

4 TEXT-BOOK OF RADIOLOGY.

The action of a resistance is best explained by reference to the case of water, and we may compare the current from our battery or dynamo to water in a tank at, say, 100 feet above the ground, with a pipe leading down and provided with a stop-cock. The pressure at the valve will be that of the height of the water—100—and will remain so, provided the pipe is a large one to keep down internal friction, whether the valve is open or shut. If the valve is slightly opened water will dribble out slowly, but only because the rate of flow is under control, and we have not reduced the pressure (voltage) behind it, as we shall find out if we attempt to check this dribble with the finger; the pressure only becomes manifest when further resistance is offered to its escape. Similarly with electricity a resistance of this kind controls the rate of flow (ampères), but if we open the circuit on the distal side of the resistance we will find the voltage is there as before. To avoid confusion, remember that *closing* the water tap cuts off or *opens* the water circuit.

A resistance arranged this way is called a *series* resistance and is indispensable for the control of our apparatus; it is very important to have a proper idea of its action from the beginning, as it explains many matters that constantly crop up in the course of our work. To speak of a *series* resistance as reducing, or "breaking down," the voltage is a misuse of terms that has added greatly to the difficulties of beginners. It only controls the rate of flow, and the voltage or pressure is always there and ready to assert itself the moment an opportunity arises.

If the foregoing has been made clear, when we speak of the 100 volt main, we mean that the electric current available from the supply company is at a pressure of 100 volts, similarly as we might speak of the water main supply being at a pressure of 100 lbs. per square inch. If we open the water tap to a certain extent we will get a strength of current equal to one gallon in a minute, and if opened twice as much the current will be