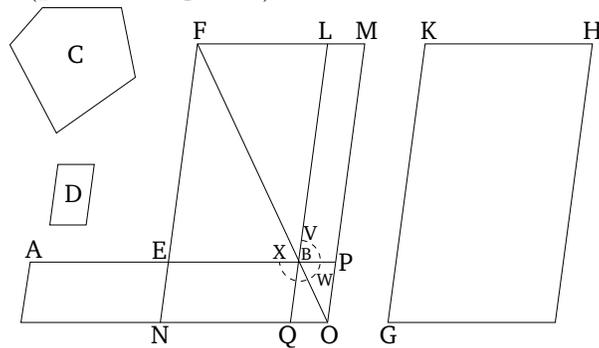


Book 6

Proposition 29

To apply a parallelogram, equal to a given rectilinear figure, to a given straight-line, (the applied parallelogram) overshooting by a parallelogrammic figure similar to a given (parallelogram).



Let AB be the given straight-line, and C the given rectilinear figure to which the (parallelogram) applied to AB is required (to be) equal, and D the (parallelogram) to which the excess is required (to be) similar. So it is required to apply a parallelogram, equal to the given rectilinear figure C , to the given straight-line AB , overshooting by a parallelogrammic figure similar to D .

Let AB have been cut in half at (point) E [Prop. 1.10], and let the parallelogram BF , (which is) similar, and similarly laid out, to D , have been described on EB [Prop. 6.18]. And let (parallelogram) GH have been constructed (so as to be) both similar, and similarly laid out, to D , and equal to the sum of BF and C [Prop. 6.25]. And let KH correspond to FL , and KG to FE . And since (parallelogram) GH is greater than (parallelogram) FB , KH is thus also greater than FL ,

and KG than FE . Let FL and FE have been produced, and let FLM be (made) equal to KH , and FEN to KG [Prop. 1.3]. And let (parallelogram) MN have been completed. Thus, MN is equal and similar to GH . But, GH is similar to EL . Thus, MN is also similar to EL [Prop. 6.21]. EL is thus about the same diagonal as MN [Prop. 6.26]. Let their (common) diagonal FO have been drawn, and let the (remainder of the) figure have been described.

And since (parallelogram) GH is equal to (parallelogram) EL and (figure) C , but GH is equal to (parallelogram) MN , MN is thus also equal to EL and C . Let EL have been subtracted from both. Thus, the remaining gnomon XWV is equal to (figure) C . And since AE is equal to EB , (parallelogram) AN is also equal to (parallelogram) NB [Prop. 6.1], that is to say, (parallelogram) LP [Prop. 1.43]. Let (parallelogram) EO have been added to both. Thus, the whole (parallelogram) AO is equal to the gnomon VWX . But, the gnomon VWX is equal to (figure) C . Thus, (parallelogram) AO is also equal to (figure) C .

Thus, the parallelogram AO , equal to the given rectilinear figure C , has been applied to the given straight-line AB , overshooting by the parallelogrammic figure QP which is similar to D , since PQ is also similar to EL [Prop. 6.24]. (Which is) the very thing it was required to do.