reappear throughout these presentations. One is the importance of good descriptive methods. This was emphasized by L. J. Savage and W. J. Dixon, among others. A second is the importance of communication (including teaching) to the statistical profession. The preface is a good essay on the communications theme as it emerged at the symposium. One noteworthy remark on the subject (made by Tukey: "I think the term 'service course' is a term native to mathematicians, and I think in view of the earlier discussions at the session, maybe statisticians might stop using it, slowly. Are we interested in getting the world to think at least a little like a statistician some of the time? I think we are. And if so, then doing this ought to be one of our main businesses, not just a 'service course.'" A third theme was the relation between computing and statistics; included were questions of university organization, the impact of computing on the development of new theory—and on old theory (for example, some theory has become obsolete because there is no longer a need to design experiments amenable to simple computations)—and of course data analysis.

The latter half of the book contains seven technical papers. In the first five of these the authors appeal to theory (often developed largely by themselves) which appears in other publications, and the papers included in the volume are essentially expository accounts of the methods, showing data and their analysis. The papers are interesting, well presented, and accessible to the nonspecialist statistician. Discussants' contributions are varied and worthwhile, presenting both theoretical and practical points, as the composition of the conference justified. Often questions that have occurred to the reader are aired by them. Moreover, the discussion is lifelike; I could practically hear the tone of voice of some of the discussants personally known to me.

The sixth paper, "Measurement in the social sciences" by G. A. Barnard, is interesting indeed. Barnard proposes that where a social science problem can be represented by some complex mathematical entity such as a diagram or a matrix, the statistician should not rush to reduce it to one or a few numerical indices. The complex mathematical entity has an important descriptive, conceptual role of its own. He gives interpretations of likelihood functions, and shows how from a single graph of the scoring functions of two samples light can be thrown on what are conventionally regarded as problems of testing, estimation, and combining of samples. He argues persuasively that where there is no theoretical basis for preferring some one particular scale of measurement, that fact should not cause the statistician to turn immediately to nonparametric methods. Barnard proposes, rather, than transformations of the data and linear methods applied to them will frequently lead to deeper insights.

The conference brought together a varied and high-powered group of participants whose symposium has resulted in an interesting—and varied—book.

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Uses of Spectrometers

Mass Spectrometry in Science and Technology. F. A. WHITE. Wiley, New York, 1968. xvi + 352 pp., illus. $14.95.

The stated objective of this book, which is intended for nonspecialists and for students with interdisciplinary interests, is "to make a serious appraisal of the mass spectrometer's present and potential relevance to a large number of professional fields." The author succeeds well. Interesting applications of mass spectrometry to chemistry, physics, nuclear geology and cosmology, the space sciences, materials science, biology and medicine, and ecology and environmental science are described and possible extensions or new studies are suggested.

In the first third of the book, in which the principles and some of the instrumentation of mass spectrometry are briefly presented, the reader is introduced to the bases for the physical or analytical applications of the mass spectrometer that are detailed in the remainder. The exposition of the instruments is for the most part succinct. No mention is made of the monopole instrument, but the author's cascade analyzer and the ion-beam microprobe are included, as are most other important or commercially available instruments. The very beautiful applications of the Syrotron instrument to the study of ion-molecule reactions should have been given at least brief mention.

A few distracting errors are noted; these occur largely in the early chapters. For example, on page 7 $y/z^2 \propto m/e$ and not the inverse; and at least 11 instances of the incorrect use of "specie" in place of "species" were detected. Only a few typographic errors are to be found; the statement that U^{234} and $_6K^{39}$ have the same charge-to-mass ratios (p. 312) is probably the most serious.

The omission of reference to the important work of Biemann, McLafferty, and others in the determination of amino acid sequences of peptides (p. 329) is regrettable. This book is a source of much information, but the subject index is too brief.

Although some repetition of principles occurs as the various applications are presented, the most insistent is the advocacy of stable-isotope dilution. Eight substantial reasons for using stable isotopes rather than radioisotopes, particularly in the life sciences, are enumerated in chapter 14 (of course, limitations are imposed by the naturally monoisotopic elements Be, F, Na, Al, P, I, and so on), and a final invitation to consider the exploitation of stable-isotope labeling with associated mass spectrometric analysis is made in the closing paragraphs of the book.

The author draws heavily upon his own contributions to illustrate the wide variety of applications he discusses. Particularly timely and cogent is his appeal that mass spectrometrists give more consideration to ecological studies.

Strong and fascinating arguments for isotope coding of materials are presented. The approach is not unreasonable and may well be economically feasible now or very soon. It is suggested that industry may wish to lead the way and initiate promptly a careful examination of the implementation of this important suggestion.

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Sun, Planets, and Comets

Mysteries of the Solar System. R. A. LYTTLETON. Clarendon (Oxford University Press), New York, 1968. x + 261 pp., illus. $7.

Seven essays, expanded from a series of lectures given at Brandeis University in 1965, cover topics studied by the author during 30 years at Cambridge University and several astronomical centers in the United States, including the Jet Propulsion Laboratory. The informal style makes easy reading of Lyttleton's mathematical studies of the