Integral Quadratic Forms, by G. L. Watson. Cambridge University Press, The Macmillan Company of Canada, 1960. xii + 143 pages. $ 5.00.

This is a most timely tract. It appears at a period of considerable resurgence of interest in the arithmetic theory of quadratic forms, to which the author himself has made substantial contributions.

The author's self-imposed restrictions are, firstly, to give an elementary account of the theory and, secondly, to concentrate on the basic problems of equivalence, decomposition and the representation of numbers by integral forms with integral variables. The material is therefore well suited to the beginner, implying a knowledge of only elementary number theory and matrix algebra.

The book begins with an introductory chapter on the basic notions of quadratic forms. Here the reader familiar with classical theory should not neglect Section 2, since the author uses the more convenient modern definitions of the matrix and discriminant of a form: f has matrix A if $f(\underset{\sim}{x}) = \frac{1}{2}\underset{\sim}{x}'A\underset{\sim}{x}$, and its discriminant d is then $(-1)^{\frac{1}{2}n}|A|$ (n even) or $\frac{1}{2}(-1)^{\frac{1}{2}n-\frac{1}{2}}|A|$ (n odd).

Chapter 2, on reduction, is a little removed from the main theme, since it is properly part of the theory of forms with real coefficients. Hence the material is restricted to what can be proved simply, but includes a description of the reduction methods of Hermite and Minkowski and the ideas of perfect and extreme forms; a proof that the number of classes of forms with given discriminant is finite; results on the minima (for integral variables) of binary and positive ternary forms; and a generalization of the Mordell-Oppenheim inequality for the minima of forms.

In Chapters 3-5, the arithmetic theory proper begins with a study of p-adic zero forms, the p-adic rational invariants and p-adic equivalence, with applications to rationally related forms and the theory of semi-equivalence and genus. Although much of this work is now classical, the treatment is modern and includes some new results (e.g. Theorem 47 on the decomposition of forms under semi-equivalence).

Chapter 6 deals with the theory of rational transformations and rational automorphs, including a modern treatment of Hermite's formula for the automorphs of a ternary form. This serves as a basis for Chapter 7, where the spinor-genus is introduced and used to develop the theories of equivalence and representation of integers as far as is possible without analytic methods. Here Eichler's basic theorem is proved, namely that the spinor-genus and the equivalence class coincide for indefinite forms of rank at least three.

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The concluding Chapter 8 contains new results on the problem of rational automorphs and their decomposition into a product of rational reflexions, a problem which, as the author comments, has not previously received the attention it deserves.

It will be apparent from the above remarks that this tract is something of a tour de force, taking the reader with a minimum of equipment in a mere 140 pages through much of the classical theory and up to some of its modern developments. The reviewer cannot help feeling however that a more discursive style would have been helpful to the beginner: many of the proofs are very concise, and the reader who is not presumed to know the theory of quadratic residues should not have to read foot-notes in order to discover Legendre's three-square theorem. Criticism can also be levelled at the index, which consists of a single page and is of little value, and at the minimal bibliography, which does not even list B. W. Jones' Carus Monograph (1950).

The elementary arithmetic theory of quadratic forms is excellent material for a graduate course in number theory, and this tract certainly fills a real need in providing a modern text well suited to students' use. Moreover, the careful development of the theory and the inclusion of recent work make this a valuable addition to the library of research workers in the field.

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The Mathematics of Radiative Transfer, by I. W. Busbridge. Cambridge tracts in Mathematics and Physics number 50, Cambridge University Press and Macmillan Company of Canada. 143 pages. $5.00.

Problems of radiative transfer are extremely involved and the theory which has grown up around this subject has become complex and heavy. The author, in her preface, states that "The theory of finite atmospheres, in particular, has been in a confused state for some years." It is therefore a pleasure to welcome a book which takes the reader with comparative ease through this labyrinthian subject in less than 145 pages of print.

The brevity necessarily imposed upon the author has led to a crisp and uncluttered style which makes for much easier reading than is frequently encountered in this subject. Miss Busbridge has done much research in the subject so that her account is authoritative.

The book consists of 10 chapters and an appendix. In the first chapter the equation of transfer is established, starting from funda-

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