same height, as evidenced by the distance to which the stream is thrown. But you will also remark that the flow will last three times longer from the large reservoir than from the small one.

When speaking of the energy with which water rushes from its reservoir, we call it pressure, and the pressure varies with the height of the reservoir. When the top of the water in the reservoir is 33 feet above the opening at the outlet, we say that there is pressure of an atmosphere, or in other words 15 pounds to the square inch. The pressure depends not at all on the size of the reservoir, but on the height of the liquid above its outflow. Allow me to illustrate this by putting side by side two reservoirs, one of which, as in the last experiment, contains three times as much water as the other, but in this case arranged differently, viz., each quantity on top of the other. If I now open the outlet tubes, you will see that the pressure is three times greater, as evidenced by the distance to which the stream is projected, or the rapidity with which it could be made to turn a wheel.

You will also remember that if we were to connect the outflow tube with another reservoir, the current will continue only so long as there is a difference in level between the surfaces of the two liquids.

There is just one other point which I must ask you to remember, and that is that given two reservoirs of the same height, or endowed with the same energy or pressure, the outflow will be in proportion to the resistance offered by the narrowness of the tube.

This can be shown by the following experiment: Here are two reservoirs of the same capacity and with the same pressure. To one is attached a tube of a certain length, and to the other one a much longer tube of, however, the same diameter.

The pressure is the same in the two reservoirs, but the friction or resistance offered by the outlet tube is greater in the one than in the other. The resistance of water in the tube varies with the diameter and the length of the pipe.

Let us take again two reservoirs each containing the same quantity of liquid. The outflow from these vessels will vary according to the pressure and the resistance of the tubes. In other words, the outflow per minute will be the pressure divided by the resistance.

When water is travelling along a pipe of large calibre, and suddenly comes to a much smaller one, the resistance is greatly increased.

All of these principles are exactly applicable to electricity: only some of the words are changed. For pressure substitute electromotive force; resistance remains the same; and for outflow substitute quantity or volume.

As I have already said, electromotive force in electricity corresponds with head or pressure in speaking of water. When we place an easily attacked metal such as zinc in an active liquid such as sulphuric or hydrochloric acid and water, the latter is decomposed into its constituents—hydrogen and oxygen. The oxygen combines with the zinc to form with the sulphuric acid sulphate of zinc, and the hydrogen is set free. A new form of energy called electromotive force is then created, or rather the energy put into the zinc when it was smelted by heat is converted into electromotive force. In order to collect this force and lead it out of the bottle in which it is formed, it is necessary to introduce therein a non-attackable conducting body such as carbon or copper.

The liberated hydrogen follows the direction of the current which is from the attacked to the non-attacked substance; but arriving at the carbon it deposits itself there in the form of small bubbles, which after a time completely cover it. And as gas is a very bad conductor of electricity, the current is mechanically hindered by it.

Not only that, but the hydrogen, being itself an element, is capable of setting up with the newly formed oxygen a secondary gas battery current, called a current of polarization of opposite direction to the principal current, which it rapidly weakens. As this hydrogen must be got rid of, this is accomplished in the following manner: An easily decomposable substance is introduced into the circuit, which readily gives up its oxygen to the nascent hydrogen, with which it forms water.

In the Daniell cell, sulphate of copper is thus used.

In the Marie Davy cell, sulphate of mercury is used.

In the Leclanche cell, peroxyde of manganese is used.

In the Bunsen, nitric acid.

In the Grenet battery, bichromate of potash.

In the Leclanche cell for the attacking fluid no acid is used as acid, but the acid is supplied gradually by the decomposition of hydrochlorate of ammonia, a compound which is easily decomposed by the current into ammonia and hydrochloric acid, which latter attacks the zinc, and the ammo-