

## The Free Surface of Water.

Hydrostatics tells us that <sup>every particle</sup> at the free surface of water <sup>exercises an equal force</sup> is level when the liquid is in equilibrium. ~~But strictly speaking this is not the case and I will now explain the reason.~~



For

1. Consider ~~two~~ <sup>particles</sup> liquid molecules A, B on the free surface of the water in an open vessel. Now, in order that ~~the~~ water may be in equilibrium, it is necessary that A & B must <sup>exercise</sup> ~~have~~ the same <sup>force</sup> ~~weight~~, (by the principle of the liquid pressure.) in order that A & B may have the same weight they must be under the influence of the same gravity and as gravity varies as the distance from the centre of the earth, it follows that A and B must be equally distant from the earth's centre i.e., the surface of the water must be parallel to the earth's surface. (as A and B are two molecules arbitrarily selected.) But the earth being a sphere, its surface is not plane; therefore the surface of the water cannot be a plane.

But any little portion of the earth's surface such as occupied by the vessel, may be considered to be a plane on account of its minuteness when compared <sup>with</sup> the whole earth's surface. Consequently the surface of the water, under consideration, may also be considered to be level.

But, as it is a decided mistake to think any large portion of the earth's surface, such as occupied by the great oceans, to be a plane or level, it easily follows that the oceans must be spherical in the surface which is always parallel with the earth's surface by the above reasoning when the water is in equilibrium.

Exercise on Physics  
The Free Surface of Water.

1<sup>st</sup> grade A.

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If you take account of Earth's rotations  
in its orbit and ~~in~~<sup>round</sup> its axis as well as  
the centrifugal force, your reason may,  
it seems to me, be more clear!