the practical ends of breeding programs. Perhaps, too, they are properly considered as results rather than methods.

Auerbach has written a useful compilation and evaluation of a number of the biological techniques important in mutation research. I look forward to reading the succeeding volume that will describe her evaluation of the results of research in a field to which she has contributed so much.

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Australasian Conference

Radiobiology. Proceedings of the Third Australasian Conference on Radiobiology, held at the University of Sydney, 15–18 August 1960. P. L. T. Ilbery, Ed. Butterworth, Washington, D.C., 1961. xi + 313 pp. Illus. $11.

This volume consists of the proceedings of a very heterogeneous symposium which, according to the foreword, was held "to stimulate further research in radiobiology" in Australia. Judging from the tremendous variety of fascinating topics that are introduced in the 29 separate papers presented in the volume, I assume the symposium was a great success insofar as its stated objective is concerned. The published proceedings, however, leave much to be desired, and the reader is left in frustration by the brevity and incompleteness of many of the papers. What the symposium gained by the wide variety of topics represented, the proceedings lost in profundity through overdiversification. It is my perhaps prejudiced opinion that publication of symposia should be restricted solely to those dealing with some single, specialized topic.

In spite of the cursory and sketchy nature of the papers and the lack of any single unifying theme in the meeting, the breadth of subject matter is impressive. Topics range from basic studies of the action of radiation on the molecular and chromosomal level to problems in clinical radiology and agriculture which are strictly of an applied nature. Typical of the basic approach are specific papers on the nature of radiation damage at the cellular level, the action of γ-rays on the enzyme ribonuclease RNase, and the all-too-short discussion of the size and structure of chromosomes. Other particularly interesting papers, which are of a fundamental nature, deal with such specific topics as the effects of radiation on the immune response and comparisons of the biological action of radiation with that of the radiomimetic chemical agents.

Little of the material presented appears to be entirely new, but the volume may be useful as a convenient report on current progress in a number of fields of radiobiology. Since this appears to be the fate of many other proceedings volumes of this type, it again raises the question of whether such volumes are worth the effort and money required to publish them.

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Reference Source

Quantum Theory. vol. 1, *Elements*. D. R. Bates, Ed. Academic Press, New York, 1961. xv + 447 pp. Illus. $10.

According to the preface, this three-volume set, of which *Elements* is volume 1, is intended as an advanced text and a reference source on the fundamentals and applications of quantum theory, primarily intended to meet the needs of postgraduate students. Twenty-one authors contributed a total of 22 chapters; of these, nine chapters, covering the fundamentals, are contained in volume 1. Volume 2 deals with particle systems: complex atoms, molecules, chemical binding, solids, liquids, and quantum statistics, and volume 3 with radiation and high-energy physics.

There is always the risk, in such a collective enterprise, of both a lack of cohesion or coordination and of an imbalance in "weight" among the various contributions. In volume 1 the first-mentioned difficulty has been quite successfully avoided; two initial articles, "Preliminaries" (mathematical and historical) and "Fundamentals," by H. Margenau are followed, in orderly fashion, by two chapters, "Soluble bound state problems" and "The continuum," by R. A. Buckingham. Then follow 3 chapters on approximation methods: "Stationary perturbation theory," by A. Dalgarno; "The variational method," by L. Moiseiwitsch; and "The asymptotic approximation method" (familiarly known as W-K-B-method), by R. S. Jeffreys. The section entitled "Transitions," by D. R. Bates, written within the framework of perturbation theory, and a long chapter, "Theory of collisions," by H. S. Burhop, conclude this volume.

This is in general the choice and order of topics one would expect to find in a conventional text on quantum theory. The level of presentation is amazingly uniform in all nine chapters, and rather elementary; any graduate student with a little bit of previous exposure to the subject should be able to use this volume without difficulty.

But, by virtue of the very fact that it is the result of a collective enterprise, this work is much more in the nature of a reference volume than a textbook. There is too much attention to detail and not as much emphasis on fundamental principles as one might wish to see in a text used at the graduate or postgraduate level. It is regrettable, for instance, that more space was not devoted to presenting the fundamentals (only 80 pages were alloted to this topic, in chapters 1 and 2). This part is definitely too slim: a basic theme like the transformation theory of representations is hardly developed at all. The extent of this handicap is illustrated quite drastically in the awkward section on electron spin. The lack of any statement of the universality of the principles of quantum theory is also regrettable; it will not do to single out electrons but to omit the electromagnetic field and to leave out any discussion of the conceptual unity that quantum theory has introduced into phenomena which, classically, are as far apart as particle motion and wave propagation.

The chapters on perturbation and approximation methods, by and large, present the essentials in a clear and readable way, with the exception of the section on perturbation theory of degenerate systems; in this section the relations between degeneracy and symmetry properties of the system are not clarified. The last and bulkiest chapter, on collision problems, gives a well-balanced survey of an enormous field; it is well supplied with suitable references to original literature and comes perhaps closest to fulfilling the ideal purpose of this book.

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