

[III.viii] Capitulum 8<sup>m</sup> de mensura et intensione in infinitum  
quarundam difformitatum

5 Superficies finita potest fieri quantumlibet longa vel alta per variationem extensionis absque eius augmento. Nam talis superficies habet longitudinem et latitudinem et possibile est ipsam secundum unam dimensionem quantumlibet augeri ipsa tamen non augmentata simpliciter dummodo secundum aliam dimensionem proportionaliter minuatur, et ita est etiam de corpore. Verbi gratia de superficie [Fig. 22]: accipiatur superficies quadrata pedalis, cuius basis sit linea *AB*; et sit alia superficies similis et equalis, cuius basis sit

III.viii: BL

1 intensione BL[V] extensione [FCG]

6 tamen om. L[ANS]

7 proportionabiliter V / diminuatur [VAN  
C] / ita est etiam B[VS] ita est [FMP  
C] ita etiam L[ANG]

III.viii On the measure and intension to infinity of  
certain difformities

A finite surface can be made as long as we wish, or as high, by varying the extension without increasing the size. For such a surface has both length and

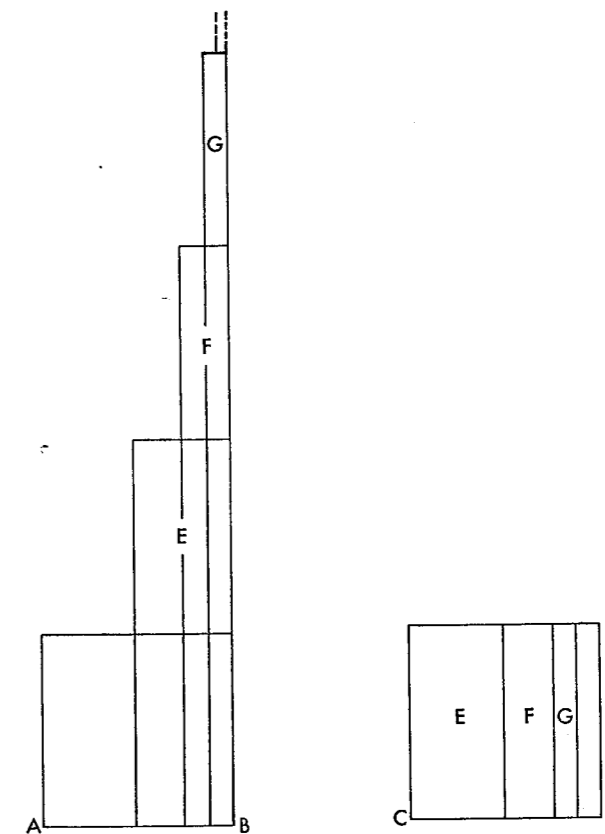


Fig. 22

Figures in MSS BLJG. MS L reverses the left drawing and adds another "foot" to the left of E on the right drawing. MS B makes the base of the left drawing CD and that of the right drawing AB. MS G reverses both drawings.

breadth and it is possible for it to be increased in one dimension as much as we like without the whole surface being absolutely increased so long as the other dimension is diminished proportionally, and this is also true of a body. For example<sup>1</sup> [see Fig. 22], in the case of a surface, let there be a surface of one square foot in area whose base line is *AB*; and let there be another surface, similar and equal to it,

III.viii

<sup>1</sup> See the Commentary, III.viii, lines 8-28.

10 linea *CD*, que ymaginetur in infinitum dividi per partes continue propor-  
 tionales secundum proportionem duplam super basim *CD* eodem mo-  
 do divisam, et sit *E* prima pars, et *F* secunda, et *G* tertia, et sic de aliis.  
 Sumatur igitur prima istarum partium, scilicet *E*, que est medietas sui totius,  
 et ponatur super primam superficiem versus extremum *B*. Deinde super  
 15 totum hoc ponatur secunda pars, scilicet *F*, et iterum super totum hoc ponatur  
 tertia pars, scilicet *G*, et ita de aliis in infinitum. Quo facto, ymaginetur  
 basis *AB* dividi per partes continue proportionales secundum proportionem  
 duplam, eundo versus *B*. Et statim patebit quod super primam partem  
 20 proportionalem lineae *AB* stat superficies alta per unum pedem, et super  
 secundam partem stat superficies alta per duos pedes, et super tertiam per  
 tres et super quartam per quatuor, et sic ulterius in infinitum, et tamen  
 totalis superficies non sit nisi duo pedalia prius data in nullo augmentata.  
 Et per consequens totalis superficies que stat super lineam *AB* est precise  
 25 quadrupla ad illam sui partem que stat super primam partem proportionalem  
 eiusdem lineae *AB*. Illa ergo qualitas sive velocitas que proportionaretur  
 in intensione huic figure in altitudine esset precise quadrupla ad partem sui  
 que foret in prima parte temporis vel subiecti secundum huiusmodi divisio-  
 nem. Verbi gratia: sit prima pars proportionalis secundum proportionem  
 30 duplam ipsius lineae *AB* versus extremum *A* alba seu calida aliquantum et  
 secunda duplo albior et tertia triplo albior et quarta quadruplo et sic con-  
 sequenter in infinitum utrinque secundum seriem numerorum. Tunc ex  
 predictis apparet quod totalis albedo lineae *AB* est precise quadrupla ad albe-  
 dinem prime partis, et ita esset de albedine superficiali, ac etiam de corporali  
 si conformiter esset intensa.  
 35 Eodem modo si aliquod mobile moveretur in prima parte proportionali  
 alicuius temporis taliter divisi alicuius velocitate, et in secunda moveretur  
 duplo velocius, et in tripla triplo, et in quarta quadruplo, et sic consequenter  
 in infinitum semper intendendo, velocitas totalis esset precise quadrupla ad  
 40 velocitatem prime partis, ita quod illud mobile in tota hora pertransiret  
 precise quadruplum ad illud quod pertransivit in prima medietate illius hore;  
 ut si in prima medietate vel parte proportionali pertransiret unum pedem,  
 in toto residuo pertransiret tres pedes et in toto tempore pertransiret  
 quatuor pedes. Istud autem alias demonstravi demonstratione subtiliori et

19-20 superficies...stat om. [FMPC]

20 partem om. B / stat...alta om. L[N] / pedes:  
partes L / tertiam: tertiam partem L[AN]

21 tres: tres pedes L[AN]

22-23 totalis...consequens om. L

24 sui partem om. L superficiem V

25-29 Illa...AB bis L

27-28 divisionem: dimensionem L[AN]

28 pars om. B[V]

29 A om. [V] DL / aliquantum: aliquantum  
L[SC]

30 quarta: quarta in L[ANS]

31 utrinque B[FMPC] utrobique [VC]  
utriusque L[AN] utrinam ?[S]

32 apparet B[VFMSG] patet L[ANPC]

33 ita om. B / ac etiam B[SG] et etiam [V] et  
L[ANFMP]

35 moveretur: movetur B moveatur [A]

whose base line is *CD*. Let the latter surface be imagined to be divided on line *CD* to infinity into parts continually proportional according to the ratio 2 to 1, with its base divided in the same way. Let *E* be the first part; *F* the second, *G* the third, and so on for the other parts. Therefore, let the first of these parts, namely *E*, which is one half the whole surface, be taken and placed on top of the first surface towards the extremity *B*. Then upon this whole let the second part, namely *F*, be placed, and again upon the whole let the third part, namely *G*, be placed, and so on for the others to infinity. When this has been done, let base line *AB* be imagined as being divided into parts continually proportional according to the ratio of 2 to 1, proceeding towards *B*. And it will be immediately evident that on the first proportional part of line *AB* there stands a surface one foot high, on the second a surface two feet high, on the third one three feet high, on the fourth four feet high, and so on to infinity, and yet the whole surface is only the two [square] feet [in area] previously given, without augmentation. And consequently the whole surface standing on line *AB* is precisely four times its part standing on the first proportional part of the same line *AB*. Therefore, that quality or velocity which would be proportional in intensity to this figure in altitude would be precisely four times the part of it which would be in the first part of the time or the subject so divided. For example, let the first part (towards extreme *A*) of the proportional parts divided along *AB* according to the ratio 2 to 1 be a certain amount white or hot, the second twice as white [intensively], the third three times as white, the fourth four times, and so on to infinity on both sides according to the [natural] series of [whole] numbers. Then from the prior statements it is apparent that the total whiteness of line *AB* is precisely four times the whiteness of the first part; and it would be the same for a surface, or for a corporeal, whiteness, if it were increased in intensity in similar fashion.

In the same way, if some mobile were moved with a certain velocity in the first proportional part of some period of time, divided in such a way, and in the second part it were moved twice as rapidly, and in the third three times as fast, in the fourth four times, and increasing in this way successively to infinity, the total velocity would be precisely four times the velocity of the first part, so that the mobile in the whole hour would traverse precisely four times what it traversed in the first half of the hour; e.g., if in the first half or first proportional part it would traverse one foot, in the whole remaining period it would traverse three feet and in the total time it would traverse four feet. Moreover I have demonstrated this elsewhere with a more subtle and difficult demonstration.<sup>2</sup> But this present treatment con-

<sup>2</sup> *Ibid.*, lines 35-44.41 ut: et L[AN] / pertransiret: transivit 43-45 Istud...pretermitto om. [G]  
L[AN] 43 demonstravi: demonstratur L42 pertransiret<sup>1</sup>: transiret [AN]