

# NIKOLA TESLA AND THE ELECTRICAL OUTLOOK.

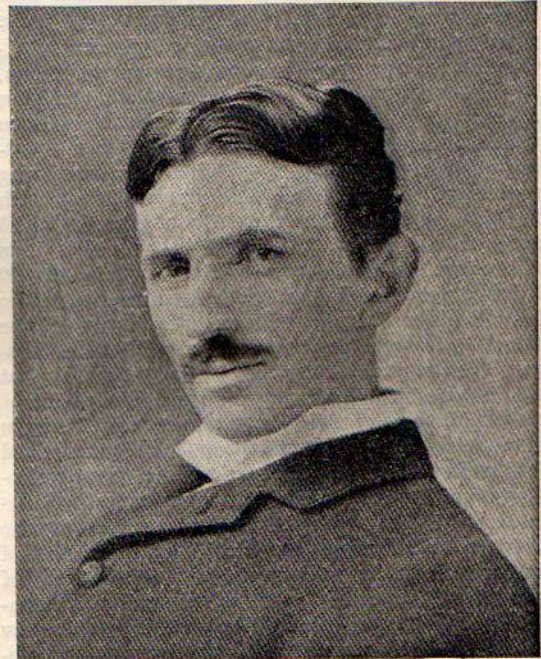
## THE NEW DEVELOPMENT IN POWER TRANSMISSION.

WHEN Nikola Tesla last gave to the world the results of his explorations into the field of electricity, the predictions which he ventured as to the possibilities of his discoveries were skeptically received. That was two years ago, in a lecture which he delivered before the Electrical Congress in session at the World's Fair. "His work is brilliant, but of what use is it?" said one of Europe's leading savants when Mr. Tesla had finished; and in this exclamatory interrogation the learned scientist voiced the general opinion of the whole Congress. Mr. Tesla was regarded as a theorist and his inventions as impracticable.

A few weeks ago we witnessed one of the triumphs of this industrial age, the yoking into service of old Niagara herself. While this event is yet news, there comes the announcement that one of our great electrical companies has formed a business alliance with the largest locomotive works in the country, with the view of substituting electricity for steam on our railroads. These two projects are themselves an answer to the question asked by the incredulous savant: Of what use is Mr. Tesla's brilliant work? for neither of them would at this time have been practically possible but for his discovery known as the "rotating magnetic field," which opened the way to the conversion (by means of the alternating, as against the direct current) of electrical into mechanical energy and the economical transmission of power through long distances. This discovery forms the basis of the Niagara Company's attempt to utilize on a large scale that enormous power which for centuries has been running to waste and thus to turn machinery in towns and cities so far away as Buffalo, 20 miles distant, and perhaps New York and Chicago. And it underlies the hardly less bold venture of the Westinghouse and Baldwin companies to drive a through railway express by electricity. It is not too much to say that the Tesla motor is behind all the large attempts at power transmission by electricity which are being made throughout the country, not only in the fields of manufacture and transportation, but also in mining, irrigation and farming.

The "rotating magnetic field" was discovered by Mr. Tesla over ten years ago, when the problems engaging the attention of the electrical world were the furnishing of light and the transmission of sound. The advantages of the alternating current as applied to lighting were already recognized, but no attempt had been made to adapt it to motor work if, indeed, it had been seriously thought of. The direct current then in use was difficult to transform and not practicable for long distances. Mr. Tesla was at least the first to conceive an effective method of utilizing the undulating current. As every one knows, a small piece of soft iron, when placed close

to an ordinary magnet (or bar of iron around which is passing an electric current), will be drawn to the magnet and adhere motionless to it. It occurred to Mr. Tesla that if instead of a bar of iron he should take an iron ring and use two alternating currents, so regulated that one would be positive in value when the other was negative, he could, by means of wires wrapped alternately about the ring,



NIKOLA TESLA.

produce a magnetic current which would travel around the ring in accordance with the frequency of the alternations in the electric currents. His theory worked in practice and he thus had a magnet the north and south poles of which revolved while the magnet itself remained stationary. A piece of iron pivoted at its centre and placed within the magnetic field of the ring, and concentric to it, would, therefore, be revolved by the changing poles of the magnetized ring. In this way Mr. Tesla was able to convert electrical into mechanical energy much more simply, economically and effectively than it had been possible to do it by the direct current. It was now only necessary to pass alternating currents around the axle of a wheel in order to set in motion the machinery of a mill or drive a railway engine.

For transmission purposes, as well as in transforming electrical into mechanical energy, Mr. Tesla was soon able to demonstrate the superiority of the

