6. J. E. LITTLEWOOD, "On the class-number of the corpus $P(\sqrt{-k})$", *Proc. London Math. Soc.*, v. 28, 1928, pp. 358–372.

7. P. LÉVY, "Sur le développement en fraction continue d'un nombre choisi au hasard", *Compositio Math.*, v. 3, 1936, pp. 286–303.

8. DANIEL SHANKS, "Calculation and applications of Epstein zeta functions", *Math. Comp.*, v. 29, 1975, pp. 271–287.

21 [9].—RICHARD P. BRENT, *Tables Concerning Irregularities in the Distribution of Primes and Twin Primes to* 10^{11}, Computer Centre, Australian National University, Canberra, August 1975, 2 pp. + 12 computer sheets deposited in the UMT file.

These tables supersede the author's earlier incomplete UMT [1], which one can see for further detail. The previous Tables 1 and 2 are here extended to $n = 10^{11}$, and the author thereby also completes two tables in his paper [2] as follows. To Table 1, page 45, add a final row:

8×10^{10}	10^{11}	8176	16088	−5618	3037	−9881	1786

and to Table 4, page 51, add two more rows:

9×10^{10}	203710414	−6872	1.797468808649	1.90216053
10^{11}	224376048	−7183	1.797904310955	1.90216054

While these tables required a great amount of machine time, the author expresses confidence in their accuracy since the counts of $\pi(n)$ obtained here for $n = 10^{10}(10^{10})10^{11}$ agree with earlier values computed by Lehmer's method. In the extension here, from $n = 8 \times 10^{10}$ to $n = 10^{11}$, of $r_1(n) = \langle L(n) \rangle - \pi(n)$, nothing extraordinary occurs, it being a melancholy feature of these computations that computation time goes as $O(n)$ while points of interest occur as $O(\log n)$.

The downward trend of $s_3(q)$ in Fig. 3 of [2] that began at $\log_{10}(q) \approx 10.6$ continues throughout this extension with one consequence that the estimate for Brun's constant is now up to 1.9021605. But the earlier value 1.9021604 may really be more accurate according to the discussion in the previous review [1]. Of course, it still is "unknown" that there are infinitely many twin primes; there are only 224376048 pairs here. Perhaps in all mathematics there is no conjecture for which there is more supporting data. Further, this data makes it almost certain that the Hardy-Littlewood conjecture is true. On the other hand, the second-order fluctuations, observed in Fig. 3, are a complete mystery; to my knowledge they have no rational interpretation whatsoever. It is a highly repetitive feature in the history of physics that the investigation of very small second-order effects (the perihelion of Mercury, the fine-structure of the hydrogen spectrum, etc.) have repeatedly led to a radically new understanding of the main phenomenon. If that is relevant here, let the reader draw the proper inference.

D. S.

1. RICHARD P. BRENT, UMT 4, *Math. Comp.*, v. 29, 1975, p. 331.

2. RICHARD P. BRENT, "Irregularities in the distribution of primes and twin primes", *ibid.*, pp. 43–55.

22 [9].—WILLIAM J. LEVEQUE, Editor, *Reviews in Number Theory,* Amer. Math. Soc., Providence, R. I., 6 vols., 2931 pp. Price \$76.00 for individual AMS members.

This collection contains all reviews of papers of an arithmetical nature which have appeared in Volumes 1–44 (1940–1972) of *Mathematical Reviews.* As such, its value to anyone interested in recent research in number theory is hard to overestimate.

The reviews are classified by a modification of the 1970 MOS classification scheme of such a nature that most of the three-hundred thirty-six sections contain about fifty reviews, the reviews appearing chronologically within each section. Since the classification is inevitably based primarily on results obtained rather than on methods used, papers involving computational methods or related to mathematics of computation are not all collected in any one place. However, the section entitled "Tables and Computation; Evaluation of Constants" contains many of them and refers to many of the others. Needless to say, several other sections, such as the section "Mersenne, Fermat Numbers", contain reviews of many computational articles. Volume 6 includes both a subject index and a name index.

While it is easy to express regret that these volumes do not cover the entire period since Dickson's *History of the Theory of Numbers* (1920), the reviewer believes that such regrets exhibit an unwillingness to face the fact that completeness is an impossible dream. After all, Dickson's history itself is incomplete since, for example, it does not cover the law of quadratic reciprocity. As it is, these volumes contain reviews of practically every article in number theory since the demise of the *Jahrbuch über die Fortschritte der Mathematik*, which is no mean accomplishment. The arithmetical community owes Professor LeVeque a tremendous debt of gratitude for his dedication in fashioning this important research tool.

PAUL T. BATEMAN

Department of Mathematics
University of Illinois
Urbana, Illinois 61801

23 [12.00].—HEWLETT PACKARD ADVANCED PRODUCTS DIVISION, HP-45 *Applications Book*, Hewlett Packard Co., Cupertino, Calif., 1974, 218 pp., 22 cm. Price $10.00 spiral-bound.

For two reasons this book will have a cursory interest to readers outside its intended audience of users of HP-series calculators.

First, keystroke sequences and examples are listed alphabetically for more than two-hundred purposes, including applications from algebra, geometry, statistics and numerical methods, among other areas. With a minimal understanding of the Polish logic of HP-series calculators, most of these sequences can easily be converted to use on other scientific calculators.

Secondly and primarily, these sequences are of interest more for their nature than for their specific solution. For they illustrate particularly graphically the recent innovations and inherent limitations of nonprogrammable calculators. To illustrate the advances in calculator capacities, they include directions for such calculations as Bessel and Gamma functions, multiple linear regression, and Gauss-Legendre quadrature, and readily suggest other potential extensions of hand-calculator usage.

At the same time, even in their most efficient form the most interesting of these routines require so many keystrokes as to be impractical in real use and to discourage efforts to create counterparts for unlisted topics. The longest sequence in the book, for three-variable linear regression, requires $155 + 32n$ keystrokes to process n 3-tuples of data, a number so large as practically to insure key misstroking.

C. MCMANUS

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