PLANE AND SOLID GEOMETRY

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BY

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INTRODUCTION.

THE study of Geometry is pursued with a threefold purpose.

1. To aid in the development of logical reasoning.

2. To stimulate the use of accurate and precise forms of expression.

3. To acquire facts and principles that may be of practical value in subsequent life.

The first two purposes are advocated because of their disciplinary importance; and when mathematics, because of its exactness, was the only science which furthered to a high degree these purposes, it was necessary for the student to devote a large part of his time to their study. But now other sciences, and even the languages and philosophy, claim disciplinary merit equal to that possessed by mathematics, although differing somewhat in the character of the training.

Hence it appears that the time has come when we can afford to hearken to the demands of the utilitarians, and give up those refinements in mathematics which have been retained for the mental discipline they bring about, but which are wholly lacking in practical application.

I have therefore, out of an experience as a computer and worker in applied mathematics, as well as a teacher, eliminated from this treatise all propositions that are not of practical value or needed in the demonstration of such propositions.

This exclusion leaves out about one-half of the matter usually included in our text-books on geometry. However, instructors will not entirely miss those familiar and interesting theorems which helped to swell the books they studied, — such theorems as fall below the practical standard are here given as exercises or as corollaries.

Until within the past two decades the verbiage of demonstrations was so elaborate that the student was tempted to memorize. The natural reaction resulted, and for a while our authors passed to the other extreme in symbolic expressions. While symbols and equational statements have the advantage of brevity, and convey information to the mind through its most receptive channel, — the eye, — still they discourage the use of language, and hence fail to develop by example and precept the employment of accurate and precise forms of expression.

I have therefore sought to use symbols and equations only in those cases where I could see no gain in spelling out their meaning.

Attention is called to the solution of problems. Ordinarily the problem is presumed to be solved, and then a demonstration is given to show that the solution was correct. This does not appear to me to be in the line of discovery. I have in all cases started with a statement of those known facts which plainly suggest the first step in the solution, then introduced the next step, giving the construction in connection with each stated fact, so that with the completed construction goes its own demonstration and the student sees the road along which he travelled, and understands from the beginning why he started upon it.

Great care has been exercised in the selection of exercises to follow each demonstration. They are intended to be variations upon the theorem demonstrated, or extensions of it, so that at least a portion of the required proof is suggested. At the end of each book will be found a larger collection of exercises, formulæ, and numerical examples.

In conclusion, I may state that no claim is made to originality in demonstration; I have employed those I deemed best; however, no statement is taken from another author unless it is the common property of several.

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