spaces of dimension one and two, conics and quadratic forms, and subgeometries of real projective geometries. Geometric ideas are kept in the foreground, but algebra remains the principal tool of proof. The great defect of the book is the impression that it leaves with the student—the impression that geometric feeling becomes precise only when translated into nongeometric language. How different from the impression given by a study of the group of isometries of the Euclidean plane, based on the theorem that a rigid motion is determined by the images of three noncollinear points!

Nonetheless, I feel that this is a teachable text, worthy of consideration by anyone who contemplates teaching a basic course in geometry.

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Flora Europaea

Flora Europaea. vol. 1 *Lycopodiaceae to Platanaceae*. T. G. Tutin, V. H. Heywood, N. A. Burges, D. H. Valentine, S. M. Walters, and D. A. Webb, Eds. Cambridge University Press, New York, 1964. xxxiv + 464 pp. Maps. $16.

This is a remarkable book, the first of four projected volumes. Werner Rothmaler proposed a flora Europaea about 1940, but World War II prevented its preparation. The present work was discussed among European botanists in 1954, and in 1956 a steering committee of nine was formed at Leicester, England. In 1958 the committee published a booklet, *The Presentation of Taxonomic Information: A Short Guide for Contributors to Flora Europaea*, and appointed an editor for each family. The aim was ". . . to produce a concise and complete Flora in the shortest possible time." The measure of the committee's success is apparent, for, although over 40 committee members, advisers, and consultants plus 51 contributors were involved, manuscript was ready for the printers in January 1963!

The editorial committee chose English as the language in which to publish the book because more botanists can use that language than can adequately handle any other. The Anglo-Latinum vocabulary (Appendix v) is a concession to those more familiar with Latin than with English. English place names are used for independent states and for areas that transcend national boundaries—for example, France, Sweden, the Alps, and the Mediterranean—but the language of the country is used if the state is not independent—for example, Corse, Kriti, Slovenija, and Sardegna.

The subdivisions of Europe that are used are shown on five maps placed at the end of the volume. Each map is printed on a strip three times as long as the width of a printed page, so the map and its legend may be spread to the right and easily compared with statements of range.

The order of families follows that of Engler and Diels (1936), except that the Monocotyledones follow rather than precede the Dicotyledones. Seventy-nine families are included in volume 1. Sections are recognized in many of the larger genera, and intraspecific taxa below the rank of subspecies are rarely used.

Artificial keys are dichotomous, and provide for families, genera, species, and often for subspecies. The key to families includes all those to appear in the entire work and has indented branches that carry matching arabic numerals at the left of each branch, facilitating comparison of contrasting segments. The matching numerals might have been omitted from short keys, but they have been applied consistently throughout.

Names of authors and places of publication of taxa have been abbreviated and the abbreviations listed in appendices I, II, and III. Synonyms are given only in part, and directly following the accepted epithet only if omission would cause confusion. Other selected synonyms appear in the index in a manner that is hard to follow if one is not familiar with the flora of Europe.

Descriptions are brief but drawn carefully and apply accurately to the species *as they occur in Europe*. Characters possessed in common by several species rarely are repeated. Instead, one may find such phrases as "Like 8 but usually a tree with erect trunk to 25 m; . . ." followed by statements that further set the species apart. Some dimensions are given; an unqualified measurement refers to length, and, if followed by "×" and a second measurement, the latter refers to width. Numerals within parentheses indicate extremes beyond the normal range of variation.

Chromosome numbers are given only if the author was satisfied that the count was made from properly identified material of known wild European origin. Less than half the taxa treated have the chromosome number listed, but the average is good in some genera—56 out of 123 in *Saxifraga*.

Ecological data are given sparingly, mainly because widespread species have such a range in requirements that to list all of them in a flora is impractical.

A brief statement about the distribution of a species is given, followed by abbreviations (of two letters each) for each European country or territory in which it is known to occur. The maps help to clarify distribution statements, and the abbreviations, printed on a sheet of blue paper, are easy to locate. Solid black circles indicate endemic taxa, and extra-European distribution is given only if the total range of a species is largely outside of Europe.

Critical treatments of troublesome series of species have not been undertaken. Rather, "species groups" that fall in this category have been keyed out together; they have no nomenclatorial status, but emphasize taxonomic problems that need critical study. Such "groups" occur in *Salix, Rumex, Sisymbrium*, and a number of other genera, but are absent in *Quercus, Atriplex, Dianthus*, and *Brassica*, among other "difficult" genera!

The two-columns-per-page format and clear typography make the text easy to read. Generic and specific names are set in bold face, descriptions and abbreviations of countries in Roman, and the general distribution statement and synonyms in italics. Numerous short notes refer to relationships of one taxon to others, to possible different interpretations, to putative hybrids, plants introduced for cultivation, and the like, and add much to the value of the book.

The appendices are invaluable. The first gives the full name, date of birth, and, when known and applicable, date of death of each author who named a species treated in volume 1. Abbreviations of the names of all books and periodicals in which these names were published constitute appendices II and III. The glossary establishes a record for brevity—one page of only 29 en-

tries. It shows how well the editorial committee framed the *Guide* and how carefully contributors restricted their descriptive terms to those widely understood.

Careful search revealed almost no typographical errors. The book is a model of concise writing. It gives the latest information about the taxonomy of most European vascular plants. It will be used extensively by botanists, professional and amateur, in many parts of the world. And these botanists look forward with eagerness to the appearance of the ensuing three volumes. Contributors, editors, advisers, consultants, printers, and others who labored on this book deserve praise. Taxonomists extend their thanks and best wishes to the men and women who have produced this outstanding work.

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Applied Statistics

Statistics and Experimental Design in Engineering and the Physical Sciences. vols. 1 and 2. Norman L. Johnson and Fred C. Leone. Wiley, New York, 1964. vol. 1, xvi + 523 pp., $10.95; vol. 2, x + 399 pp., $11.50. Illus.

A good comparison can be drawn between the set of books reviewed here, *Statistics and Experimental Design in Engineering and Physical Sciences*, and the volumes by Kendall and Stuart, *Advanced Theory of Statistics*: both are published in two volumes and written by two authors, both contain a wealth of worked examples and exercises, and both include a comprehensive selection of topics in their respective fields. Kendall and Stuart is frequently cited, but seldom used as a textbook. It is my opinion that Johnson and Leone will also serve as an excellent reference source, for students who have had some formal training in statistics and wish to work as consultants in the field of science and engineering, but that it will not serve as well as a textbook for students in science and engineering. To appreciate the many subtle ideas and useful techniques enthusiastically introduced by the authors (and in some places evidently addressed to professional statisticians), some prior training in statistics is almost surely desirable.

The first five chapters (154 pages) cover the necessary background, including descriptive measures, probability theory, and discrete and continuous distributions. In chapter 6, order statistics are discussed and the distribution of range and tolerance distributions are derived. Chapter 7 covers briefly theories of testing and estimation; chapter 8 gives some standard tests of significance, including a discussion on the use of noncentral distributions; and chapter 9 is on nonparametric tests. In chapter 10 on control charts, cumulative sum charts are treated in detail. Nineteen pages (chapter 11) are allotted to a discussion of prior probabilities and to decision and loss functions. Chapter 12 deals with regression and correlation. It seems to me that the eight pages devoted to the Doolittle and Choleski methods for the solution of normal equations could have been better utilized to provide a more detailed exposition of models of linear relationships. Twenty-six tables complete the first volume.

Three chapters (250 pages) on analysis of variance and the related experimental designs are the highlights of the second volume. The topics are thoroughly treated and illustrated with examples taken from statistical publications. Sequential analysis is introduced in chapter 16 and response surfaces in chapter 17, which is on multivariate observations. Chapter 18, on sampling structures, concludes the main part of the second volume. A selected bibliography of statistical tables and periodicals is given in chapter 19. At the end of each volume solutions are given for about ten exercises per chapter.

These volumes are encyclopedic, and probably cover more topics than any other single treatise on applied statistics—half-normal plot, ratio of standard deviation of trimmed and untrimmed means, Tukey's quick compact two-sample tests, moments of Wilcoxon statistic, and the Zeta distribution are a few examples of the topics included. On the other hand, the law of large numbers and the central limit theorem are not mentioned by name anywhere; apparently this was intentional.

I noted a considerable number of errors and misprints. Most of these are obvious and could have been corrected at the proof stage. For example, the formula for $\alpha_3(x)$ in section 5.6.3, and the equation (12.22) are incorrect; a data point discussed in the text is missing from figure 15.2; and figure 16.3 is missing altogether.

In summary, the authors have successfully presented in these two volumes an up-to-date collection of the many useful statistical techniques developed in recent years; the practicing statisticians in the field of science and engineering should find this publication a helpful and valuable reference.

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Chemistry

The Chemistry of Complex Cyanides. A literature survey. M. H. Ford-Smith. Her Majesty's Stationery Office, London, 1964 (order from British Information Services, New York). vi + 93 pp. Illus. $5.50.

In this useful book, Ford-Smith considers successively, in order of increasing atomic number, the 28 metallic elements that are known to form complex ions containing at least one cyano ligand. Under the heading of each individual element one may find two types of information. First, there is an outline, usually presented in a few sentences, of the methods of preparation and the reactions of the various complex ions, accompanied by the appropriate literature references. Then, for those complexes that contain only cyano ligands, the author presents in tabular form literature references to sources of information about the following topics: reaction kinetics, polarography, redox potentials, anion structures, the infrared spectrum, the visible and ultraviolet spectrum, formation constants, and magnetic moments. At the end of the book, after the coverage of the individual elements, there are six appendices and a four-page section in which Ford-Smith considers the overall state of development of the field and lists some areas in which he feels that future research would be particularly profitable. Each appendix contains the formulas of the known complexes of a given type—for example, Appendix A contains the formulas of carbonyl-cyanide complexes.

Most of the more than 450 references are to the original literature, but per-