4. Join FC :—the straight line FC, drawn from the given point C, shall be at right angles to the given straight line AB.

PROOF.—1. Because DC is equal to CE (*Construction* 2), and FC common to the two triangles DCF, ECF.

2. The two sides DC, CF, are equal to the two sides EC, CF, each to each.

3. And the base DF is equal to the base EF. (*Construction* 3.)

4. Therefore the angle DCF is equal to the angle ECF. And they are adjacent angles.

5. But when the adjacent angles which one straight line makes with another straight line are equal to one another, each of them is called a right angle. (*Definition* 10.)

6. Therefore each of the angles DCF, ECF, is a right angle.

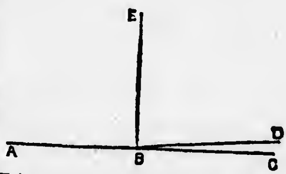
CONCLUSION.—Wherefore from the given point C in the given straight line AB, a straight line FC has been drawn at right angles to AB. *Which was to be done.*

COROLLARY.—By help of this Problem, it may be demonstrated that

Two straight lines cannot have a common segment.

HYPOTHESIS.—If it be possible, let the two straight lines ABC, ABD, have the segment AB common to both of them

CONSTRUCTION.—From the point B, draw BE at right angles to AB. (*Prop.* 11, *Book* I.)



DEMONSTRATION. — 1. Because ABC is a straight line, the angle CBE is equal to the angle EBA. (*Definition* 10.)

2. But because ABD is a straight line, the angle DBE is equal to the angle EBA. (*Definition* 10.)

3. Wherefore the angle DBE is equal to the angle CBE. (*Axiom* 1.)

The less angle equal to the greater; which is impossible. Therefore, two straight lines cannot have a common segment.

PROPOSITION 12.—PROBLEM.

To draw a straight line perpendicular to a given straight of unlimited length, from a given point without it.

GIVEN.—Let AB be the given straight line which may be produced to any length both ways, and let C be a point without it.