

probability distribution. More standard methods are based on  $P(D|H)$  differently (through calculations, under respective  $H$ , of various characteristics of a method, such as error probabilities of tests and standard errors of estimates). In Bayesian and standard methods the likelihood function has no autonomous interpretation although it appears in technical roles.

Edwards's lively and readable book is the first extended account of the likelihood approach. In it he introduces the area and the likelihood concept and then treats successively more general problems, drawing many examples from genetics research including some of his own. He addresses primarily the working scientist who has some familiarity with statistics, to whom he appeals to judge the likelihood approach by its consequences, particularly in the scientist's own work. Other approaches are discussed primarily to clarify the likelihood approach.

Edwards emphasizes but discusses only briefly the dependence of interpretations of data on the scientific research context: weight must be given to relative simplicities of models and to their plausibilities in the light of background knowledge; but the only general guidance ventured on such points is "eschew dogmatism". Edwards's book will serve well not only to acquaint scientists with the likelihood approach, but also to stimulate interest in the theoretical bases of the various approaches and in critical comparisons of their applications in scientific research.

ALLAN BIRNBAUM

## Polynucleotides

*Organic Chemistry of Nucleic Acids.* Part A. Pp. xvi+1-268. £9. \$19.50. Part B. Pp. xv+269-639. £11. \$23.50. Edited by N. K. Kochetkov and E. I. Budovskii. Translated from the Russian by Basil Haigh. Translation edited by Lord Todd and D. M. Brown. (Plenum: London and New York, 1972.)

THE content of these books is precisely stated in their title. This restriction of subject matter, to exclude all but a passing reference to biological function, has allowed the authors to present, within reasonable compass, a most welcome systematic account of the literature of the organic chemistry of nucleic acids up to mid-1969.

The Russian editors, already known in the West, are well served by a translation, under the most authoritative editors, which is both lucid and of pleasing

style. The quite speedy publication has, however, been made at the expense of several proof errors. The point mutations arising from transliterations of cited authors' names provide light relief but the occasional wrong reference numbers and an error in the van't Hoff equation are more serious. The nomenclature used is familiar to the West, with one exception: in order unambiguously to identify the position of exocyclic substituents the Russian nomenclature has been wisely retained (for example, 6-methyladenosine is called 6-exo-N-methyladenosine) and will, it is to be hoped, become international.

The first volume deals with the more general aspects of the subject by consideration of the structure of nucleic acids. It begins with a brief survey of classification, distribution and primary sequence determination and ends with a chapter on secondary structure. In between we are given an excellent short summary of the conformation of nucleosides and nucleotides and a critical treatment of the electronic structure and reactivity of heterocyclic bases which is admirable for its constant juxtaposition of theory and experimental data. The only inconsistency I found in this multi-author monograph was in this chapter, where, on page 166, we are told that there is no evidence that the C5-C6 double bond of pyrimidines is the most reactive to radicals. That evidence is summarized on page 417! Part A concludes with the infuriating statement that the index is in part B.

It is in part B, examining the special organic chemistry of the nucleic acids, that one's best expectations are fulfilled. A chapter is devoted to each of the various types of reactions of the nucleic acid components with particular reference, wherever possible, to reactions at the polynucleotide level. An excellent introduction to nucleic acid photochemistry completes the volume.

In summary, I think the authors have succeeded in their aim to familiarize the reader with the chemical reactions of the polynucleotides. The best way to commend it to interested research workers is to say it is worth its price.

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## Physics in Memoriam

*Nuclear, Particle and Many Body Physics.* Edited by P. M. Morse, B. T. Feld, H. Feshbach and R. Wilson. Vol. 1. Pp. xxi+693. \$23. Vol. 2. Pp. xxi+931. (Academic: New York and London, March 1972.)

AMOS DE-SHALIT, a distinguished Israeli nuclear physicist, died at the early age of 43 in 1969. At that time he was Director General of the Weizmann Institute of Science, and in his short career had made a profound impression not only on the world of nuclear physics but also on all physicists, whatever their specialization, with whom he had come into contact. In the eulogy which prefaces the two volumes under review and which are dedicated to Amos de-Shalit, Igal Talmi writes, "His death was the loss of a leading figure in nuclear physics, of a mentor and guardian to physics in Israel and of a friendly and helpful colleague to his many friends all over the world".

The deep respect with which he was held led the Weizmann Institute to sponsor the publication of a volume of *Annals of Physics* in which the invited papers were dedicated to his memory. The response to the invitation extended to research physicists to contribute papers was overwhelming and in the end seventy-four papers written by 146 authors were published in volumes 63, 66 and 69 of *Annals of Physics*. The present two volumes collect all the papers together in bound form and as such represent a massive and lasting tribute to him.

It is, of course, impossible to review the individual papers. They range over many fields—theoretical and experimental nuclear physics, elementary particle physics, formal mathematical physics, many body theory and so forth—and the tremendous spectrum amply demonstrates his wide influence. A common feature to many of the papers reflects de-Shalit's own approach to physics, namely, a concern with the underlying physical significance of phenomena. As Professor V. F. Weisskopf writes about him—"he would take up a problem with enthusiasm and with an insight which does not come from special expert knowledge, but from a deep understanding of the real meaning of physics"—or about his attitude—"The true goal of science must be the discovery of the basic laws of nature and the clarification of the essential features of natural phenomena".

Many of the authors are very distinguished and many of the papers are important, but it cannot be said that they all conform with the editors' hope that each author would contribute "one of his more significant papers" to the volumes. It also cannot be ignored that since the papers have all been published in a standard journal it is unlikely that sales of these volumes will be extensive. Nevertheless, Amos de-Shalit's many friends throughout the world will surely wish to possess this memorial to a gifted physicist who was liked and respected by everyone.

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