DEMONSTRATION.—1. Now, because the angle AGH is greater than the angle GHD, add to each of these the angle BGH.

2. Therefore the angles AGH, BGH, are greater than the angles BGH, GHD. (*Axiom* 4.)

3. But the angles AGH, BGH, are equal to two right angles. (*Prop.* 13, *Book* I.)

4. Therefore the angles BGH, GHD, are less than two right angles.

5. But those straight lines which, with another straight line falling upon them, make the interior angles on the same side together less than two right angles, will meet together if they be produced far enough. (*Axiom* 12.)

6. Therefore the straight lines AB, CD, will meet if produced far enough.

7. But they cannot meet, because they are parallel straight lines. (*Hypothesis*.)

8. Therefore the angle AGH is not unequal to the angle GHD; that is, the angle AGH is equal to the angle GHD.

9. But the angle AGH is equal to the angle EGB. (*Prop.* 15, *Book* I.)

10. Therefore the angle EGB is equal to the angle GHD. *Axiom* 1.)

11. Add to each of these the angle BGH.

12. Therefore, the angles EGB, BGH, are equal to the angles BGH, GHD. (*Axiom* 2.)

13. But the angles EGB, BGH, are equal to two right angles. (*Proposition* 13, *Book* I.)

14. Therefore, also, the angles BGH, GHD, are equal to two right angles.

CONCLUSION.—Wherefore, if a straight line, &c. (*See Enunciation.*) *Which was to be shewn.*

PROPOSITION 30.—THEOREM.

Straight lines, which are parallel to the same straight line, are parallel to each other.

HYPOTHESIS.—Let AB, CD, be each of them parallel to EF.

SEQUENCE.—AB shall be parallel to CD.

CONSTRUCTION.—Let the straight line GHK be drawn cutting AB, EF, and CD.

DEMONSTRATION.—1. Because GHK cuts the parallel straight lines AB, EF, the angle AGH is equal to the angle GHF. (*Proposition* 29, *Book* I.)