weight of columns of the fluid reaching to the centre; Huyghens took, as his basis, the prependicularity of the resulting force at each point to the surface of the fluid; Bouguer conceived that both principles were necessary; and Clairaut showed that the equilibrium of *all* canals is requisite. He also was the first mathematician who deduced from this principle the Equations of Partial Differentials by which these laws are expressed; a step which, as Lagrange says,[12] changed the face of Hydrostatics, and made it a new science. Euler simplified the mode of obtaining the Equations of Equilibrium for any forces whatever; and put them in the form which is now generally adopted in our treatises.

The explanation of the *Tides*, in the way in which Newton attempted it in the third book of the *Principia*, is another example of a hydrostatical investigation: for he considered only the form that the ocean would have if it were at rest. The memoirs of Maclaurin, Daniel Bernoulli, and Euler, on the question of the Tides, which shared among them the prize of the Academy of Sciences in 1740, went upon the same views.

The *Treatise of the Figure of the Earth*, by Clairaut, in 1743, extended Newton's solution of the same problem, by supposing a solid nucleus covered with a fluid of different density. No peculiar novelty has been introduced into this subject, except a method employed by Laplace for determining the attractions of spheroids of small eccentricity, which is, as Professor Airy has said,[13] "a calculus the most singular in its nature, and the most powerful in its effects, of any which has yet appeared."

12. *Capillary Action.*—There is only one other problem of the statics of fluids on which it is necessary to say a word,—the doctrine of Capillary Attraction. Daniel Bernoulli,[14] in 1738, states that he passes over the subject, because he could not reduce the facts to general laws: but Clairaut was more successful, and Laplace and Poisson have since given great analytical completeness to his theory. At present our business is, not so much with the sufficiency of the theory to explain phenomena, as with the mechanical problem of which this is an example, which is one of a very remarkable and important character; namely, to determine the effect of attractions which are exercised by all the particles of bodies, on the hypothesis that the attrac-

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[12] *Méc. Analyt.* ii. p. 180. [13] *Enc. Met.* Fig. of Earth, p. 192.
[14] *Hydrodyn.* Pref. p. 5.