ON THE DIVISION OF SPACE WITH MINIMUM PARTITIONAL AREA

BY

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1. This problem is solved in foam, and the solution is interestingly seen in the multitude of film-enclosed cells obtained by blowing air through a tube into the middle of a soap-solution in a large open vessel. I have been led to it by endeavours to understand, and to illustrate, GREEN's theory of »extraneous pressure» which gives, for light traversing a crystal, FRESNEL's wave-surface, with FRESNEL's supposition (strongly supported as it is by STOKES and RAYLEIGH) of velocity of propagation dependent, not on the distortion-normal, but on the line of vibration. It has been admirably illustrated, and some elements towards its solution beautifully realized in a manner convenient for study and instruction, by PLATEAU, in the first volume of his *Statique des Liquides soumis aux seules Forces Moléculaires.*

2. The general mathematical solution, as is well known, is that every interface between cells must have constant curvature [1] throughout, and that where three or more interfaces meet in a curve or straight line their tangent-planes through any point of the line of meeting intersect at angles such that equal forces in these planes, perpendicular to their line of intersection, balance. The *minimax* problem would allow any

[1] By »curvature» of a surface I mean sum of curvatures in mutually perpendicular normal sections at any point; not GAUSS's »curvatura integra», which is the product of the curvature in the two »principal normal sections», or sections of greatest and least curvature. (See THOMSON and TAIT's *Natural Philosophy,* part i. §§ 130, 136.)