Part II, entitled How to Find What You Want, describes a procedure for looking up given subjects in the literature. General guides to mathematical literature, abstracting journals, and specialized bibliographies are cited and briefly described. Special attention is given the problem of obtaining information about the large number of existing mathematical tables. Also, a list of recommended periodicals is included to assist the reader in keeping up with the current literature in numerical analysis. The four periodicals especially recommended are *Mathematics of Computation*, *Numerische Mathematik*, *Siam Journal on Numerical Analysis*, and *Computing Reviews*.

The third and concluding part of this document consists of a 27-page subject index, which is particularly useful. When more than five references are listed for a given subject the author has underlined a smaller number, which might be consulted first by the reader.

As he states in the Introduction, the author has not attempted to make this bibliography complete in any sense, nor has he included any foreign language references. He does point out, however, that many good Russian books have been translated into English and these are accordingly listed herein.

This attractively printed, conveniently arranged bibliography should provide considerable assistance to anyone searching through the English-language literature in numerical analysis.

J. W. W.

14[X].—A. H. Stroud & Don Secrest, *Gaussian Quadrature Formulas*, Prentice-Hall, Englewood Cliffs, N. J., 1966, 24 cm. Price $14.95.

This is a valuable reference book for the use and application of Gaussian quadrature formulae. Not too many years ago, quadrature almost always was done with equally spaced data and the familiar Newton-Cotes quadrature formulae. The advantages of this approach are that most tables of special and other functions are given in equally spaced form so that no interpolation is required and further, much of the same data can be used for more than one formula of the Newton-Cotes variety. A disadvantage is the fact that the Newton-Cotes formulae are usually asymptotically divergent with respect to the number of points used. On the other hand, a disadvantage of Gaussian quadrature formulae is that the data are not equally spaced and that data for an n-point formula cannot be used for an m-point formula, $m > n$. Advantages of Gaussian quadrature formulae are that they converge under conditions which are most always realizable in practice and the order of precision with reference to the degree of the polynomial for which a specific formula is exact is much greater than that for the corresponding Newton-Cotes formula. The Gaussian quadrature formula nearly always uses data at points with numerical values which are irrational. But in current usage, as so much of computing is done on automatic computers, this presents no problem provided the computer can be given an efficient algorithm to compute the intergrand. Thus, Newton-Cotes formulae are by no means a relic of the past, especially if only a few calculations are needed and a desk calculator is handy, but the advent of the automatic computer enables one to exploit the advantages of Gaussian quadrature formulae over Newton-Cotes formulae while minimizing the disadvantages noted above.

The text portion of this volume is divided into five parts. Chapter 1 delineates properties of Gaussian quadrature formulae, culminating in the proof of convergence. The subject of error estimates is deferred to Chapter 4. Computation of the formulae is taken up in Chapter 2. There, beginning on p. 28, Fortran programs to compute the abscissae and weights for quadrature formulae based on the classical Jacobi, Laguerre, and Hermite polynomials are presented. Applications of the tabulated formulae to the evaluation of multiple integrals and the solution of integral equations are discussed in Chapter 3. Chapter 5 summarizes tables of quadrature formulae found in the literature.

Chapter 6 gives tables of coefficients for Legendre polynomials, $n = 1(1)16$; Chebyshev polynomials of the first and second kinds, $n = 1(1)12$; Hermite polynomials, $n = 1(1)12$; and Laguerre polynomials $n = 1(1)10$. Also given are exact coefficients for the orthogonal polynomials, with respect to the weights $|x|^\alpha$ on $[-1, 1]$, $n = 1(1)8$; $|x|^\alpha e^{-x^2}$ on $[-\infty, \infty]$, $n = 1(1)8$; $\ln(1/x)$ on $[0, 1]$, exact for $n = 1(1)4$ and to 30S for $n = 1(1)16$. The coefficients in the recursion formula for orthogonal polynomials with weight $|x|^\alpha e^{-|x|}$ on $[-\infty, \infty]$ are given to 30S for $\alpha = 1, 2$, and 3. Exact orthogonal polynomials for the evaluation of the inverse Laplace transforms are given for $n = 1(1)12$.

Let us write

$$\int_a^b w(x)f(x)\,dx \sim \sum_{i=1}^N A_i f(x_i).$$

The tables below summarize the $w(x)$ and $[a, b]$ for which the x_i and A_i are tabulated to 30S in Chapter 6. For each table there is a corresponding table of error coefficients to 4S. There are ten such tables like the one generally described above. Four other tables for the above integral but with slightly different right hand sides are also given. These are described below.

Table	$w(x)$	a, b	N
1	1	$[-1, 1]$	2(1)64(4)96(8)168, 256, 384, 512
2	$(1 - x^2)^\alpha$, $\alpha = -\frac{1}{2}, \frac{1}{2}, 1, \frac{3}{2}$	$[-1, 1]$	2(1)20
3	$(1 + x)^\beta$, $\beta = 1(1)4$	$[-1, 1]$	2(1)20. For $\beta = 1$, 2(1)30
4	x^α, $\alpha = 1(1)4$	$[-1, 1]$	2(1)20
5	e^{-x^2}	$[-\infty, \infty]$	2(1)64(4)96(8)136
6	e^{-x}	$[0, \infty]$	2(1)32(4)68
7	$\|x\|^\alpha e^{-x^2}$, $\alpha = 1, 2, 3$	$[-\infty, \infty]$	2(1)20
8	$\|x\|^\alpha e^{-x}$, $\alpha = 1, 2, 3$	$[-\infty, \infty]$	2(1)20
9	$\ln(1/x)$	$[0, 1]$	2(1)16
10	$(2\pi i x)^{-1}e^x$	$[c - i\infty, c + i\infty]$	2(1)24

$$\int_a^b w(x)f(x)\,dx \sim Af(-1) + \sum_{i=1}^N A_i f(x_i) + Bf(1)$$

Table	$w(x)$	a, b	N
11	1	$[-1, 1]$	2(1)32(4)96, $A = B$
12	1	$[-1, 1]$	2(1)19(4)47, $B = 0$

$$\int_a^b w(x)f(x)\,dx \sim \sum_{i=1}^N A_i f(x_i) + \sum_{k=0}^M B_{2k} f^{(2k)}(0)$$

Table	$w(x)$	a, b	N
13	1	$[-1, 1]$	$N = 2(2)16$, $M = 1, 2, 3$
14	e^{-x^2}	$[-\infty, \infty]$	$N = 2(2)16$, $M = 1, 2, 3$

Y. L. L.