

DOWSETT ON CONSTRUCTIVE GEOMETRY

Advanced Constructive Geometry. By J. F. Dowsett. Oxford University Press (American Branch, New York), 1927. viii+340 pp. Price \$9.00.

The author of this work, who is lecturer and chief instructor in geometry and graphics, London County Council School of Building, Brixton, states in his preface that the book is intended for advanced students and for teachers of building geometry.

It is encouraging to know that such a thorough course in descriptive geometry, with applications to carpentry and masonry, is available for students of building geometry. Much too often, craftsmen have no adequate knowledge of the principles of descriptive geometry, and also no facilities for carrying out its constructions when they have need for them. Thus the author remarks (Chapter XVII, p. 278), "The absence of facilities for setting out elaborate geometrical constructions on the building site is the chief factor in perpetuating crude rule-of-thumb methods, and is responsible for much of the poor craftsmanship to be found in quite important structures." For this reason the author devotes a chapter to methods of placing lines to which to cut bevels, and for other purposes, directly on the materials of construction.

This is but one illustration of the practical nature of the work. However, aside from applications, the author gives the reader a very good working knowledge of Mongean Descriptive Geometry. In addition to this, the student will find much of interest and of value in the numerous applications to wood and stone cutting.

The book is well planned in that necessary material is developed and ready for use when needed. Thus, for example, the first six chapters, which constitute Section I, are devoted to constructions in plane geometry. Chapter I deals with some constructions (necessarily approximate) such as finding tangents and radii of curvature of curves which are given graphically (i.e., of curves for which the law of generation is not known). It also gives approximate constructions for rectifying and dividing arcs of circles. In the following chapters of this section much useful information is given concerning the circle and the other conic sections. Such applications are given as the construction of scroll curves and volutes, the drawing of moulds for easings to connect two straight hand-rails, etc.

The second section of the work, comprising Chapters VII to XX inclusive, is devoted to descriptive geometry, that is, to the solution of space problems by means of constructions which can be executed in the plane.

With the exception of Chapter XX, which deals with perspective, the method of treatment is principally that of double-orthographic projection (i.e., the method of Monge). Aside from the applications, the geometric problems treated are those usually considered in a thorough course on descriptive geometry.

No classification of problems, such as a division of them into problems of pure geometry of position, perpendicularity problems, and metrical problems, is given. Much, almost excessive, use is made of the device of "changing the ground line."*

Following the problems involving the point, line and plane, there is a consideration of the so-called "three round bodies": sphere, cylinder, cone, to each of which a chapter is devoted.

Among the applications to masonry in these chapters are methods of obtaining moulds (or templates) used in the construction of voussoirs for hemispherical domes, pendentives, cylindrical vaulting, groined arches, skew arches, etc. Equally important problems in carpentry are also considered in much detail.

A further chapter is devoted to what the author calls the geometry of double circular work. Here such problems as the design of arches over openings in cylindrical walls are considered for both stone and wood construction. A whole chapter is devoted to the geometry and construction of wreathed hand rails. Then follows the chapter, already mentioned, on the placing of lines directly on the materials of construction, and another on mouldings and the design of moulding cutters. A chapter on shadows and one on perspective close the main body of the text.

Following the index is a well selected group of miscellaneous problems derived from the examination papers of various institutions.

The book is rather free from error. Most of the typographical errors are easily detected. In the statement of Problem 78, p. 145, concerning the determination of a point of a given plane for which the lines connecting this point with two given points of space shall make equal angles with the plane, it should be further stipulated that the plane of these two connecting lines be perpendicular to the given plane. For, as solved, the problem is nothing more than that of finding the brilliant point of a plane with respect to two given points of space.

In Fig. 126, the vertical trace of the plane containing the point P is not in proper position. It should also be stated that this plane is parallel to the ground line.

The work in a number of places might have been made easier of understanding if a statement of the space construction (i.e., the operations in space of which the constructions in the drawing plane are counterparts) had preceded the description of the construction in the drawing plane.

The drawings are well executed and the pictures showing space relations (which the author calls pictorial views) are excellent. However, in several cases the scale is a little too small for the easy reading of the letters.

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* This consists in assuming a new vertical (or horizontal) plane of projection to which the space object under consideration is more simply related than it is to the old one, and then revolving (or "rebatting") this new plane into the horizontal (or vertical) plane around its horizontal (or vertical) trace, that is, around the new ground line.