

Electrostatics III

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The laws of electrostatics are stated: Like charges repel: Unlike charges attract. Logically either of these laws could be derived from the other one; the statements are complimentary.

Experiments show that there is attraction between any particles that are not at exactly the same charge level; that is unequal charges experience an attractive force between them. Thus any two particles that are similarly charged in relation to the charge level of their environment will be attracted apart by the surrounding particles that are at a different charge level.

The definition of charge needs to be clearly stated. Electric charge is a relative quality. It must have a reference point just as electrical voltage must have a reference point. The usual reference for electric charge is the earth or ground. When a particle or object has fewer electrons than the objects at ground or earth potential it is positively charged. When a particle or object has more electrons than the objects at ground or earth potential it is negatively charged.

It is necessary to reconcile the laws of electro statics with gravitation which is an electrical force. Reference my treatise: "A Unified Theory of Matter, Gravity and Electricity" wherein it is demonstrated that the force of gravity corresponds to a residual positive electric charge on all matter. There is a residual positive electric field about all atoms and molecules and thus about all matter that is the gravitational force.

That there is a very strong attractive force between positive and negative charges is evident within the atom; this is the force that holds the electrons in orbit about the nucleus of the atom. This attractive force is normally much stronger than that of the residual positive electric field of the gravitational force.

Vibration due to wind or vibration from heat forces the atoms so close together that the electric field about the atom is disrupted by the close approach of atom to atom; the outer electrons are then radiated away as electromagnetic radiation. Thus gasses and matter are positively ionized. When matter or gasses are positively ionized the attraction of positive to positive becomes much stronger. This is exhibited at the base of storm clouds that produce tornadoes; the base of clouds are highly positively charged as indicated by the positive cloud to ground lightning. A similar phenomenon occurs when the ocean surface becomes positively charged producing the strong winds of a hurricane. Evidence from chemistry indicates that there is attraction between positively charged objects, such as the nuclei of atoms. Cations, positively ionized atoms, are smaller than neutral atoms or anions, negatively charged atoms illustrating the attraction of positive to positive.

With the exception of when atoms or molecules are ionized the laws of electrostatics are usable. Experiments listed below indicate no repulsive force rather like charges are attracted apart by the attraction to the unlike charges in the environment about them. The apparent repulsion of like charges is due to them being attracted apart. Charges move to equalize the charge. An analogy of this is air molecules moving such as to equalize pressure—one might say that high pressure areas are repelled by high pressure areas, and low pressure areas repel low pressure areas and further that dissimilar pressure areas attract.

Experiments:

A series of experiments were performed with a special dual leaf electroscope with two outside electrodes. A high voltage direct current power supply was used to charge the leaves and outside electrodes in carrying out these experiments. The experiments confirmed that only when there is a difference in the voltage and thus the charge between the leaves and the external electrodes is there any movement of the leaves.

Thus if two negatively charged particles or objects (charged in relation to earth ground) are placed in an enclosure that is charged negatively to the same potential there is no repulsion between these objects. Similarly if two positively charged particles or objects (charged in relation to earth ground) are placed in an enclosure that is positively charged to the same potential there is no repulsion between them. This was illustrated with the outer electrodes of the electroscope serving as the enclosure, and the two leaves of the electroscope as the charged particles.

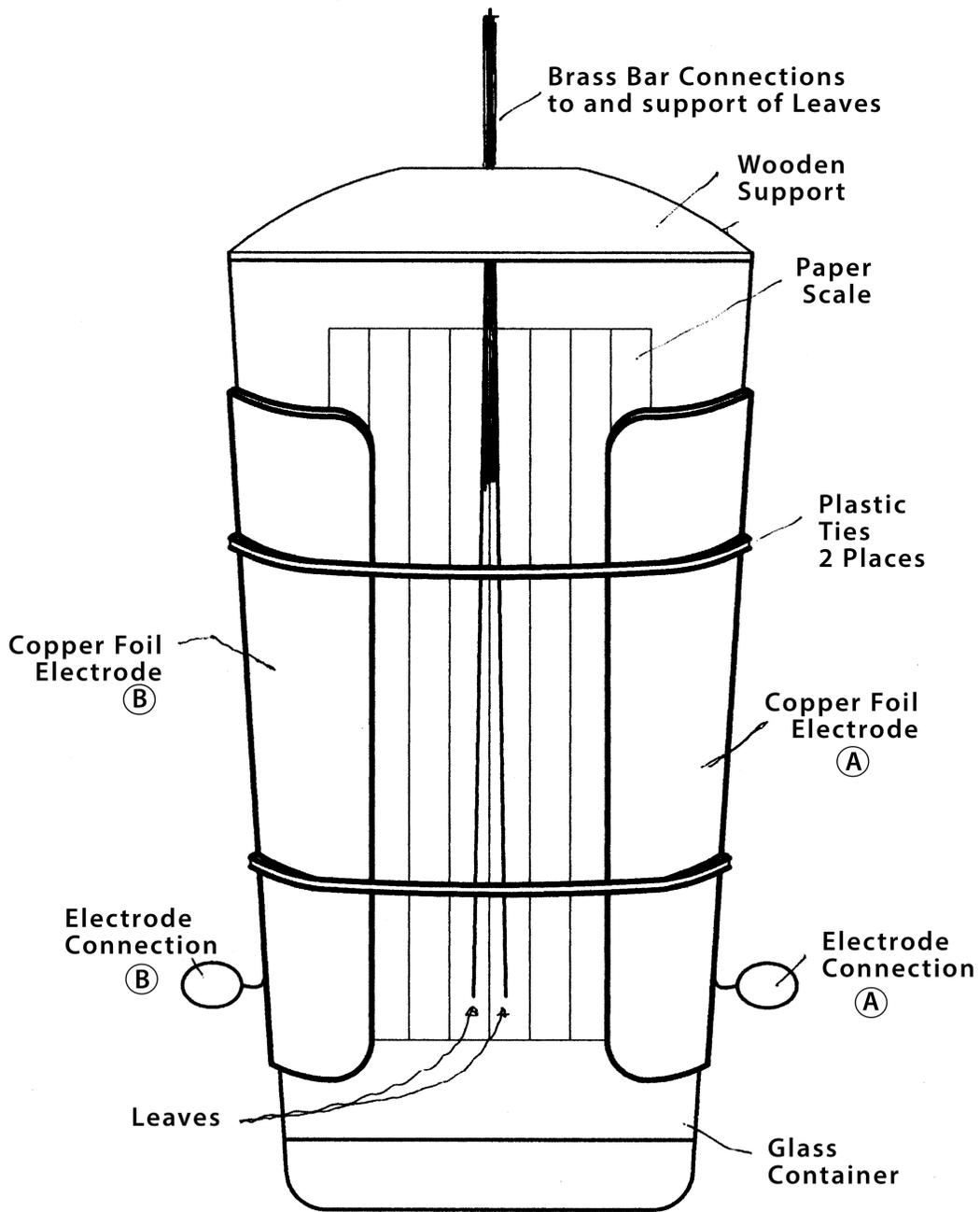
With the leaves connected to ground and the outer electrodes connected to positive 10,000 volts the leaves separate. Repeating this at negative 10,000 volts produced an equal separation of the leaves.

With the outside electrodes connected to ground and the leaves connected to positive 10,000 volts the deflection of the leaves was equal to the deflection as above. Repeating this with negative 10,000 volts produces the same deflection.

The above experiments were repeated using positive and negative 5,000 volts. The results were the same except the displacement of the leaves was reduced at 5,000 volts.

With the outside electrodes and the leaves connected together there is no displacement of the leaves regardless of the voltage applied. This was tested at 5,000 and 10,000 volts, both positive and negative voltages.

These experiments demonstrate that it is not repulsion between charges, charged in relation to earth ground, that cause the apparent repulsion of like charges, rather it is the attraction of the charges to the surroundings which are at a different charge level that cause them to be attracted apart.



Dual Leaf Electroscope