MR. A. E. EDKINS.

WE have pleasure in presenting to our readers the accompanying portrait of Mr. A. E. Edkins, President of Toronto Branch No. 1 of the Canadian Association of Stationary Engineers. Mr. Edkins, who is about 30 years old, was born in Birmingham, England, where he received an ordinary common school education. At the age of 16 he was apprenticed to the machinist's trade with Messrs. Part & Co., of Lancashire. After remaining with this firm about three years, he came to Canada, and was engaged by Messrs. Manning & Macdonald, who placed him in charge of machinery and plant used in the construction of public works. In this capacity he remained four years. He had charge of the electric plant during the construction of the Lachine Bridge, near Montreal, and on its completion was drafted into the service of the C. P. R.

About three years ago Mr. Edkins came to Toronto and entered the service of Messrs. A. Jardine & Co., as engineer-in-charge. On the termination of his agreement with this firm a year ago, he took the management of the steam and electric plant of Messrs. T. Eaton & Co., where he may be found at present.

Mr. Edkins is a young man of excellent character and ability, whose zeal for the advancement of the interests of the Toronto branch of the Canadian Association of Stationary Engineers has resulted in placing him in the positions of Secretary, Vice-President, and finally President of that organization.

MR. A. E. EDKINS.

THOUGHTS ON ELECTRIC UNITS.

IN mechanical work we use quite a variety of units for measurement, and these units are quite well understood by most intelligent mechanics. Electric measurements are mechanical, and the units adopted are directly related to the mechanical units with which we are familiar. The variations are in sizes of the units and their names. The reasons for adopting new units for electric work are similar to those which induce us to measure coal by the ton, butter by the pound, gold by the pennyweight, diamonds by the carat. We understand that the carat is a certain small part of a ton, but we do not care enough about this relationship to learn what part of a ton a carat is. The human mind has a better idea of the "fitness of things" than to measure diamonds by the same units as we do coal. Therefore when scientific men were called upon to establish units for electric measurements, they sought such sizes as the force demanded, and then worked to establish accurately some standards to represent the units adopted. As these units were new they required new names, and what better course could have been adopted than to apply the names of those men who had taught the world so much of electricity as to make a need for these new units of measurement?

An electrician knows that his units are certain small parts of the common mechanical units, but he dosen't think of this relationship, except in those calculations, involving horse power parlance, any more than the diamond dealer thinks of the relation between the carat and the ton. The units mostly in use are the ohm, the volt and the ampere.

We know that any conductor offers resistance to the passage of electricity, just as we know that pipes offer resistance to the passage of water, and a unit was established for measuring this resistance. It was called an ohm, in honor of the German mathematician who originated the simple formula so much used by electricians.

A unit was established to measure the force which "pushes" electricity through conductors. It is called a volt, in honor of Volta, the great Italian electrician. We have two units for expressing the force which pushes water forward, used according to circumstances. If the water is flowing through pipe systems like city water works we use the "pound" to measure the pressure, but if flowing down streams, as used for water power, we use the "foot of head" as the unit.

A unit of quantity was also established, and was called an ampere in honor of a famous French electrician. There are many other units in use by electricians, but the three mentioned are those most in use, and a full understanding of these is of vast importance to the mechanic. When the uses of these units are well understood it then becomes easy to appreciate the others that have been adopted, but are much less frequently used.

These three units are directly related to one another. The ampere, for instance, is the quantity of electricity which would be forced through a conductor which had a resistance of one ohm by an electric pressure of one volt. To know the work to be done by an electric current we must know both the force and the quantity, which is the same as we require in water power calculations. To say, for instance, that 1,000,000 gallons of water pass a certain place in one day would not convey any idea of the power to be obtained therefrom. The hydraulic engineer must know the number of feet fall that he could obtain for this water. Tell this engineer that you have 1,000,000 gallons per day with a drop of 20 feet, and he could very soon tell you the horse power it would give. So also with electricity; to say that we have 10 amperes would give the electrician no idea of the work that could be done by the current. He must know the force behind it. If, however, you say that you have 19 amperes and a force of 100 volts he could very soon calculate the amount of horse power obtainable, and he could also tell what could be accomplished with this current in the various ways in which it is used.

The ampere is in reality the measurement of the rate of flow, so to speak, of the electric current, and it does not really give an idea of the quantity passing, because for this we need also to specify the time. Perhaps the best comparison is that of a trotting horse. To say that a horse passes us at a 2:40 pace would give us no idea how far he travels, but to say that he travels at a 2:40 pace for 2 minutes and 40 seconds would give us the idea that he had travelled just one mile. Using the second as a unit of time, then if we have one ampere for one second we have in reality a unit of quantity, and electricians have called this coulombe. This term has not come into general use, however, and another unit of quantity has been adopted in practical work. In this case the hour is used for the unit of time, and to express this unit we simply connect the two terms by a hyphen, viz., ampere-hour, and this is the unit used for most electric meters. Unfortunately this unit conveys no idea of the work that can be done by the current. For instance, one ampere-hour of electricity, with pressure of 50 volts, would only be worth one-half as much as one ampere-hour with 100 volts, and if an electric light company furnishing electricity with a pressure of 50 volts should charge the same price per ampere-hour as another company supplying electricity at 100 volts, the former would be receiving twice the rental of the latter. This difficulty has given rise to the practice of registering the work in lamp hours when used for lighting, and the most satisfactory meters to the public are those which indicate the work in this