cerns on the waste areas of our country underlaid by peat, and the wide stretches of these solitudes will become resonant with the welcome sounds of industrial activity.

CANADIAN PEAT ASSOCIATION.

The Canadian Peat Society was formed at Ottawa on July 28th. All the Canadians present at the annual meeting of the American Peat Society joined the new organization and from now on a vigorous campaign will be carried on to interest Canadians in the peat industry and to join the new society. Dr. J. McWilliams, of London, is the president, Mr. L. B. Lincoln, of Montreal, vice-president, and Mr. A. J. Forward, of Ottawa, secretary-treasurer. The headquarters of the new organization will be at Ottawa and its annual meetings will be held here.

It will remain affiliated to the American society. It will work along very similar lines to the American society, but will not do much experimenting. It will approach the railways with regard to securing rates when necessary and be advisory to the Government.

ELEMENTARY ELECTRICAL ENGINEERING.

L. W. Gill, M.Sc.

CHAPTER V.

ALTERNATING CURRENT APPARATUS AND SYSTEMS.

This series of articles will be continued for some months. They will be of particular interest to the student of electrical work and the civil engineer anxious to secure some knowledge of the simpler electrical problems.

General Principles.—Before proceeding to a discussion of alternating current systems as used in commercial work, it is necessary to consider some of the laws which govern the generation and flow of alternating current.

If the flow of electricity in any circuit changes periodically in direction, and the total quantity which flows in each direction in each period is constant, the current is said to be "alternating." If the total quantity which flows in each direction in each period is not constant, the current is said to be "oscillating." The difference is illustrated in Fig. 49, where the two currents are represented by graphs plotted on a time base. The term "cycle" is applied to any one of the repeated series of changes. The change of flow in the case of an alternating current may follow any one of an infinite number of laws, and before it is possible to deal mathematically with any particular case it is necessary to know the law which governs the change in its magnitude and direction. The above remarks, except regarding quantity, apply to e.m.fs. as well as currents.

A very simple alternating current system is shown in Fig. 50. The generator is composed of a wire bent into the form of a rectangle of length **l** and width **d**, and the ends are connected to two insulated rings r_1 and r_2, the axes of which are coincident with that of the rectangle. This rectangle is placed between the poles of a magnet and revolved at the rate of **n** revolutions per second. As the wire revolves it cuts the lines of force which pass from one pole of its magnet to the other, and an e.m.f. is generated in it. At any instant the e.m.f. generated in one side of the rectangle is in the opposite direction in space to that generated in the other side, but, when the rectangle is considered as a circuit, the e.m.fs. in the two sides act in the same direction around the circuit. This e.m.f. acts in one direction around the rectangle during one-half of the revolution

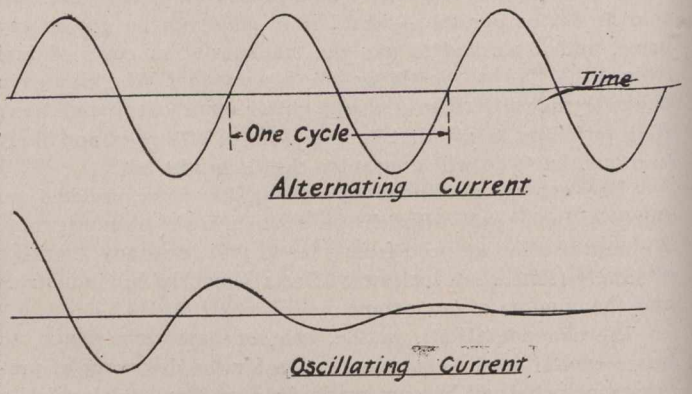

FIG. 49

and in the opposite direction during the other half. The e.m.f. impressed on the rings is thus an alternating one, each revolution being accompanied by a complete cycle of changes. If two fingers or brushes, b_1 and b_2, are fixed so that they press against the rings, the alternating e.m.f. will be impressed on these brushes, and if the latter are connected by a conductor of any kind, an alternating current will flow through the closed circuit formed by the rectangle, brushes and external conductor.

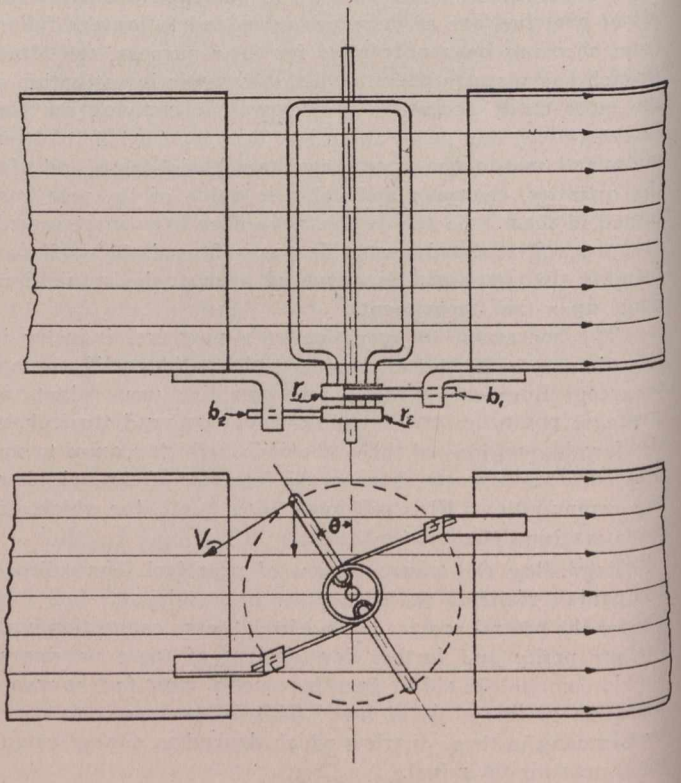

FIG. 50

Let H represent the strength of the magnetic field (supposed uniform).

Let V represent the linear velocity of the sides of the rectangle.