Force Fields for Young People

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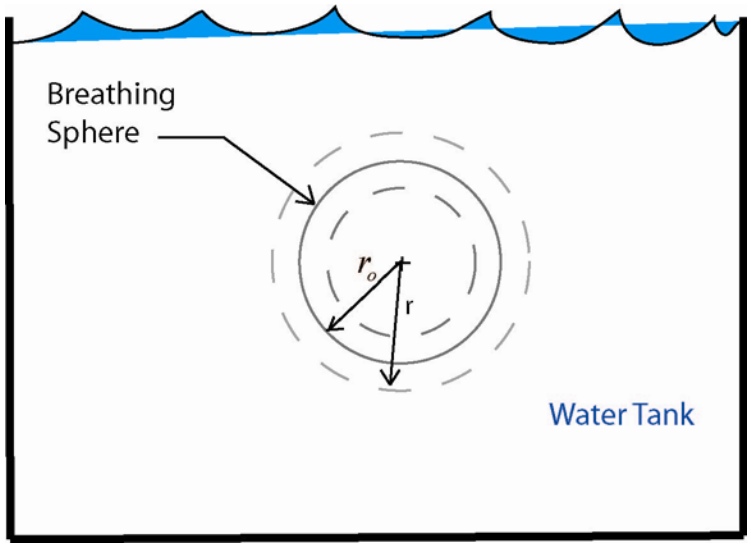
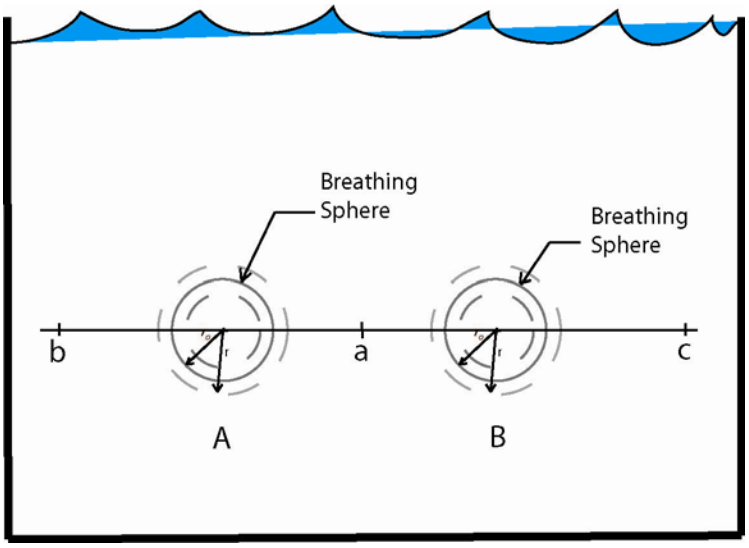
What in the world is a "field?" Frequently physicists will speak and write about fields. More pedantic physicists likely would use the term "force fields." We will try here to explain what is meant by a force field.

First we consider a large tank filled with water. At the center of this tank let us place a small hollow elastic sphere. This sphere is designed so that it can be expanded and contracted much as a balloon can be expanded and contracted. The figure below shows such an arrangement:



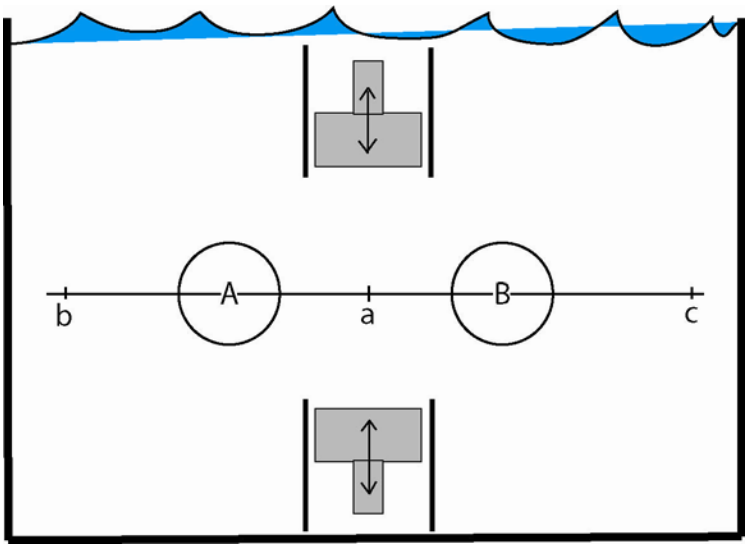
A sphere which expands and contracts in the way described here is a "breathing sphere." The center of the sphere is fixed to the tank. When the sphere expands the water flows radially outward from the sphere and when the sphere contracts the water flows radially inward. This radial in and out flow is called a "flow field." The flow also is called a "force field" for the reason to be shown later.

Let us now consider a large tank with two such identical Breathing Spheres “A” and “B”:



When the spheres are breathing out of phase there is no transverse flow between A and B since the surfaces of A and B closest to point “a” are moving in the same direction. However, at point “b” breathing sphere A creates a transverse flow and thus lowers the pressure at point “b” and likewise at “c.” Thus, the pressure between A and B pushes the spheres apart.

One way to illustrate the reduction in pressure due to transverse flow is to consider pistons located radially around the line b-a-c. Let the pistons be oscillating in phase. See the figure:



Now an interesting thing happens. When the spheres breathe "in phase," i.e., when A expands B expands and when A contracts B contracts also; The spheres attract each other. When breathing out-of-phase the spheres repel each other. Since the two flow fields acting simultaneously produce a force each flow field is called a force field.

The mechanism producing the attractive force is explained now. If we look at a point "a" midway between A and B when the spheres breathe out they cause the fluid to flow transverse to the line a-b and this flow averaged over a cycle causes the pressure to be lowered acting on the plane through point "a" perpendicular to line b-a-c. Similarly the pressure averaged over a cycle on perpendicular planes through points "b" and "c" is lowered, but approximately half as much as at point "a" since the flow at "b" is mostly due to the sphere at A and at point "a" the flow is the same as at "b" due to A but also in the same amount due to sphere B. As the pistons move radially outward there will be radial outward flow between A and B and so a tendency for A and B to come closer together. When the pistons come back slowly they will just bring the pressure back up to the initial pressure but not above it. Thus, over a cycle the pressure between A and B will be lessened from the static (non-flowing) case and consequently the spheres will be attracted toward each other.

A complete detailed analysis of this phenomenon has been developed. The resulting equation is:

$$F = \pm \rho \frac{8\pi^2 a^2 b^2 \alpha\beta}{T_e^{\,2} R^2}$$

The force is F and it is attractive (+) when the breathing is in phase and is repulsive (-) when the breathing is out-of-phase. The density of the medium (water) is ρ, the radii of the spheres are *a* and *b* and the (half) amplitudes of vibration are α and β, the separation distance of the sphere centers is R, and T_e is the time for one cycle of oscillation. (The oscillation rates of the two spheres are the same.)

Experiments have been performed using breathing spheres in water and they verify this equation.

The planets and stars are immersed in an ethereal gas that pervades the whole universe. Each heavenly body is made up of atoms and they are made of proton-electron pairs. The proton-electron pairs act like breathing spheres and their action on the ethereal gas is the gravitational field. Each proton-electron pair of the Earth produces a gravitational force field. All the electron-proton pairs in the Earth are superimposed upon each other to produce a strong gravitational force field. All the electron-proton pairs in your body superimposed on each other produce your gravitational force field. The actions of your breathing spheres coupled with the action of the Earth's breathing spheres pull you and the Earth together – you pull the earth toward you and the Earth pulls you toward it. (Actually, the gaseous ether outside you and the Earth push you together. There is no such thing as a pulling force in the universe. Even the electron does not pull on the proton – the gaseous ether pushes them together.)