SHORTER NOTICES

The Theory of Integration. By L. C. Young. Cambridge University Press, 1927. vii+52 pp.

This is one of the well known Cambridge Tracts in Mathematics and Mathematical Physics. A detailed discussion of the contents in therefore superfluous, as the chief duty of the author is to present the material intelligibly and accurately; in this case these requirements are satisfied. On the other hand it seems to the reviewer desirable to call attention to two defects of another kind. As the author points out in his preface, "the object of small treatises of this kind is to enable the general student to gain rapid access to the various branches of Modern Mathematics." Viewed in this light the title is somewhat misleading, as the book deals almost exclusively with W. H. Young's theory of integration. Although this is stated in the preface, it is to be feared that the general student would not realize that he had read *a* theory of integration and was still unacquainted with the one most widely known. The other defect is the total absence of references to the literature. Surely a small, well chosen bibliography should be included in any book of this kind.

W. A. WILSON

Integral Bases. By W. E. H. Berwick. Cambridge University Press, 1927. 95 pp.

This new Cambridge tract contains the author's investigations of the problem: *To determine an integral base for an algebraic field given by an arbitrary equation* $f(x)=0$. This problem can be reduced to the determination of a partial base for all primes p dividing the discriminant of $f(x)$. For this case the author has, as he asserts in the preface, evolved various new methods, which can also be used for finding the decomposition of p in prime-ideals. "Failing cases exist, but the approximations given are sufficient to cover nearly any numerical equation not specially constructed to defy them."

The method is, in brief, the following: Let

$$f(x) \equiv \phi_1(x)^{a_1} \cdots \phi_r(x)^{a_r} \pmod p$$

be the decomposition of $f(x)$ in prime-functions (mod p); then $p=A_1 \cdots A_r$, where all ideals A are relatively prime. To find the further decomposition of A, we write $f(x)$ in the form

$$f(x) = \sum Q_i(x) p^{\alpha_i} \phi(x)^i,$$

where $Q_i(x) \not\equiv 0$ (mod $p, \phi(x)$) and construct the Newton polygon to the lattice-points (i, α_i). Then $A = B_1^{\lambda_1} \cdots B_u^{\lambda_u}$, where k is the number of sides and λ_i certain constants. Under certain conditions the prime-ideal decomposition of p and the corresponding partial bases can be found in this way.

The author seems to be unaware of the fact that his new method and his results have already been completely evolved in my paper *Zur Theorie* *der algebraischen Körper*, Acta Mathematica, vol. 44 (1923), pp. 219–314, and that this method has been used for the solution of the same problems and various other problems in the theory of algebraic fields (Acta Mathematica, vols. 45–46). I also mention that it is possible to generalize the method so that it can be applied in every case.

The book is difficult to read, but contains various good numerical illustrations of the method. The final chapter is dedicated to the study of fields defined by a binomial equation $x^n - a = 0$ and gives an elaborate study of the different possibilities arising in this case.

OYSTEIN ORE

Einführung in die Wahrscheinlichkeitsrechnung. By J. L. Coolidge. German translation by Dr. Friedrich M. Urban. Leipzig, 1927. ix+212 pp. 10 R. M.

In the one-page preface of the translator the reason is given for publishing a German edition of this American work. There are several German texts of a very high order on this subject, but none of them appears to meet the needs of the beginner in such an attractive and elementary manner. The application of statistics to new fields is constantly increasing and many of the methods of the theory of probability must be used by investigators whose principal interest is not in mathematics. They have not had the training necessary for profitable study of the advanced treatises. This justifiable demand ought to be met by a book which has few preliminary mathematical requirements.

To the English student who is beginning to extend his study of probability to the great German works this translation will be the Rosetta stone that furnishes him the required technical vocabulary. This is important when we lack an interlingual mathematical dictionary. Many of the terms used in probability have fine distinctions in our own tongue, such as dispersion, error, deviation and discrepancy. When we meet such words in another language for the first time, it sometimes requires an immoderate amount of reading and re-reading to establish the proper vocabulary.

The translation is quite accurate in the technical statements but some of Coolidge's delightful expressions were not adequately turned. "This unlovely formula" (p. 170) becomes "diese hässliche Formel" (p. 168). With a little more care this might have been rendered by a more appropriate adjective, yet one could hardly expect to find a single word in German carrying the same double meanings as Coolidge's "unlovely." "Unliebenswürdige" would translate one meaning, the other might be given by "unzierliche," which is as unusual in German as "unlovely" is in English.

Most of the errors mentioned in the review by H. L. Rietz of the English edition in this Bulletin (vol. 32, No. 1) have been corrected, but in formula (11), Chapter III, $1/\sqrt{2npq}$ has become $1/\sqrt{2n\pi q}$ where it should be $1/\sqrt{2n\pi pq}$. A few others have also been corrected.

F. A. FORAKER