Review
Author(s): J. E. Wright
Review by: J. E. Wright
Source: *The Mathematical Gazette*, Vol. 2, No. 37 (Jan., 1903), pp. 243-244
Published by: Mathematical Association
Stable URL: http://www.jstor.org/stable/3603459
Accessed: 10-01-2016 03:31 UTC

Ex. 2. To find the number of quarts not exceeding 167.

$167 = 10100\overset{\frown}{111}$ binary, and there is one sequence as marked. Hence the number of quarts is

$$1+(0+1+1)+2(0+0)+4(1+1)+8\cdot0+16\cdot1=27.$$

N.B.—These 27 quarts are—7, 15, 23, 28, 31, 39, 47, 55, 60, 63, 71, 79, 87, 92, 95, 103, 111, 112, 119, 124, 127, 135, 143, 151, 156, 159, 167.

W. A. WHITWORTH.

REVIEWS.

Cours d'Analyse Mathématique. Tome I. By É. GOURSAT. Pp. 620. 1902. (20fr.)

This work is practically the résumé of a course of lectures given by the author to the Faculté des Sciences de Paris. The attempt has been made to give in this the first volume a general exposition of the properties of functions of real variables, the exception being made of those connected with differential equations. This part of the subject, however, will be treated in a second volume at present in the press.

As was perhaps to be expected from M. Goursat, the book is one of the most pleasing which has appeared recently on the subject in question. The matter is treated in a vigorous manner, and its arrangement leaves little to be desired. The author assumes that the student has some acquaintance with the elements of the calculus, and he also assumes some knowledge of the better known properties of irrationals. Whilst admitting that the theory of irrationals ought logically to form the ground-work of an exposition of Mathematical Analysis, appeal is made to the many well-known works on the subject.

The contents of the volume are divided primarily into four parts—(1) General theorems on differentiation, (2) Integration and properties of Definite Integrals, (3) Theory of Series, and (4) Geometrical Applications.

The first part commences with theorems on continuity and on limits. General theorems connected with differentiation are then given, some space being devoted to a consideration of the properties of Jacobians and of Hessians, and to a discussion of various transformations, such as those of contact, for example.

Taylor's Theorem, and its extension to several variables, together with properties of functions connected with it, form the next chapter, while the remainder of this part is devoted to a discussion of maxima and minima, and to problems connected therewith.

The second part commences with a close examination into the question of continuity from an analytical standpoint. General theorems on integration are then given, which are afterwards exemplified by appeal to geometrical intuition. After a discussion of ordinary methods of integration the author proceeds to consider double and multiple integrals, some space being devoted to Green's and Stokes' theorems. A few interesting examples of definite integrals are given, and this part concludes with a short account of the integration of total differentials.

The next two chapters are concerned with the theory of series. The first of these is occupied with general convergence criteria. For the purpose of obtaining many of them, use is made of Cauchy's theorem that

$$\sum_{x=0}^{\infty} \phi(a+x) \text{ and } \int_a^\infty \phi(x)dx$$

converge or diverge together.

There are also given in this part of the work sections on multiple series and on series with variable terms. The section on properties of power series is particularly worthy of note. The division concludes with a discussion of trigonometric series, the proof of Fourier's theorem given being Bonnet's modification of that due to Lejeune-Dirichlet.

The remainder of the volume is occupied with general properties of plane and twisted curves and of surfaces.

An interesting feature of the work as a whole is the number of examples given, both solved and unsolved. Those solved seem particularly adapted to illustrate the points desired, and the exercises given at the ends of the various chapters form a collection which is sure to be extremely useful.

Altogether the author is to be congratulated on having produced a very interesting elementary treatise on Mathematical Analysis, and one which is sure to be found widely useful.

J. E. WRIGHT.

Elementary Geometry. W. M. BAKER and A. A. BOURNE. Pp. viii. + 211. 2s. 6d. Second Edition revised. 1902. (Bell.)

The appearance of this and similar books marks an epoch in the history of geometry. The time seems to have come when Euclid, considered as an introduction to geometrical ideas, must at last be abandoned in this country. Even as a system of logic he falls before the searching requirements of the modern founders of geometry, and it would appear that the pre-eminent place he has occupied for over two thousand years must be vacated. It cannot be without a feeling of sentimental regret that we watch him being relegated to antiquity while our better judgment bids us welcome the new dispensation.

The present volume is written on the lines suggested by the Committee of the Mathematical Association (see *Gazette*, May, 1902), and includes the substance of Euclid, Books I., III., 1 to 34, and IV., 1 to 5, theorems on loci, mensuration, and an appendix on graphs, which, though doubtless a useful introduction to the subject, seems rather out of place here. The remainder of the course is to be published shortly.

The recommendations of the Committee have been very faithfully followed, and the result is in essentials excellent, and should prove extremely useful to teachers. The work has been so well done that we are tempted to find fault with details which might otherwise have passed unnoticed. For we do not regard it as impossible to establish some one standard book on geometry in place of Euclid, and are convinced that in the interests of education such a book is very much to be desired. But while being based on sound lines and wide knowledge, it must be free from superficial blemishes if it is to last for all time, and some of these we are constrained to point out in the present volume.

The definition of a straight line has always been a difficulty. To say that it is "even" is only to substitute one adjective for another. It is better not to define, but to state the chief property, namely, the unique determination by two points. So too the idea of an angle is distinct from, and not less simple than, the idea of amount of turning. It, like straightness, is a fundamental intuitive idea, and should not be defined; but the association of rotation with it is extremely valuable, and it is strange, considering the practical nature of the book, that the suggestion of the Committee has not been followed in this case, and that the opportunity of "illustration by rotation" in dealing with the exterior angles of a polygon is missed. A distinction between different directions of rotation should be made, as without it the reasoning on page 3 is invalid.

It seems an unnecessary piece of conservatism to place the equality of right angles among the axioms, especially as a proof is given on the next page.

A list of abbreviations is given on p. 10, which "may be used" (presumably by students) "in writing out propositions." This may be useful in establishing uniformity, but the continual use of unnecessary abbreviations when not required for compactness is disfiguring to the text and annoying to the reader.

The English language has been called a branch of mathematics, and an English text-book should be free from even time-honoured abuses. The word "shall" as used in enunciations is barbarous and unmeaning, and the authors are not even consistent in its use.

A few minor details may be noted. The name pentagon is used on p. 19 and defined on p. 24. To *prove* prop. 4 by cutting triangles out of a *double* sheet of paper is rather begging the question. In the construction of a triangle with given sides, it should be pointed out that the circles must *cut*. It is surprising to come suddenly upon the definition of a chord on p. 171 after frequent use has been made of the term and after the definition has been given in its proper place at the beginning of Book III.

The book is well supplied with examples both of a theoretical and of a practical character.

R. W. H. T. HUDSON.