1. A. R. EDMONDS, *Angular Momentum in Quantum Mechanics,* Princeton Univ. Press, Princeton, N. J., 1960.

2. B. KROHN, Private communication, 1975.

30 [7].—RICHARD P. BRENT, *Knuth's Constants to* 1000 *Decimal and* 1100 *Octal Places,* Technical Report no. 47, Computer Centre, The Australian National Univ., Canberra, A.C.T. 2600, Australia, 1975, 25 pp., 30 cm.

In appendices to the three volumes published to date of *The Art of Computer Programming* [1], Knuth lists 33 mathematical constants to 40D and 44 octal places, and suggests in Volume 2 (Exercise 4.3.1.36) that it would be worthwhile to compute them to much higher precision.

The present author has followed this suggestion by extending the precision to that stated in the title, using his Fortran multiple-precision arithmetic package on a UNIVAC 1108 computer. Each constant was computed twice, once with base 10000 and 260 floating-point digits, and once with base 11701 and 250 digits. Each run required approximately 25 minutes of computer time, and both runs for each constant produced identical results. The results were also checked by comparison with available published values, cited in the appended list of 17 references.

Specifically, the constants are the square roots of 2, 3, 5, and 10; the cube roots of 2 and 3; the fourth root of 2; the natural logarithms of 2, 3, 10, π, and ϕ (the golden ratio); the reciprocals of ln 2, ln 10, and ln ϕ; π; $\pi/180$; π^{-1}; π^2; $\pi^{1/2}$; $\Gamma(1/3)$; $\Gamma(2/3)$; e; e^{-1}; e^2; γ; e^γ; ϕ; $e^{\pi/4}$; sin 1; cos 1; $\zeta(3)$; and ln ln 2.

J. W. W.

1. D. E. KNUTH, *The Art of Computer Programming,* v. 1, *Fundamental Algorithms;* v. 2, *Seminumerical Algorithms;* v. 3, *Sorting and Searching,* Addison-Wesley, Reading, Mass., 1968–1973.

31 [8].—THE INSTITUTE OF MATHEMATICAL STATISTICS, Editors, and H. L. HARTER & D. B. OWEN, Coeditors, *Selected Tables in Mathematical Statistics,* Vol. II, Amer. Math. Soc., Providence, R. I., 1974, viii + 388 pp., 26 cm. Price $16.40.

In a discussion of the contents of the first volume [1] of this series of statistical tables this reviewer directed his remarks to their applications and their importance to the practicing statistician. Although attention was drawn to the adequacy of the background explanation provided by the authors for specific mathematical procedures followed in developing the tables, the important questions regarding convergence properties of the relevant mathematical approaches were not addressed. The present review is written in the same vein.

As in the first volume, the tables herein relate to real problems that somehow have been neglected in the main stream of statistical literature. Perhaps the best example of this is the fixed-effect analysis-of-variance model usually discussed in the literature. It is generally assumed that the denominators of the F ratios are valid $\chi^2(\sigma^2)/f$ statistics (f being the number of degrees of freedom), and therefore, under the null hypothesis of no fixed effects, the F statistic is the correct one. Most practicing statisticians, in reality, feel very uncomfortable about this assumption; they are usually aware that the assumed model is not correct in that all the effects have *not* been accounted for, thereby truly making the denominator of the F ratio a multiple of a *noncentral* χ^2. The tables herein of Doubly Noncentral F Distribution, by M. L. Tiku, and one of the accompanying examples directly address this extremely important point. The other examples accompanying these particular tables also address problems that require more realistic models than those usually presented in the literature.

Tables 1 and 2 of the doubly noncentral F distribution give to 4D the values of the probability $P(f_1/2, f_2/2, \lambda_1, \lambda_2, u_0)$ for values of u_0 for which type I error of the