

# France to Talk to Germany by Wireless.

## Prof. Pupin, However, Sees a Limit to Further Extension of System.

**W**ITHIN a few days a wireless telephone has been in successful operation over a distance of 250 miles. Preparations are being completed in Paris which, it is promised, will make it possible to talk without wires to the German frontier. Using the Eiffel Tower as a sending station, it is even promised by enthusiastic electricians that it will soon be possible to talk across the Atlantic through the air. The powerful new batteries which are now being installed at the Eiffel Tower are also expected by believers to transmit wireless telegraph messages from Paris to Madagascar. Even the wireless transmission of power is alleged to be a possibility for the near future. In connection with this enthusiastic prophecy the judgment of Prof. M. I. Pupin of Columbia University will be heard with unusual interest.

"The mere idea of wireless transmission, of telephoning or telegraphing through empty space, exerts a curious fascination on the mind," said Prof. Pupin in discussing the situation. "The inherent difficulties are little understood by the average layman. It should be borne in mind that in wireless telegraphing or telephoning we must send out the message in all directions, much the same as the sun radiates light and heat. The receiving apparatus at a great distance picks up a minute part of the original initial force, just as the earth, for instance, receives the slightest fraction of the heat and light of the sun. You see what must be overcome.

"Then, again, in wireless telephoning the difficulty is still further increased. The electric waves which must be sent out broadcast into space are very rapid. They may be represented by a line resembling a series of M's, whereas the sound waves are much slower and may be represented by a gentle undulating line. Thus it is only the crest of the electric waves which can be caught and transformed into intelligible sound.

"All this means that the conditions must all be extremely favorable for the transmission of wireless telephone messages. The atmosphere must be just right, the sending and receiving instruments in perfect accord, or the message will not be received. Now, in electricity, where the progress is so rapid, it is fool-

ish to prophesy one way or the other, but it seems to me that the inherent difficulties of wireless telephoning fix a definite limit to its general use. It is possible today, of course, to talk under favorable conditions for many miles in all directions. I have no doubt that with such a sending station as the Eiffel Tower remarkable results are being obtained, but I am



Prof. Pupin.

not hopeful of its universal application. It is significant that the United States Navy experimented with the wireless telephone at some length and abandoned the work."

"Would the wireless telephone facilitate communication?" was asked.

"Well, that's an interesting point," replied Prof. Pupin. "You see, we would never get away from it. It is possible, of course, to telephone through walls, through the human body for that matter. What privacy would we have left? It's had enough as it is, but with the wireless telephone one could be called up at the opera, in church, in our beds. Where could one be free from interruption? I sometimes think that what we want is a fool-proof telephone. If American ingenuity could invent one, any fool can use the telephone, you see, you

are at the mercy of every one. Now, if we had a telephone which was less simple, less perfect, life would be much easier.

"The telephone, by the way, is one of the most characteristic products of American genius. The American keenness of perception, ingenuity, and energy are admirably illustrated in the telephone as we know it to-day. Nowhere else in the world has the telephone been developed as in the United States. The Europeans are simply copying us. Americans do not appreciate what they have done in developing the telephone. One must compare telephone conditions here and abroad to realize it.

"It is doubtless a question of a very little time when we shall be talking from New York to San Francisco. We now talk from Boston to Denver. By doubling the circuit—that is, by talking from Boston to Denver and return—it has been proved beyond any question that it is entirely practical to talk more than 3,000 miles. It is entirely possible to talk across the Atlantic. Whether it would pay to lay the proper kind of cable is another matter. But to return. Suppose a telephone line were installed in Europe 3,000 miles in length. It would reach clear across the Continent. Such a thing is beyond the dreams of Europeans.

"Why, after all, should we care for the wireless telephone? I believe we will see it in operation between ships at sea, and doubtless for considerable distances. This will probably be its chief utility. The value of the wireless at sea is, of course, above praise. But on land, think what would happen. There would be thousands of voices traveling in all directions. There would be a babel of voices. And what a chance for long-distance eavesdropping."

"What of the wireless transmission of power?" "There is another dream," said Prof. Pupin. "Can't you see what would happen? Power would be sent out in all directions, just as the wireless messages are sent out, or the heat of the sun is radiated. You would be sending your goods all over the shop, so to speak. There would be 10,000 people receiving it who do not want it, to one who did. What a waste of energy. It is not practicable to transmit power by wires from Niagara to New York, what hope is there of transmitting it without wires?"