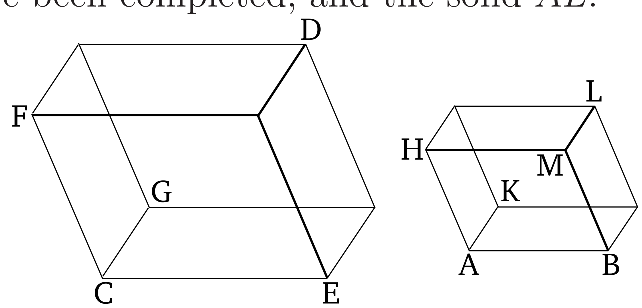
Book 11
Proposition 27

To describe a parallelepiped solid similar, and similarly laid out, to a given parallelepiped solid on a given straight-line.

Let the given straight-line be AB, and the given parallelepiped solid CD. So, it is necessary to describe a parallelepiped solid similar, and similarly laid out, to the given parallelepiped solid CD on the given straight-line AB.

For, let a (solid angle) contained by the (plane angles) BAH, HAK, and KAB have been constructed, equal to solid angle at C, on the straight-line AB at the point A on it [Prop. 11.26], such that angle BAH is equal to ECF, and BAK to ECG, and KAH to GCF. And let it have been contrived that as EC (is) to CG, so BA (is) to AK, and as GC (is) to CF, so KA (is) to AH [Prop. 6.12]. And thus, via equality, as EC is to CF, so BA (is) to AH [Prop. 5.22]. And let the parallelogram HB have been completed, and the solid AL.



And since as EC is to CG, so BA (is) to AK, and the sides about the equal angles ECG and BAK are (thus) proportional, the parallelogram GE is thus similar to the parallelogram KB. So, for the same (reasons), the parallelogram KH is also similar to the parallelogram GF, and, further, FE (is similar) to HB. Thus, three of the parallelograms of solid CD are similar to three of the parallelograms of solid AL. But, the (former) three are equal and similar to the three opposite, and the (latter) three are equal and similar to the three opposite. Thus, the whole solid CD is similar to the whole solid AL [Def. 11.9].

Thus, AL, similar, and similarly laid out, to the given parallelepiped solid CD, has been described on the given straight-lines AB. (Which is) the very thing it was required to do.