

pages). Chapter XI (45 pages) is devoted to the discussion of several plane curves of lesser importance. An exposition of the properties of a number of space curves is given in Chapters XII and XIII (72 pages). These chapters are not, however, up to the standard of the rest of the book. Chapter XIV (13 pages) is devoted to polhodes and herpolhodes.

The treatment is, throughout, quite elementary, and can be followed by anyone with a knowledge of analytics and calculus. The book is not, however, suitable for a student seeking a systematic treatment of the theory of the higher curves, as its aim is the consideration of noteworthy curves and not the systematic exposition of curves in general. It is a treatise, not on curve theory, but on particular curves.

The method of exposition, whenever practicable, is as follows: the rectangular and polar equations of the curve are given, the form of the curve is derived from the equations and a figure of the curve is shown. The most interesting geometric properties of the curves are then deduced, the parametric equations — when the curve is unicursal — derived and the integrals for the length of arc and the area of the curve obtained.

The book is metrical both in viewpoint and in method. Trilinear coordinates are, however, used a few times and line coordinates several times but not in such a manner as to necessitate a previous knowledge of those subjects. It is to be regretted that the author does not enter into the projective theory at least enough to show the projective interrelations, and occasionally the projective identity, of some of the curves considered.

The content and method of the book are such as to make it especially valuable for engineers and others not specialists in geometry, but geometers also will find in it a valuable collection of information on particular curves. The Spanish text presents little difficulty to one who can read any Romance language with facility.

C. H. SISAM.

*The Scientific Papers of J. WILLARD GIBBS.* Volume 1, *Thermodynamics*, xxviii + 434 pp., with portrait; volume 2, *Dynamics, vector analysis and multiple algebra, electromagnetic theory of light, etc.*, ix + 284 pp. London, Longmans, Green, and Co., 1906. Large 8vo.

SHORTLY before the death of Professor J. Willard Gibbs he had decided to yield to requests from various sources and to