

PLANE GEOMETRY

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Plane Geometry by Arthur Schultze & F. L. Sevenoak

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BY

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PREFACE

It is generally conceded that the final aim of mathematical teaching should be not only the acquisition of practical knowledge, but that training of the student's mind which gives a distinct gain of mental power. In recognition of this principle nearly all college entrance examinations in geometry require some original work, and most text-books devote considerable space to exercises. Comparatively little, however, has been done to introduce the student *systematically* into original geometrical work. No teacher of physics or chemistry would ask a student to discover a law without so guiding his work as to enable him to reach the desired result; many text-books and teachers expect the pupil to invent geometrical proofs and to solve problems, entirely new to him, without offering any assistance further than a knowledge of the well-established theorems of all text-books. Some writers give a description of the analysis of propositions, which is entirely logical and of great advantage to a person of some mathematical knowledge, but which is usually too abstract to be of any practical value to the beginner. In this book the attempt is made to introduce the student *systematically* to the solution of geometrical exercises. In the beginning the exercises given in a certain group are of similar kind and related to the preceding proposition; later some general principles are developed which are of fundamental importance for original work, as,

for example, the method of proving the equality of lines by means of equal triangles; the method of proving the proportionality of lines by means of similar triangles, etc., and finally the analyses of theorems and problems are introduced, but in a more concrete form than usual.

The propositions are arranged with the view of obtaining a perfect logical and pedagogical order. An unusually large number of exercises, selected with care for the purpose of securing increased mental power, is given.

The general plan and preparation of the greater part of the book are the work of Dr. Schultze, while that of Dr. Sevenoak has been chiefly editorial.

SUGGESTIONS TO TEACHERS

1. Students should be made thoroughly familiar with the definitions, especially in the beginning. Many beginners who are otherwise perfectly capable of understanding logical deductions, fail in geometry because they have not acquired this thorough knowledge of the fundamental concepts. Exercises in geometrical drawing (*e.g.* §§ 113, 114, 115, etc.) and numerical exercises afford an excellent means of familiarizing the student with the definitions.

2. The preliminary propositions (§§ 52-58) on account of their great simplicity are quite often confusing for the beginner and should not be made *the basis of the study of geometrical form*. Later on, however, too much emphasis cannot be laid upon this form in which demonstrations are presented.

3. Do not omit the exercises at the first reading, although it is not necessary at this time to study every exercise given in the text.

4. It is advisable to explain at length to the beginner the meaning of the very first exercises, since many students need some practice before they can understand geometrical language.

5. Many beginners experience considerable difficulty in trying to remember the data of a proposition; they forget the hypothesis. Graphical methods afford an excellent means to overcome this difficulty. Draw equal lines or equal angles in the same color, or if this is impracticable, mark them by equal