

YOUNG ON PROJECTIVE GEOMETRY

Projective Geometry. By J. W. Young. Chicago, The Open Court Publishing Co., 1930. ix+185 pp.

This volume is the fourth in the series of Carus Mathematical Monographs sponsored by the Mathematical Association of America. The natural point of departure for the reviewer would seem to be the expressed purpose of the Carus Monographs, namely, "to contribute to the dissemination of mathematical knowledge by making accessible at nominal cost a series of expository presentations of the best thoughts and keenest researches in pure and applied mathematics," "in a manner comprehensible not only to teachers and students specializing in mathematics, but also to scientific workers in other fields, and especially to the wide circle of thoughtful people who, having a moderate acquaintance with elementary mathematics, wish to extend their knowledge without prolonged and critical study of the mathematical journals and treatises." For the present reviewer, this would mean to start with a handicap of skepticism. The "other scientific workers" are finding a steadily increasing need of mathematical training. Their first interests lying in other directions, they naturally wish to secure this training at the least possible cost of time and effort. Each individual will have to find out for himself the minimum expenditure for which he can acquire a useful tool. The Carus Monographs may be helpful to this group. But is it possible to make accessible the keenest researches in mathematics to that wide circle of thoughtful people who wish to extend their knowledge without prolonged and critical study? To ask a simpler question, is it possible to convey to a group of intelligent readers having a moderate acquaintance with elementary mathematics something of the beauty and fascination of the ideas of projective geometry, unless these readers are willing to pay the price of the moderately prolonged and critical study which the average mathematician has devoted to the subject? Whatever the answer to this question, the reviewer ventures the opinion that *if it can be done* Professor Young's book does it.

But if one may be allowed to forget the stated purpose of the Carus Monographs, he is then free to express unreserved approval of this excellent piece of expository writing. The usual first course in projective geometry (so-called) is a mixture of projective and metric geometry in which distance, perpendicularity, and circles are as prominent as harmonic sets, involutions, conics, and polar systems. Probably such courses are useful; but it is doubtful whether they leave the student with any clear conception of what is meant by *projective* geometry. And just at this point one could do the student no greater service than to place in his hands the little book under review.

After defining projective space by introducing the "ideal" elements, the first five chapters proceed to develop pure projective geometry by the synthetic method. The treatment calls upon the reader frequently to exercise his geometric intuitions. It is not at all logical in the sense of building up the subject from an explicitly stated set of postulates; nor is it illogical in any derogatory sense. With respect to this part of the book, one can readily make himself believe in the group of non-mathematical readers, and in their keen interest and pleasure as the subject unfolds itself. Starting with the idea of duality in the plane and in space, one is led on to the consideration successively