tions to this literature, and the book under review represents the accumulation of his experience with *Fusarium*.

The book begins with a brief historical background account, which is followed by chapters on the toxigenic fusaria and their principal toxins; included here are tables of yields of toxins produced in the laboratory, concentrations found during instances of natural occurrence, and values, taken from the literature, of their toxicity in terms of LD_{50}. Next come discussions of antibacterial, antiprotozoal and insecticidal activity (but not of antifungal activity, despite the existence of several reports on the use of yeasts in the bioassay of trichothecenes) and of the phytotoxicity of *Fusarium* species. The latter chapter is dominated by the author's own studies on correlation between the rabbit skin test and phytotoxicity — one hopes that such tests will soon be made obsolete by developments in immunological assays, biological assays using microorganisms and cell cultures, and modern physicochemical analytical methods.

The remaining chapters are devoted to human fusariotoxicoses, the role of *Fusarium* in human mycoses, fusariotoxicoses of laboratory and domestic animals, and the difficult issues of the taxonomy and identification of toxigenic isolates (keys and detailed descriptions and synonymies are provided). Professor Joffe finishes where I began — with a comment on the question of 'yellow rain'.

The contents are essentially a compilation of primary data, and this is not an easy book to read. It gives the reader the feeling that he or she is looking over the author's shoulder directly into his laboratory records. Compounding the problem is the large number of references interspersed throughout the text. The resulting bibliography fills 86 pages and spans the period from 1890 to 1984.

Despite the difficulty of assimilating all of the information presented in this book, no one will be left in any doubt about the toxigenic nature of many isolates of *Fusarium*. A bonus for those interested in biological variability is that it is unusual to find comparative data on such a large collection of isolates, and the book provides useful insight into the range of toxigenic capability amongst isolates of the same species. □

Maurice O. Moss is Senior Lecturer in the Department of Microbiology, University of Surrey, Guildford, Surrey GU2 5XH, UK.

How to play with particles

Robert J. Hollebeek

Introduction to Experimental Particle Physics. By Richard C. Fernow. *Cambridge University Press: 1986. Pp. 421. £32.50, $44.50.*
Statistics for Nuclear and Particle Physicists. By Louis Lyons. *Cambridge University Press: 1986. Pp.226. £25, $44.50.*
Detectors for Particle Radiation. By Konrad Kleinknecht. *Cambridge University Press: 1986. Pp.206. £25, $44.50.*

EXPERIMENTAL elementary particle physics has changed so rapidly during the past decade that few of its experts have attempted to describe the current state of research in anything but conference proceedings and contributions to technical journals. The problem is that having spent years attempting to write a comprehensive review of the subject, an author may find himself in possession of an excellent but out-dated volume. For the student, however, this situation makes it quite difficult to become an expert except by working directly on a high-energy physics experiment and reading extensively in current journals. Even this is sometimes not enough, since many experiments are now done by several hundred physicists and take many years to complete. As a result, a student may be quite knowledgeable in a specific area, and yet know little about many of the other techniques being used on his own experiment. It is a brave author indeed who embarks on publishing a text in such a field, and the rest of us should be suitably thankful that some still do.

Richard Fernow's *Introduction to Experimental Particle Physics* is an excellent step towards bridging the gap between the enormous amount of primary literature and the beginning graduate student or interested scientist. The emphasis here is not on theories but on techniques. If you wish to learn about quarks, unified field theories, strings, supersymmetry and weak gauge theories, you should look elsewhere; but if you want to learn about the many techniques used to design a detector capable of probing inside the smallest distances known to man, this is a good place to start.

The introductory chapters cover the various interactions of charged and neutral hadrons and leptons in matter in sufficient detail for a graduate-level course. The author proceeds from this background to discuss the types of detectors which make use of these physical processes, the electronics systems used to read them, and the machines and beams used to do the physics. In many cases, comparisons are made between different techniques and suggestions given to the experimenter on how to optimize a detector for a particular application. There are a large number of references, many of which cite major review articles or important journal papers, and each chapter concludes with a small number of exercises.

Also of interest to experimental particle physicists, as well as anyone else who has to *use* statistical techniques, is Louis Lyons's *Statistics for Nuclear and Particle Physicists*. This is probably not the first book on statistics which a student or researcher should read, because many results from statistical analysis are stated or provided in a non-rigorous way. It is instead, as the author states, the result of "a course given by a non-statistician to non-statisticians". While the title states that the book is intended "for nuclear and particle physicists", this is probably too restrictive; many examples are drawn from particle physics, but they are simple enough to be understood by the non-expert.

The book's true value is that it contains the accumulated experience and insight of someone who has learned to use statistics to solve problems encountered by scientists in general. Many simple examples are given in which the author emphasizes the connections between various statistical techniques and the most frequent errors made in applying them. This, then, is an ideal book for the person who knows about statistical techniques but wants to learn how and why to apply them. In considering the origin of the well-known N-1 term in the sample variance, for example, Lyons points out the advantages and disadvantages of using several other choices of the form $N + k$ (one instance is that using $N + 1$ yields a biased estimator, which has a smaller variance about the true variance). When correlated variables are introduced, Lyons starts with the simple example of Abram and Lot at the cross-roads. In Lyons's words, "The reader interested in further details should consult Genesis 13:9". A challenging set of problems accompanies each chapter, many of which expand on concepts discussed in the text.

Detectors for Particle Radiation by Konrad Kleinknecht is the most detailed of the books under review, and consequently will become dated most rapidly. Several of the areas covered are already in need of changes and additions; for example, semiconductor detectors are described but no mention is made of advances in the past few years in CCD and silicon strip detectors, and the account both of RICH counters and compensation in hadron calorimeters needs to be updated. The discussion of the physical processes which are used in different types of detectors is briefer than Fernow's, and probably less useful for graduate students, but researchers using wire chambers or scintillators will find here an outstanding review of their speciality. □

Robert J. Hollebeek is a Professor in the Department of Physics, University of Pennsylvania, Philadelphia 19104, USA.