Electrical Department.

THE ELECTRICAL OUTLOOK.

There is a limit to the things which electricity can do. It is quite safe to make this assertion, but those who have given the subject the profoundest study have, at present, the most shadowy notions where this limit is to be fixed. Our knowledge of the real principles of electrical science is, indeed, but rudimentary. Even those best posted in the science must confess that what they know relates more to the effects produced by electricity, than to the true nature of the fluid and the laws which govern its various operations. In the field of visible effects alone, there is still much to learn.

To take the phenomena of currents as an example—no sooner have some people fancied that they are getting pretty well at the bottom of the action of current, than the multiphase system comes up to make a revolution in motors, if not in the general application of the science to the mechanical arts. The generation of electricity in waves, suddenly following each other in exact analogy—as will probably be found—to the waves of the ocean, or like the regulated gusts of the South Atlantic trade winds, opens up a wide field for fresh investigation. And yet every week brings up some new development, some new application of electricity even upon the old lines of work and the old lines of thought, if anything connected with modern electrical science can be called old.

One of the most important of the industrial problems which electricity is destined to solve is the revolution of the present systems of distributing and centralizing power. The subject is receiving new and increased attention throughout the world, and if the estimates of American and foreign electricians are not astray as to the power that they may get from Niagara Falls, then Canada is destined to be the seat and centre of the chief electrical force of the earth. No pent-up Niagara confines our powers. In the Lachine Rapids, formed by the vast volume of the St. Lawrence, and the Sault-au-Recollet Rapids of the Back River of equal power on the opposite side of the river, Montreal has a source of power second only to Niagara. Quebec has the Montmorenci Falls with its tremendous depth of fall; Ottawa has its Chaudiere and Rideau Falls; while we could name a hundred Canadian towns and villages with hitherto unused electrical force sufficient to give light and power both to themselves and neighboring communities. Besides this there are hundreds of falls and rapids on rivers and streams remote from any present town or settlement, and utterly unused even as water power for turbine wheels. In short, Canada with its net work of lakes, rivers and streams—unique in the map and plan of the world—has a wealth of unharnessed electricity greater than all the rest of the world combined. Canada with its exhaustless electric power, Canada with its immeasurable stores of coal, Canada with its remarkable beds of special minerals, such as nickel, mica and asbestos, all rising in importance in the mechanical arts—Canada is the controlling centre of future power in the Western hemisphere. We only need to awake to the fact.

SOME articles on electrical subjects will be found in the first four pages of this issue.

THE MULTIPHASE SYSTEM OF ELECTRICITY.

In another article we have alluded to this new system of generating electricity by wave motion. In a paper before the New England Cotton Manufacturers' Association, C. J. H. Woodbury describes the system as follows:—

In the dynamo the electricity is generated in the armature in currents passing to and fro, first in one direction and then in the other, forming what is known as the alternating current. The function of the commutator and the brushes upon a dynamo is merely to convert this alternating current into a continuous current. There is no reason why an alternating current is not just as well suited for electric lighting as a continuous current.

But many years ago, when Sir Frederick Siemens, one of the pioneers in the application of electricity, made a dynamo for arc lighting, he required a continuous current to operate the regulator in the upper part of his arc lamps, and instead of trying to invent a form of regulator to feed the carbons which could be operated by an alternating current, he placed the commutator and brushes on the dynamo, producing a continuous current, and in that manner set for years the practice of electric lighting by continuous currents, although in the meantime there have been numerous devices for regulating the carbon-feeding mechanism of arc lamps by alternating currents.

Electricians have of late years begun at the place from which they were diverted a number of years ago, to investigate and apply alternating currents for lighting and power purposes. These investigations have opened up a wealth of electrical principles and applications, of which the world has but just seen the beginning.

One of these new forms of alternating currents is what is called the multiphase current, of which the electricity is generated in waves, one wave following another before the first wave has been completed, using currents of electricity which will affect other apparatus by induction through space and without the intervention of metallic conductors, being as a matter of principle comparable to the results produced upon a telephone system when it receives by induction the noise of electric motors or the click of the message transmitted along telegraph wires in juxtaposition to the telephone wires, or even the voice which is transmitted over other telephone wires.

In its application to these multiphase motors, I would say that the method of construction differs entirely from the motors hitherto in use. Instead of using commutator and brushes to transfer electricity from one part of the armature to the other, as has been already alluded to in the continuous current motors, the magnetism revolves through the magnet, causing the armature to revolve in exact synchronism with it.

For purposes of comparison the general arrangement of these motors may be compared to that of a hat rim, as representing the circular magnet, and a ball of twine stands for the armature on the inside, which is a suitably-wound collection of insulated wires joined together at the ends and not electrically connected to any-