ESSENTIALS OF DRAFTING; A TEXTBOOK ON MECHANICAL DRAWING AND MACHINE DRAWING WITH CHAPTERS AND PROBLEMS ON MATERIALS STRESSES, MACHINE CONSTRUCTION AND WEIGHT ESTIMATING. SECOND PRINTING - CORRECTED

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ESSENTIALS OF DRAFTING

A TEXTBOOK ON MECHANICAL DRAWING AND MACHINE DRAWING

WITH

CHAPTERS AND PROBLEMS ON MATERIALS STRESSES, MACHINE CONSTRUCTION AND WEIGHT ESTIMATING

BY

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DEDICATED TO THE AUTHOR'S FRIEND
GARDNER CHACE ANTHONY
WHOSE INFLUENCE AS AN ENGINEER
AND TEACHER ON THE DEVELOPMENT
OF AMERICAN MECHANICAL DRAWING
IS UNIVERSALLY RECOGNIZED

PREFACE

THE evening technical school has been rapidly developing during recent years. From a makeshift it is coming to occupy a field distinctly its own. The ambitious man attending an evening technical school is fully the equal of his brother at the day technical school and his worth is being increasingly realized.

The foundation subjects — mathematics, mechanics, and drawing — require particular attention in evening courses, where the time may be somewhat limited and the needs of the student varied. This book has been prepared for Ohio Technical Drawing School students as part of a technical course.

Progress in engineering work of any kind depends upon an intimate knowledge of mechanical drafting as the language of the engineering world. Its possibilities must be understood. The mere drawing of lines and more or less copying of exercises or sketching from a few models is far from the purpose of a drawing course. The value of drawing as one of the working tools to be treasured and used during a lifetime in the most useful of professions, ENGINEERING, should be realized. It is as an aid in the study, and later use of engineering knowledge, that drawing finds its place. These preliminary remarks may serve to explain the makeup of the book.

The actual handling of the instruments can best be taught by careful individual instruction of each student, after which false or awkward motions should be immediately corrected. Inefficiency in this respect is one of the most severe handicaps of many "self-made" draftsmen. The treatment of the various subjects is necessarily somewhat brief, as it is intended that personal instruction should be given in each subject.

In the first studies the student is taught to represent each object in strict conformity to the laws of projection. All lines are drawn, all intersections are shown, and invisible surfaces are all

indicated by dotted lines. For simple parts such drawings are easily read and they are generally used in the drafting room. When more complicated pieces are met with or where whole machines or constructions are to be represented, such a method would lead to great confusion and often would produce a drawing which it would be almost impossible to read. The time necessary would be very great even for an expert. In such cases the full lines representing the visible surfaces are shown, but the intersections and invisible surfaces are not all drawn in. The selection of what lines to draw and what lines to leave out is an important study in itself.

Furthermore there are many representations of parts which are or appear to be violations of orthographic projection, which are used because practice has shown that they convey the idea to the workman more completely or easily. Other representations are used to save the draftsman's time, or in the interests of simplicity. Almost anything which will make a drawing more readily intelligible is justified. This statement must be used with caution, as what will seem plain to a man familiar with the work may not be so plain to the workman or other reader.

A drawing has one great purpose, and that is to be useful. To this end lines may be added or left out, shading may be used, or notes may be put on. As an expression in the engineering language each drawing should have only one meaning, and should state that meaning with the least possible chance for misinterpretation. Many of these idiomatic expressions of the engineering language will be considered in the later chapters.

The chapters on Materials and Stresses, Machine Construction, and Estimation of Weights are brief treatments of subjects which are necessary for the making of intelligent drawings. Considerable elementary machine design is included as belonging in a practical treatment of mechanical drafting, for the author does not look with favor upon fine distinctions between "subjects." It is the "usability" which really counts.

The subjects are arranged to suit the author's convenience, but they may be taken in a different order if desired. The problems are placed in one chapter at the end of the book, so that a selection may be easily made. These problems are suggestive, and may be amplified by the teacher, who should make a free use of actual shop blueprints and castings.