4[20-00, 20C30, 20D06, 20D08].—J. H. Conway, R. T. Curtis, S. P. Norton, R. A. Parker & R. A. Wilson, *Atlas of Finite Groups—Maximal Subgroups and Ordinary Characters for Simple Groups*, Clarendon Press, Oxford, 1985, xxxiii + 252 pp., 42 cm. Price $45.00.

This is indeed an atlas in which a "map", frequently of just one page, is devoted to each of 93 of the finite simple groups, starting with A_5, the smallest simple group, of order 60, and ending with the exceptional group $E_8(2)$, whose order requires 75 digits, and including all 26 of the sporadic simple groups. The main item on each map that is for the most part not readily available elsewhere is a complete character table of the group in question, but also included are: the order of the group, its Schur multiplier, its automorphism group, its principal occurrences in mathematics and in nature, its conjugacy classes and how they behave when powers are taken and how they, as well as the characters, relate to those of its Schur covering group and automorphism group, a presentation in terms of generators and relations, and a list of its maximal subgroups.

The atlas per se is preceded by a long introduction, describing the set of all finite simple groups according to the recently completed classification and containing instructions for the use of the atlas, and it is followed by other fragments of information including a bibliography which is especially extensive for the sporadic groups. By putting much thought into not only the choice of their material, but also its arrangement, the authors have been able to present a great deal of concrete information about a representative collection of the finite simple groups. For this they are to be congratulated.

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5[10-04, 10A25, 10A15, 10H08, 68C05].—Eric Bach, *Analytic Methods in the Analysis and Design of Number-Theoretic Algorithms*, An ACM Distinguished Dissertation 1984, The MIT Press, Cambridge, Mass., 1985, 48 pp., $23\frac{1}{2}$ cm. Price $ 15.00.

Suppose N is an odd natural number and $N - 1 = 2^k m$ where m is odd. Given an integer b, we say N is a "strong probable prime to the base b" if either

(i) $b^m \equiv 1 \bmod N$ or

(ii) $b^{2^i m} \equiv -1 \bmod N$ for some $i \in \{0, 1, \ldots, k-1\}$.

If N is actually prime, it is an elementary consequence of Fermat's Little Theorem that N is a strong probable prime to every base b coprime to N. However, it also can occur that a composite integer N passes the test for some b. An example with $b \neq 1$ is $N = 65$, $b = 8$. Nevertheless, the terminology "strong probable prime" is justified on both empirical and theoretical grounds: Examples with N composite for a fixed base $b \neq 1$ are rare (see [11]).