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### *Original Communications.*

#### ELECTRICAL MEASUREMENTS.

By A. LAPHORN SMITH, B.A., M.D.

*Read before the Canadian Electrical Society of Montreal, Sept. 3rd, 1888.*

Mr. CHAIRMAN AND GENTLEMEN.—It is with feelings of considerable diffidence that I accede to your request to read a paper before this Society. My object in wishing to belong to it was rather to learn than to teach; so that I feel I must throw myself wholly on your indulgence in offering you the following considerations on electrical measurements. The reason why I choose this, for me, somewhat difficult subject, was that during the succeeding meetings we will probably have the pleasure of listening to some very deep but interesting papers from some of the more learned members, in the course of which continual reference will be made to terms which to them are as plain as the alphabet, but which may be beyond the grasp of those of us who received our scientific education before the days of electricity; But first I must apologise to those who are thoroughly up in this modern science if during the course of this paper I take up a little of their time in explaining carefully things which they already know; my excuse must be found in the maxim that in addressing an audience, we should keep in our mind's eye, not the person present who knows most about the subject of which we are speaking, but the one whom we suppose to know least about it. I shall therefore hope that before I have finished my

address this evening I shall have been able to make the terms, vol, ohm, ampere and coulomb familiar to every one to whom they are not as yet very clear.

If we pick up any work on electricity, whether applied to medicine, surgery, or the arts, we cannot read a page hardly without meeting with some of these words. And when, in a few years, electricity shall have completely taken the place of gas, and when motive power will be furnished from electrical stations, it will become more and more important to know the meaning of these words. Before long such terms as volt, ohm, ampere will be as common standards as gallons, pounds and inches.

As the electrical current is an imponderable fluid, we can best acquire a clear idea of its measurable characteristics by comparing it with water. Now you know that when you have a reservoir of water at a certain height above the ground, and you make an opening at the bottom of it, the water will run out, and it does not matter whether the reservoir holds one gallon or one million gallons, the pressure with which the water is forced out of the opening at the bottom is just the same.

As any one who has not thought of this might not agree with me, I will just demonstrate this fact by means of these two reservoirs, both the same height, the one of which contains exactly three times the amount of the other. I place them side by side and open the tubes at their bottoms simultaneously, and you will perceive that the pressure or force with which the water escapes is just the same in one and in the other at the beginning, and as long as the two liquids are at the