

is repeated evidence of careful revision both in the addition of new matter and even in the smaller details of phraseology. The printing in the fifth edition, at least in the case of formulas, is a little more compact than in the fourth, and there is a considerable increase in the amount of matter in smaller type so that there is a reduction of twenty-one pages in size of the volume while there is an actual increase in matter.

As is to be expected in a fifth edition, the author adheres closely to the terminology which he had previously adopted. The most considerable change which came to the reviewer's attention is in the usage of the words "stream-line" and "stream-tube" as set forth in Sections 19 and 21; and even this is not of great importance.

In its new edition the book will continue to hold, and a little more effectively than ever before, the important place which it has now held for a generation.

R. D. CARMICHAEL

Geschichte der Elementarmathematik. By Johannes Tropfke. Bd. 7: *Stereometrie, Verzeichnisse.* Berlin and Leipzig, Walter de Gruyter & Co., 1924. iv + 128 pp.

The seventh and last volume of Tropfke's revised *History of Elementary Mathematics* maintains the high standard of the preceding volumes, and completes a work that is invaluable to the teacher of elementary mathematics, as well as to the student of the history of the subject. That the revision has been thoroughgoing is shown by the fact that the 35 pages of the first edition on solid geometry have been increased to 52 pages, while the number of references to the literature has been increased from 145 to 309. The very complete index covers 74 pages, and is arranged in two alphabets, under the headings "Names and Writings" and "Subject-matter".

Two items may be singled out for special mention, among the numerous improvements over the first edition. First, the additional information given concerning the history of technical terms is of great interest and value, especially for teachers, who will find such facts as are here to be found adding materially to the interest of many students in the subject-matter itself. Secondly, the history of the regular solids is enlarged and brought into line with the latest historical researches. The fact may be of general interest that the dodecahedron was known to the ancient Etruscans, who found it in natural form, in the crystals of iron pyrites that abound in northern Italy.

One error was noted. It is stated on page 32 that the theorem, "Sections of an oblique circular cone parallel to the base are circles", although known in antiquity, is first found explicitly proved in the *Book of the Three Brothers* in the 9th century. As a matter of fact, the proof occurs in Apollonius, along with that of the theorem that

the subcontrary sections are also circles.* On pages 40 and 41 occurs a passage where the revision was not edited so carefully as usual: Kepler is still, as in the first edition, credited with the cubature of the torus, whereas in the preceding paragraph (an addition in the new edition) this result is described as found in Heron of Alexandria. In this connection "the so-called theorem of Guldin" is mentioned. (See also p. 8.) Is it not time that Guldin's name was entirely dropped, and the theorem referred to exclusively as "the theorem of Pappus"? The reasons for doing this are clearly stated by Tropfke himself in the passage in question.

The index has evidently been very carefully compiled, which is of course an absolute necessity where the number of references is so great. The reviewer has checked a large number of these, and has noted the following corrections: p. 77, Kahun, I 134 should read, II 134; p. 101, Addition, II 65 should be I 65. Two other misprints should be mentioned: p. 51, l. 4, "Oktaeders" should read "Dodekaeders;" and in vol. IV, p. 139, l. 17, "4000 v. Chr." should read "2000 v. Chr."

Two topics that the reviewer believes should have been included have been entirely omitted: the *regula falsi*, and the "Russian peasant method of multiplication". Each is of historical interest and not without significance as furnishing supplementary material for class-room work or for outside reference, as in mathematics club programs.

We must end as we began, that this work is unique and of the highest excellence in its field, and a monument to the skill and industry of its author.

R. B. McCLENON

Binomial Factorizations, Giving Extensive Congruence Tables and Factorization Tables. Vols. II, III, and VI. By Lt. Col. Allan Cunningham. London, Francis Hodgson.

Of the seven volumes of this work the reviewer has in hand Volumes I, II, III, IV and VI. The content and general make-up of these tables has been considered in a previous review in the *BULLETIN* (vol. 31, pp. 180—181). By means of certain congruence-tables, giving the smallest roots, y , of the congruence

$$\frac{y^n + 1}{y \pm 1} \equiv 0 \pmod{p}$$

the author has built up factorization tables for numbers of certain special forms.

The value of such tables depends entirely upon their accuracy. An examination of certain of the tables, selected at random, leaves one in a state of doubt as to the value of the whole. Thus on page 193

* T. L. Heath, *Apollonius of Perga*, Cambridge, 1896, pp. 2, 3.