

**Davenport, Harold**

**Multiplicative number theory. 2nd ed. Rev. by Hugh L. Montgomery.** (English)

Zbl 0453.10002

*Graduate Texts in Mathematics*, 74. New York - Heidelberg - Berlin: Springer-Verlag. xiii, 177 p. DM 37.00; \$ 21.90 (1980).

The major part of this book presents an account of classical analytic number theory, culminating in the explicit formulae for  $\psi(x)$  and  $\psi(x; q, a)$ , the latter uniform in  $\leq (\log x)^N$ . This part of the text is essentially unchanged from the first edition (1967; Zbl 0159.06303). Recent relevant work has been noted in the text or in additional footnotes as appropriate. Otherwise the only changes are the insertion of the evaluation of  $\tau(\chi)$  for non-primitive characters  $\chi$ , and two small improvements of arguments used by Davenport.

The latter part of the book is devoted to Bombieri's theorem on the average of  $\psi(x; q, a) - x/\varphi(q)$ . This area, based on the large sieve, is one in which major developments have taken place in the last fifteen years, and Montgomery rightly decided that the account in the first edition should be completely replaced. The new edition presents Vaughan's proof. It is based on Gallagher's form of the large sieve with characters and on Vaughan's version of Vinogradov's method, both of which are clearly expounded. As a further illustration of this version of Vinogradov's method the proof of the three-prime theorem is added to the list of topics.

The final chapter entitled 'references to other work' curiously has not received any attention from the editor. Thus Ingham's theorem on  $p_{n+1} - p_n$ , is quoted, but no mention is made of more recent work of Montgomery, of Huxley, and of Iwaniec and Jutila.

Montgomery is to be congratulated on avoiding the introduction of any disturbing contrast in style between the original text and the section that has received total revision. The new edition is to be as highly recommended today as was the original in its time.

Reviewer: [David A. Burgess \(Nottingham\)](#)

For a scan of this review see the [web version](#).

**MSC:**

- 11-02 Research exposition (monographs, survey articles) pertaining to number theory
- 11Lxx Exponential sums and character sums
- 11Mxx Zeta and  $L$ -functions: analytic theory
- 11Nxx Multiplicative number theory
- 11P32 Goldbach-type theorems; other additive questions involving primes
- 11N35 Sieves

Cited in **6** Reviews  
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**Keywords:**

analytic number theory; Bombieri's theorem; large sieve