NIVEN, IVAN, *Diophantine Approximations* (Interscience Tracts in Pure and Applied Mathematics, No. 14, John Wiley & Sons, New York), viii+68 pp., 36s.

This small attractive book arose out of a course of lectures delivered by the author at the 1960 summer meeting of the Mathematical Association of America. It gives proofs of basic results on homogeneous and non-homogeneous approximation of real and complex numbers, the real case being considered in Chapters 1 and 2 and the complex analogue in Chapters 4 and 5. The remaining chapter contains mainly standard results on the fractional and integral parts of the sequence of multiples of a real number, many of these being concerned with uniform distribution.

The proofs given avoid completely the use of continued fractions; many of them are new and elegant, but, largely because of the difficulty of the subject, not all are as simple as their appearance would suggest.

Apart from the inclusion of the usually neglected basic results on approximation in the complex case, the most useful features of the book are the comments and facts contained in the sections entitled " Further results " at the ends of the chapters, and the extensive and up-to-date Bibliography. The book is, for its size, expensive and will, on the whole, be of interest only to the specialist in Number Theory.

J. HUNTER

CHÂTELET, A., *L'Arithmétique des Corps Quadratiques* (Monographies de L'Enseignement mathematique, No. 9, 1962), 257 pp., 26 fr. S.

This book was the last work of the veteran French mathematician Albert Châtelet: in fact he died before it was quite finished and the various tables were completed and the book seen through the press by F. Châtelet, who has added two useful appendices.

In these circumstances it is distasteful to have to record that little can be said in favour of the book. Its main purpose is to show how to find the class number of a quadratic field by grouping the ideals of the field into classes of equivalent reduced ideals, thus in effect combining the theory of equivalent reduced quadratic forms with the fact that ideals can be put into one-to-one correspondence with forms. These ideas are not new; they are expounded in, for example, Bachmann's *Grundlehren der Neueren Zahlentheorie*, published in 1921, and the combined idea was used in the construction of the *British Association Tables of Reduced Ideals in Quadratic Fields*, published in 1934. What the present book does give is a detailed account of how to carry out the calculations, with a justification of the method, and tables of results on the structure of the groups of ideals.

It is claimed on the inside cover of the book that it contains notions which would be useful in dealing with fields of higher degree. These are not noticeable and the treatment of integers goes in quite the opposite direction: an integer is defined as $r+s\theta$ where $\theta^2-d = 0$ (if $d \not\equiv 1 \pmod 4$) or $\theta^2+\theta+(1-d)/4 = 0$ (if $d \equiv 1 \pmod 4$) and where r and s have rational integral highest common factor. This not only gives no reason why integers should be so defined (there is nothing like the illuminating discussion on page 276 of Hasse's *Vorlesungen über Zahlentheorie*) but evades the whole difficulty of finding integral bases. Absence of motivation appears again when ideals are defined; it is not shown beforehand that unique factorisation fails to obtain in some fields nor why one should employ such a structure as an ideal to remedy the deficiency.

It is also claimed that the book is suitable for the graduate student and even the good undergraduate (to translate French terms into their British equivalents): in fact it seems to miss both targets, being neither far-reaching enough for the one, nor sufficiently explanatory for the other

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