ELEMENTS OF PLANE GEOMETRY: FOR THE USE OF SCHOOLS

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Elements of Plane Geometry: For the Use of Schools by N. Tillinghast

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PREFACE.

This volume has been prepared with reference to what I believe to be the want of Schools; it is short, because the time commonly devoted to Geometry in schools is very limited: several of the propositions usually contained in geometrical treatises are omitted, because they are considered too difficult for those for whom this work is designed; and, for the same reason, rigor of demonstration has been departed from, in respect to some propositions which it was necessary to retain.

If the work has any merits, they will doubtless commend themselves to a candid public; if not, it must meet the fate of many other things on which much labor has been bestowed in vain.

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GEOMETRY.

BOOK I.

THE PRINCIPLES.—DEFINITIONS.

1. GEOMETRY is that science which treats of Magnitudes. Magnitudes may be considered under three dimensions—length, breadth, thickness.

2. A *line* has length only, without breadth or thickness.

The extremities of a line are points; hence,

3. A *point* has neither length, breadth, nor thickness, but position only.

4. A *straight line* is one, the direction of which is always the same.

5. When two straight lines meet, the opening between them is called an *angle*; the point of meeting is called the *vertex*; and the lines themselves, which are said to *contain* the angle, are called the *sides*.

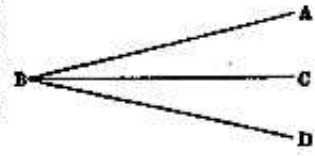
Thus the opening between the lines AC, CB, is called the angle made by those lines; the point at which C is placed is called the vertex; and the lines AC, BC, are called the sides.

An angle is sometimes designated by the letter at the vertex; or, more frequently, it is designated by the three letters at the extremities of the sides, the letter at the vertex being always placed in the middle of the three letters; thus the angle ACB, denotes the angle having the vertex C, and contained by the sides AC, BC.

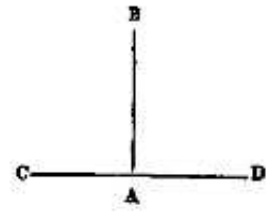
The pupil should be careful not to confound an angle with the length of its sides. It is evident, for example, that the lines DE, FE, make a much greater angle, that

is, are much further apart, than the much longer lines GH, HI.

Angles, like all other quantities, are susceptible of being added to, and subtracted from each other: thus the angle ABD is the sum of the two angles ABC, CBD; and the angle ABC is the difference of the two angles ABD, CBD.

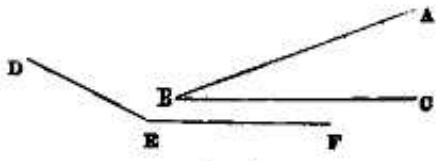


6. When a straight line, as AB, meets another straight line, as CD, so as to make the adjacent angles, CAB, BAD, equal to each other, each of these angles is called a *right angle*, and the line AB is said to be *perpendicular* to CD.



7. Every angle less than a right angle is called an

acute angle; and every angle greater than a right angle is called an *obtuse angle*. For example, ABC is an acute, and DEF is an obtuse angle.



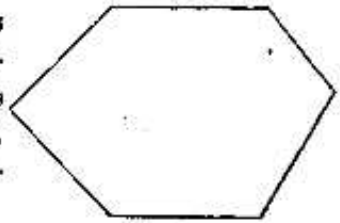
8. A *plane* is a surface, in which, if *any* two points be taken, the straight line drawn between those points will lie wholly in the surface.

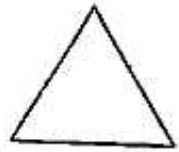
9. Straight lines are *parallel* when they have the same direction, as AB, CD.

Parallel lines cannot meet, how far so ever they are produced, (that is, continued.)

10. A *plane figure* is a plane terminated on all sides by lines.

11. If the bounding lines are straight, the figure is called a *polygon*; and the lines themselves, taken together, form the *contour*, or *perimeter* of the figure.



12. Among polygons, are more particularly distinguished the figure of three sides, called a *triangle*, and that of four sides, called a *quadrilateral*.

13. An *equilateral triangle* is one which has all its sides equal.