SHORTER NOTICE.

Elementary Mathematical Analysis.   By JOHN WESLEY YOUNG
   and FRANK MILLETT MORGAN.   New York, The Macmillan
   Company, 1917.   548 pp.

THIS book is intended to meet the need which has been
felt by many during the last years, of a more unified course
in freshman mathematics which, without unduly neglecting
matters of technique, places more than the usual emphasis
upon a genuine understanding of the mathematical concepts
and methods.   The book has its faults, as have most books,
but, in the opinion of the reviewer, it is a fine contribution
to the problems in hand and is really a class room text.

The central theme is the idea of functionality.   This
idea is skillfully kept before the reader's mind, though in
the consideration of some topics, as that of trigonometric
relations, it is rather lost sight of.   This seems to be inherent
in the situation and it is possibly unwise and somewhat
artificial to insist that everything in such a course must
associate itself immediately with the idea of functionality,
important and far reaching as that idea is.

The material of the book is presented under five general
headings.

In Part I (Introductory Conceptions) thirty-two pages are
devoted to the general subject of functions and their repre-
sentation and thirty-one pages to algebraic principles and
their connection with geometry.   Great pains is taken to
familiarize the reader with the notion of functionality and
with the geometrical representation of functions.   Many con-
crete examples are exhibited in detail.   Under the second
heading is given an elaborate discussion of numbers and their
geometrical representation, a statement of the fundamental
laws of algebra and a review of elementary algebraic technique.

In Part II two hundred and twenty-nine pages are devoted
to the elementary functions: the linear function; the quad-
ratic function; the cubic function; the function x^n; the
trigonometric functions with a special chapter on trigonometric
relations; the logarithmic and exponential functions; numer-
ical computation, including logarithmic solution of triangles,
the slide rule, logarithmic paper; the implicit quadratic

functions.   Under the last title equations of the second degree
are classified according to their graphs.   Thus the way is
prepared for the conic section as the locus of a point which
moves so that its distance from a fixed point is always equal
to a constant times its distance from a fixed line.

Part III consists of 118 pages devoted to applications to
geometry and contains a thorough treatment of the straight
line, the circle, the conic sections, polar coordinates, and
parametric equations.

In Part IV seventy-two pages are devoted to the considera-
tion of such algebraic topics as permutations, combinations,
probability, the binomial theorem, complex numbers, the
general polynomial, the theory of equations and determinants.

Part V (forty-five pages) is a short treatment of the elements
of solid analytic geometry.

The idea of slope as the limit of $\Delta y/\Delta x$ is introduced very
early in Part II and is used wherever pertinent throughout the
book.   In addition to familiarizing the reader with this funda-
mental idea, the use of the slope facilitates the consideration
of the various curves and enables the authors to make more
of the subject of maxima and minima than is usual in a fresh-
man course.

The trigonometric functions are defined at once for the
general angle.   The addition formulas are proved by means
of the formulas for the rotation of axes, which have been
previously considered.   The chapter on logarithms is intro-
duced by a careful, intuitive discussion of the exponential
function, well calculated to give the reader a correct feeling
as to the significance of exponents positive, negative, zero,
rational, irrational.

The avowed purpose of the authors to place "more emphasis
on insight and understanding of fundamental conceptions and
modes of thought" is well carried out both in the text and
in the problem lists.   In the text are numerous questions
tending to make the student read more thoughtfully and the
problem lists contain many exercises of various degrees of
difficulty which focus on the fundamental principles under
consideration rather than on manipulation or technique.
However there is a sufficient number of problems of all kinds
and the lists are properly graded.

In the opinion of the reviewer, Part I is too long and (espe-
cially chapter two) contains too much discussion not well

chosen to introduce the subject to students during their first days in college. Chapter three, on the linear function, and certain parts of the sequel likewise seem to be somewhat verbose and indirect.

The book is well adapted for use by students who enter with trigonometry as well as by those who enter without trigonometry. The reviewer has felt that the program outlined in the preface is somewhat too ambitious and still believes that the average class will have some difficulty in covering the ground indicated. This emphasizes the need for greater brevity and directness in certain parts of the text. However by careful selection the needs of almost any class can be satisfied.

In the preface the authors announce the book as somewhat of an experiment and suggest a possible revision. It is too much to expect that, in these troublous times, such a revision may appear soon but it is to be hoped that it may not be delayed too long. In view of the experience of the authors themselves with the present book, a revised edition would surely be a finished product. The reviewer is, with the authors, in doubt as to the advisability of including more calculus in the text. Probably this can be determined only by experiment.

The book is attractive in print and in appearance and the figures are good. There are minor errors but the reviewer has made no effort to list these.

Any teacher who is interested in the matter of a more unified course for the freshman year would do well to give this book a careful examination. Any teacher of freshman mathematics who is interested in securing, on the part of his students, a better understanding and appreciation of the principles and methods of mathematics will find much here that is helpful whether or not he is interested in this particular type of course.

<div align="right">A. D. PITCHER.</div>