

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