WIRELESS POWER

By RICHARD MAXWELL WINANS

A BOLT of lightning passing through the earth, and returning to the point of entry with undiminished force, was the astounding discovery made by Nikola Tesla, "Wizard of Electricity," inventor, scientist, scholar.

As the issue of this momentous discovery Professor Tesla has perfected a practical system of wireless power distribution. And the universal application of the wireless transmission of energy will speedily solve vast and far reaching problems in commerce and the industries, and will eventually revolutionize the whole structure of the world's social and political economy.

Already Tesla has advanced his discovery of the wireless transmission of electrical energy to the point of practical application. At his great experimental plant on Long Island he has secured actual and satisfactory results in wireless power transmission that go far toward making for its early and successful introduction into commercial and industrial uses. When all the details of his transmitting system are complete, and the world at large shall adopt wireless power in its general utilities, the wonders of science and invention, of dynamics and mechanics, the arts and the social scheme, that we employ and enjoy today will appear as the antiques of a primitive age.

The magic Lamp of Aladdin was never rubbed to such fruitful purpose, nor did it ever create such undreamed-of wonders, as will the application of the wireless transmission of energy to some of the most simple contrivances, the everyday utilities of the present; let alone the improved devices that will develop in its use, with which inventive genius will provide us for the future.

In recounting the incidents leading up to and the elemental details of the discovery that unexpectedly and unquestionably opened the way to this great realization, Tesla recites that during a systematic research, for which he had long trained himself, which he had assiduously conducted for several years, to the end of perfecting a system of wireless transmission of energy through the natural media, the earth and air, he came in 1898 to recognize three essential requirements. The first was to produce a transmitter of tremendous power; the second, to perfect a system for individualizing and isolating the energy transmitted; the third, to acquaint himself with the laws governing the propagation of electrical currents through the earth and air.

IN May, 1899, Professor Tesla selected, for various scientific reasons, a large plateau sixty-five hundred feet above sea level, in the vicinity of Colorado Springs, where the surroundings contributed ideal conditions for careful observations. Such were the climatic and other conditions that he could hear claps of thunder four to five hundred miles away; and he could have improved upon this record had it not been for the tedium of waiting for the sounds to arrive, in definite intervals, as shown by an electrical indicating device—nearly an hour before.

Having established his laboratory and adjusted the highly sensitive instruments necessary to the proposed experiments, he learned that the earth was literally alive with electrical vibrations. Colorado, with its dry and rarefied atmosphere, is famed for its natural displays of electricity; static electricity being abundantly developed. The discharges of lightning during storms are not only frequent, but often violent to an inconceivable degree. During his stay there were in the course of one electrical storm approximately twelve thousand discharges within an observed period of two hours, occurring inside a radius of less than thirty miles. Many of these discharges were so heavy that they resembled gigantic trees of fire.

About a month after his Colorado observations began Tesla was both surprised and puzzled to note that his instruments were affected more decidedly by discharges taking place at great distances than those nearby. This presented a perplexing problem, which was made the more mystifying when careful observation disclosed the fact that the differences were not due to intensity of discharges, nor varying relation between the periods of the receiving circuits and those of the terrestrial disturbances.

ONE night when meditating over these experiences," says Tesla, "I was suddenly staggered by a thought. The same thought had presented itself to me years ago; but I had then dismissed it as absurd and impossible. And that night when it recurred to me I banished it again. Nevertheless, my instinct was aroused, and somehow I felt that I was nearing a great revelation.

"It was on the third of July (1899) when I obtained the first decisive experimental evidence of a truth of overwhelming importance for the advancement of humanity. A dense mass of strongly charged clouds gathered in the west, and toward evening a violent storm broke loose which, after spending much of its fury in the mountains, was driven away with great velocity over the plains. Heavy and long persisting arcs formed almost in regular time intervals. My observations were now greatly facilitated and rendered more accurate by the experiences already gained. I was able to handle my instruments quickly, and was prepared. The recording apparatus being properly adjusted, its indications became fainter and fainter with the increasing distance of the storm, until they ceased altogether. I was watching in eager expectation. Sure enough, in a little while the indications again began, grew stronger, gradually decreased, and ceased once more. Many times, in regularly recurring intervals, the same actions were repeated, until the storm, as evident from simple computations, with nearly constant speed had retreated to a distance of about two hundred miles. Nor did these strange actions stop then, but continued to manifest themselves with undiminished force.

"When I made this discovery I was utterly astounded. I could not believe what I had seen was really true. It was too great a revelation of Nature to accept immediately and unhesitatingly. Subsequently I confided my discovery to my assistant, and he afterward confirmed it, as did also a noted engineer in a German university. Several opportunities were presented later which brought out still more forcibly and unmistakably the true nature of the wonderful phenomenon. No doubt whatever remained—I was observing stationary waves! Impossible as it seemed, this planet, despite its vast extent, behaved as a conductor of limited capacity.

"All effects diminish as the extreme line of their radius increases. For instance, sound effects would be exhausted within a given radius, which would be determined by atmospheric conditions. The general law is that at one-half the distance the intensity of the effect is fourfold. And this is also true of electrical activities. But this discovery demonstrated something that was altogether contradictory to all previous experience. Not only could an electrical current be passed through the earth with undiminished intensity, but, under certain conditions, its force would be even augmented with distance.

"Had this discovery been worked out at that time it would have given us practical wireless transmission of power on a commercial scale at least ten years ago. The world, however, was not then, and is not yet, ready to receive it. Man—that is, the layman, the man unversed in dynamic forces and scientific engineering—does not understand how one element is related to another. If I had attempted at that time to place upon the market an apparatus for the wireless transmission of power, the world would not have utilized it. It may be years before it is educated to receive these new ideas and the perfection of this discovery. It is difficult for the average citizen to comprehend or to form an adequate idea of the tremendous significance of this marvelous revelation of Nature, or the stupendous possibilities that the development and perfection of this discovery assure as a heritage to humanity."

THE full development of a possible twenty-five hundred millions of horsepower from the waterfalls and streams of the United States has been materially handicapped and restricted by the limited area over which hydroelectric energy may be practically transmitted by wire. The falls of Niagara alone could be made to supply a fifth of all the power used at present by industry and the railroads. At some remote day their power may be entirely utilized by diverting the full volume through tunnels to turbines at night, charging immense storage batteries with its energy for use during the next twelve hours, and again turning the water over the falls during the day to satisfy the sentiment of the people.

Aside from Niagara, however, most of the great power sites of the country are so distant from the centers of