RADIO NEWS

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Short Radio Waves

DURING the last decade we have as a rule employed for radio communications wave-lengths varying from 10,000 meters down to about 600 meters for commercial work. The broadcast era inaugurated about two years ago witnessed a reduction of this wave-length down to about 360 meters. Long before that time, American amateurs had been transmitting on a wave-length of 200 meters and although our radio experts told us that very long wave-lengths such as 10,000 meters and over were absolutely necessary for long distance work, such as trans-oceanic, the amateur proved with his puny wave-length that he could span the ocean with facility.

Over three years ago, in an editorial, we mentioned and prophesied that the greatest wonders in store for radio lie in short wave-lengths, and we seem to be just about coming to this. About a year ago Marconi made the announcement that he could send radio waves in any direction by means of parabolic wave reflectors. The wave-lengths he used were about 20 meters or thereabouts. This was a great step in advance. Recently Dr. E. F. Nichols, director of the Nela Research Laboratories and his Associate, J. D. Tear, went Marconi one better and actually produced a wave-length of a little less than 1/100th of an inch! This is most extraordinary because for the first time radio waves have been made to overlap heat waves. Heat waves of 1/175th of an inch have been obtained in the laboratory, so that *we have now actually merged radio waves into heat waves.*

Just what this statement means to the future of radio seems impossible to even dimly discern today. One can make the wildest guesses and will probably hit far below the mark. For instance, if we say that the future radio generator may be an ordinary burning candle, this may sound like a wild dream, nevertheless the results of Nichols and Tear will make such a thing possible. If the radio waves can be converted into heat waves, or rather intermingled with them, there is no reason why the flame of an ordinary candle cannot be made to give out radio waves by some sort of transformation which as yet we can only see dimly in the future.

On the practical side, the era of short waves is just dawning. Recent experiments of Dunmore and Engel, of the Bureau of Standards, have shown that an entirely new field may be opened by short wave-lengths of about 10 meters or less. Such wave-lengths can and will be used for house to house communications in low power radio telephony. These waves can be directed in a beam so that they will only go in one direction. In other words, they can be directed just as a light ray is directed, by a search light, with the advantage that the concentrated radio beams can be made to go much further than light rays.

Hertz, in his famous researches years ago, has shown that electro-magnetic waves—radio waves in other words—can be refracted exactly like light rays. By means of a huge lens made of pitch, Hertz actually focused a beam of radio waves upon a chosen spot. By means of a pitch prism he refracted his waves much as we refract light rays, through a crystal prism. Indeed Nichols and Tear used similar appliances; for instance, they used a focusing lens made of paraffin where Hertz used a lens made of pitch.

There is a tremendous field for research open to the amateur in the wave-lengths between 10 meters and 1 meter, and entirely new fields will be opening up once we avail ourselves of these new wave-lengths. For one thing, interference is practically done away with. Static, the enemy of all radio experimenters, entirely vanishes when such a wave-length as 10 meters is used. For communication between friends and for short distances, up to a few miles, a 10-meter wave-length is ideal and likely to bring out new and unsuspected phenomena. Unless all indications are wrong, there will be a general stampede down to the low wave-length during the next few years. It will be accompanied by entirely new varieties of instruments which we cannot even conceive of clearly today. This is certain, mainly because the frequencies for the low wave-lengths become truly enormous. Thus, for instance, the frequency for 350 meters with its number of oscillations is 856,628. On 200 meters, the frequency has already become 1,499,100 vibrations per second, while for wave-lengths of 10 meters, the frequency has gone up to the tremendous value of 29,982,000 oscillations per second.

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