SHORTER NOTICES.

Géométrie, Premier et Second Cycle. Par EMILE BOREL.
   Paris, Librairie Armand Colin, 1905. 383 pp.

THIS is one of a series of elementary text-books written by
Borel to meet the demand caused by the recent activity for
the improvement of instruction in elementary mathematics in
France. As the author states, it has been his aim to make a
book more in line with the ideas of the geometers and analysts
of the nineteenth century who have taught that "Geometry
is the study of groups of movements." With this end in view
he has introduced the ideas of symmetry and displacements as
often as possible, thereby making many demonstrations simpler
and more concrete.

The book is divided into three parts. Part one contains
about what is ordinarily called books I and II. The treatment
however is quite distinctive. The theorems concerning isosceles
triangles and parallel lines are proved by the use of symmetry.
The symmetry of regular figures is discussed at some length.
For use in constructions, the square is introduced as a third
instrument and many constructions are thereby made much
simpler. Part two is the extension of the first part to space.
The ideas of translation and rotation are used quite freely.
Part three treats similitude, areas and volumes. The trigono-
metric functions of the angle are given and used in the demon-
stration of many of the theorems which follow. The book
closes with a short discussion of conics and a chapter devoted
to the approximate determination of plane areas. A good col-
lection of problems is given at the end of each part.

<div align="right">C. L. E. MOORE.</div>

Orthogonale Axonometrie. Ein Lehrbuch zum Selbststudium,
   Mit 29 Figurtafeln in besonderem Hefte. By Dr. RUDOLF
   SCHÜSSLER, Associate Professor of Mathematics in the Tech-
   nical School at Graz. Leipzig, Teubner, 1905. 170 pp.

IN this book the attempt has been made to develop axono-
metry as an independent method of representation without the
use of the horizontal and vertical planes of descriptive geometry
and without the assumption of any previous knowledge of con-
ical or parallel perspective. The method of procedure is rather
similar to that of Pelz * but made much more concrete and ele-

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* See the Vienna *Sitzungsberichte*, vols. 81, 83, 90 and the Prague *Sitz-
ungsberichte*, 1885, 1895.

mentary, as well as more comprehensive and systematic. The book begins very concretely; after defining what axonometry is, the projection of the rectangular coordinates of a point, the projections of a line on each of the coordinate planes, and the intersections of a plane with each of the coordinate planes are explained with excellent clearness. The discussions regarding a finite but inaccessible point of intersection of two lines, and of a line and plane (pages 19, 20) are particularly commendable. Each particular or exceptional case is discussed in sufficient detail so that every case met in subsequent constructions is a direct application of the principles already explained.

The treatment of pyramids and prisms is now easy and natural; a thorough treatment of shades and shadows is added, applying to all bodies bounded by planes. The section applied to metrical properties, lengths, normals, angles, etc., is less direct and natural than the preceding ones and the question may well be asked whether for such purposes this method of representation has any advantage over the ordinary h, v method.

The circle is treated with care and the usual detail; a large number of alternate proofs are given for the same theorem, perhaps too many for a student who is reading it alone — and for such students the book was designed — though they are valuable to one already familiar with the projection for purposes of comparison. Now follow conics, cones, cylinders and their curves of intersection, and the ideas here developed are applied to surfaces of revolution. The only slip noticed is on page 153, where it is stated that an inflexion in the meridian curve will produce a corner in the shadow cone. The shadow cone must touch the parallel circle generated by the point of inflexion.

Numerous exercises for the student to solve are added to each section, many of them provided with a figure for suggestion. Notice is always given on the margin when a new figure is considered. Finally, mention should be made of the figures themselves, which were drawn by the author. They are very well done; proper lines are drawn heavier or lighter to show at a glance just what the figure means. The whole work shows care and thoughtfulness on every page, and is provided with an excellent index. It is an important addition to the literature on constructive drawing.

VIRGIL SNYDER.