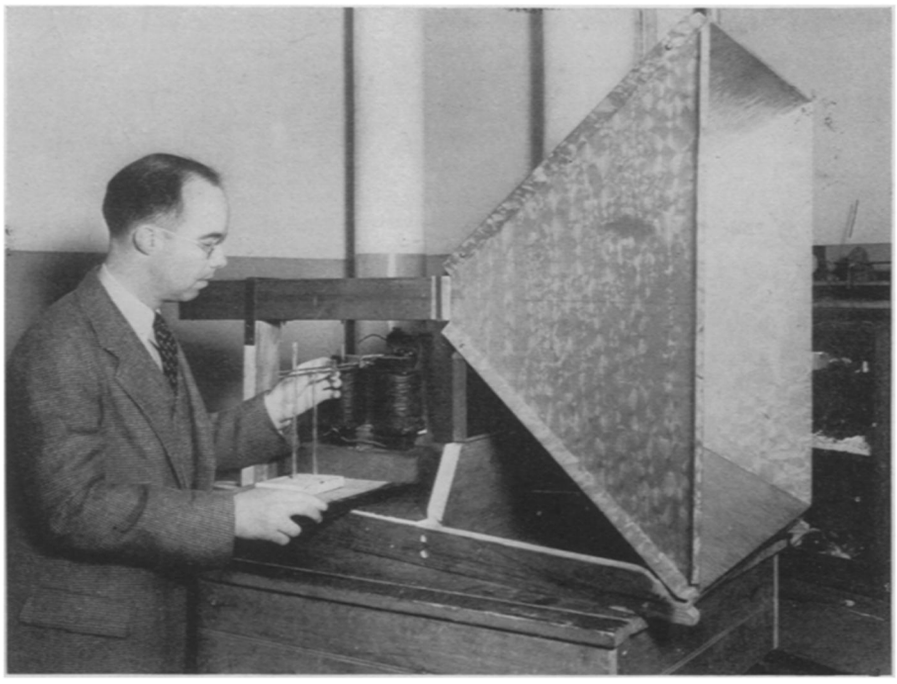

RADIO "HORN"

Dr. Wilmer L. Barrow here adjusts the transmitter by which radio waves are started from the square hollow tube into the throat of the horn which can project them into space.

RADIO

New Type "Horn" Antenna Produces Sharper Radio Beams

Electromagnetic Device Acts as Acoustical Horns Do On Sound; May Be Useful in Micro-Ray Communication

A SIMPLE yet highly efficient method of producing a beam of ultra-high frequency radio waves, which may have widespread application in controlling "blind" airplane landings in fog, snow or rain, has been developed at the Massachusetts Institute of Technology by Prof. Wilmer L. Barrow.

The development may also have important uses in ship navigation and similar problems to which these short waves are adapted. This range of wavelengths, roughly less than a meter long, is the subject of intense study throughout the world these days in an effort to find still other uses.

Announcement of the advance was made by Dr. Barrow before a joint meeting of the Institute of Radio Engineers and the International Scientific Radio Union.

Major feature of the new method is a flared electromagnetic horn which is used as an "antenna" to project the waves into space much as acoustical horns concentrate sound waves into a beam. It holds particular promise of being useful in so-called micro-ray communication in which signals are sent over a narrow pencil-like beam at wavelengths only a tenth of a meter long. Several micro-ray communication channels have been in use in Europe for the past three or four years, the one across the English Channel probably being the best known.

In discussing application of the apparatus to hazardous blind airplane landings, Dr. Barrow said a further increase in the reliability and ruggedness of the sending and receiving apparatus is needed before the shorter waves can be used. Research is already under way on this problem at Technology under the sponsorship of the Bureau of Air Commerce.

Possibilities of radiating waves from electromagnetic horns were first described by Dr. Barrow two years ago in connection with the transmission of telegraph, telephone and television signals through the inside of hollow metal pipes. Development of the horns has now reached the state where it is possible to design them for particular applications with an engineering precision possibly greater than results for antennas of more conventional construction.

Can't Double Back

A major reason for this high agreement between calculations and experiment is that the waves, starting from a small rod in the throat of the horn, are forced to follow the guiding surfaces of the horn straight out into space and cannot easily double back on wires and other apparatus to be radiated in unintended directions. The beam is exceptionally clean-cut and regular.

The present shape of the horn has a rectangular cross-section, which permits delicate control of the sharpness of the beam in the two directions at right angles to its length by varying the flares of the two sets of opposite sides. Thus it is possible to send out a fan-shaped beam that is broad in one plane and narrow in another. A cigar-shaped beam can also be sent out through other variations in the shape of the horn, and other changes permit quick adaptation of the horn to numerous different problems, virtually impossible with older types of antennas.

Waves may be started in the horn by locating a small rod antenna only a few inches long directly in the throat or by connecting a hollow pipe carrying ultra-short waves so that it opens into the throat and pours the waves into it to broaden out into space.

In comparison with other directive antennas now in use, the new horn is very easy to operate since there is but one simple adjustment to make. It is also a very economical system, for the horn can be made from sheet copper or galvanized iron. Abolition of insulators contributes to efficient operation and relatively permanent mechanical strength.

Science News Letter, May 14, 1938

An old lady in Dalmatia, who threw a bunch of faded daisies in a corner and later observed hundreds of dead insects around the flowers, is credited with starting scientific interest in pyrethrum, valuable insecticide.