SHORTER NOTICES.

Junior High School Mathematics. By GEORGE WENTWORTH,
DAVID EUGENE SMITH, AND JOSEPH CLIFTON BROWN.
Book 3; 282 pages, price 96 cents. Boston, Ginn, 1918.

FOR many years past, the unification of elementary mathe-
matics has been a constant subject of discussion. Until
recently, however, very little progress has been made in the
direction of a practical solution of this problem. Only in
vocational education has there been any definite attempt to
modernize and coordinate instruction in mathematics, and
in this field results are necessarily of somewhat limited appli-
cation. Everyone interested in educational affairs must
recognize the necessity of keeping pace with the growing
needs and opportunities of our time. The members of the
American Mathematical Society as well as teachers of high
school mathematics should therefore feel indebted to the
authors of the work under review for having so effectively
modernized high school mathematics, especially geometry,
and for the attractive and teachable form in which the results
are here presented.

The two books of the series which precede the one under
review were intended for the seventh and eighth grades, and
include arithmetic, the elements of algebra, and intuitive
geometry. Book 3 is based on this preliminary work, and
includes algebra, the elements of plane trigonometry, and
demonstrative geometry.

In particular, the first section, on algebra, includes the four
fundamental processes applied to monomials, polynomials
and fractions, the solution of simple and quadratic equations,
and of simultaneous linear equations. Algebra is here pre-
sented as a universal shorthand, and approached from the
practical standpoint of the formula. A pedagogical feature
of special importance is the clear and concise treatment, and
the use of the unit page, no topic overrunning the page,
making each page complete in itself.

The section on plane trigonometry defines the trigonometric
functions, and illustrates their practical application to the
solution of right triangles. The importance of this section,
of course, does not consist in its mathematical content, but

in the stimulus it gives to effort by opening a new and practical field of applications intelligible to every child. As this involves both geometrical and arithmetical magnitudes, it also naturally serves as the connecting link between what precedes on algebra and what follows on geometry.

The concluding section on demonstrative geometry, however, is the one of greatest pedagogical importance, as it makes a radical departure from the canon of Euclid. In the first place, there is no attempt to base the subject on a minimum number of axioms. For instance, it is assumed that at a point on a straight line one perpendicular and only one can be erected. Moreover, angles and triangles are compared and classified, and several problems in construction are explained before there is any attempt at formal demonstration. The axioms are simply the four relating to equals combined with equals, and are all stated on one unit page and illustrated numerically. The postulates are ten in number, and are also listed on one page, and include many statements commonly required to be proved. This variation from Euclid is extremely important, as children frequently get a lasting distaste for, and misconception of, geometry by being required to prove statements which are perfectly obvious, such as that a circle is bisected by a diameter. The book also calls attention to the fact that the axioms here introduced were previously applied in algebra, thereby impressing the child with the important fact that these two subjects have a common mathematical basis.

A very clear explanation is then given of the nature of a proof, and how an inference may be examined and proved. This is an especially meritorious feature, as there are few teachers capable of presenting the true nature of geometrical reasoning in such a clear and concise manner. The nature of an inference is further illustrated by comparison of a geometrical inference with one based on medical diagnosis, or on legal evidence. This is certainly calculated to give training in correct thinking, generally recognized to be so much needed at the present time.

Other features of the book show painstaking care and unusual teaching ability, such as the selection of interesting and practical problem material and the specially prepared set of full page perspective drawings, relating the plane figures of geometry to our three-dimensional world of experience.

The work certainly marks the greatest advance in the pedagogy of elementary mathematics which has yet appeared, and is deserving of a wide adoption as a text.

<div align="right">S. E. SLOCUM.</div>

Business Arithmetic. By C. W. SUTTON and N. J. LENNES. Allyn and Bacon, 1918.

THIS book begins in the most elementary manner with the most elementary operations of arithmetic and covers in great detail their applications to almost every kind of a business transaction which one could imagine which calls for such elementary operations. A printed list of topics which are considered would be far too long to give here. So much information of a business nature is given and given so carefully that the book should prove valuable to any one, particularly a business man, as a book of reference; it is veritably a compendium of business knowledge. However, as a textbook, it violates the well-developed belief that better results are obtained by presenting relatively few fundamental principles and facts and then devoting the rest of the time to stimulating independent thought, rather than by the statement and explanation of a multitude of fairly independent principles and facts. It may be that business arithmetic is an exception. Only those who are familiar with the great number of terms and expressions involved can appreciate the difficulties of attempting to treat the subject in accordance with the theory advanced above.

There is a multitude of problems—there are over one hundred problems on some pages—but the problems are so elementary and frequently so similar that it seems at times that sufficient drill could be obtained by a smaller number and valuable time thus gained.

It is the reviewer's belief that any textbook on elementary mathematics—and especially one on business arithmetic—should include at least a simple statement or discussion of some of the rules for numerical computation. It is with considerable misgivings that we note (in Art. 147) the instructions given the student in adding the numbers 12., 1.49, .978, 640.2, 4.904, .007, which will surely serve to authorize him to ignore the adopted convention followed in writing numbers to indicate the degree of the accuracy. Twelve problems follow on page 115 establishing firmly this dangerous fault which is already all too prevalent.