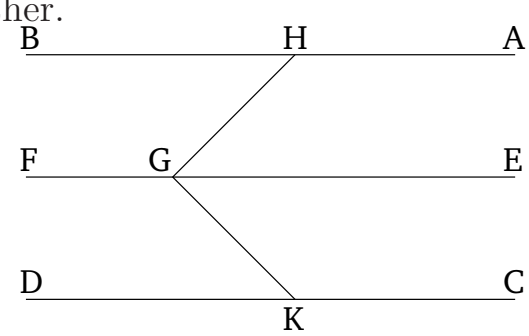
Book 11
Proposition 9

(Straight-lines) parallel to the same straight-line, and which are not in the same plane as it, are also parallel to one another.



For let AB and CD each be parallel to EF, not being in the same plane as it. I say that AB is parallel to CD.

For let some point G have been taken at random on EF. And from it let GH have been drawn at right-angles to EF in the plane through EF and AB. And let GK have been drawn, again at right-angles to EF, in the plane through FE and CD.

And since EF is at right-angles to each of GH and GK, EF is thus also at right-angles to the plane through GH and GK [Prop. 11.4]. And EF is parallel to AB. Thus, AB is also at right-angles to the plane through HGK [Prop. 11.8]. So, for the same (reasons), CD is also at right-angles to the plane through HGK. Thus, AB and CD are each at right-angles to the plane through HGK. And if two straight-lines are at right–angles to the same plane then the straight-lines are parallel [Prop. 11.6]. Thus, AB is parallel to CD. (Which is) the very thing it was required to show.