INVENTOR

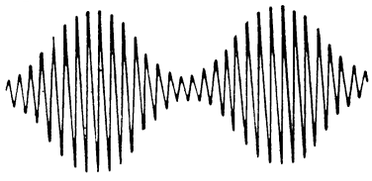
Columbia University's Professor of Electrical Engineering, Maj. Edwin H. Armstrong, is the inventor of the frequency modulation method of radio communication. Its remarkably clear service range is about 100 miles radius from the transmitting station.

network broadcasting has minimized the demands for distance reception. Most people prefer to tune in their local station and get the better network program. Frequently, if they switch to distance, they find that they are getting the same chain program anyway.

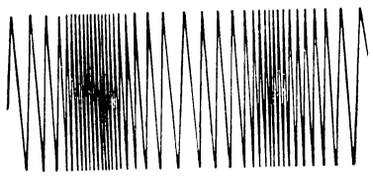
When a station covers a 100-mile zone about the large centers of population in the cities it is serving nearly all of the American listening public.

The new radio system rides through natural and man-made static with ease. How it does it is not as difficult to understand as the name, frequency modulation, might indicate.

Ordinary broadcasting uses amplitude modulation which means that the alternating current signals have little wiggles on them which become speech in your loud speaker. The modulation is obtained by changing the size of the swings of the AC signals. Loud sounds mean large swings and soft sounds small swings. The result looks like this:



In frequency modulation all the swings of the waves are the same and modulation is obtained by varying the frequency. Intense, loud sounds have much higher frequency than soft sounds. The wave pattern looks like this:



One way of saying it is that the speech sounds caught by the microphone make the frequency wander rapidly over the dial. With this system the receiver has the ability to pick up the station at nearly any point on the dial.

Noises of static are found to be alternating current signals having very small frequency variations but large amplitude swings.

Ordinary broadcasting keeps the transmitter's frequency as stable as possible and hopes that the frequency of static noise will miss it or, if the two happen to coincide, overpower it.

In the new Armstrong system, however, all signals have the same amplitude and by making the receiver sensitive only to shifts in frequency the interference with noise is small. Wide frequency swings in the signal make it powerful relative to noise.

The signal-to-noise ratio is predominantly in favor of frequency modulation. It is equivalent to boosting the power of ordinary amplitude modulated stations some hundreds of times.

As to the future of frequency modulation radio, C. A. Priest, editorializing in *General Electric Review,* says:

"The need for additional facilities in the present broadcast band—which cannot readily be accomplished technically—makes it probable that an additional band in the ultrahigh-frequency range will eventually be allocated to supplement present services and to provide for new services which cannot be accommodated in the present band. For these services the advantages of frequency modulation clearly render it the logical, technical, and economic choice; in fact it seems clear that practically every service requiring voice transmission by radio at frequencies above 30,000 kilocycles can be performed best by frequency modulation."

To the potential purchaser of a new type receiver for such radio service the operation of the device may be interesting but, in final analysis, he wishes to know what this new kind of radio can do which ordinary radio cannot. What does it sound like?

Outstanding is the remarkable clarity of tone in music and amazing reproduction of sounds including the human voice. Add the virtually complete suppression of static and inner-set noises and you have a picture of this superior reception. Strange indeed will seem the absolute silence of the receiver when a speaker pauses between sentences or an orchestra halts for an instant in its program. The receiver seems turned off rather than merely quieted.

Faint musical passages in a beautiful melody—now frequently lost because they have insufficient volume to ride over noises—come through with brilliance that brings new conceptions of what radio should be like.

In contrast, the tremendous crescendo passages of a Wagnerian opera—whose intensity sometimes overloads present radio transmitters and is perhaps cut off in the control room at the broadcasting stations—are enabled to come into the receiver in every home.

Homely natural sounds like the scratching of a match and the gurgling of water from the mouth of a bottle are transmitted with absolute fidelity, not by a sound effects man simulating the sounds in a studio but by broadcasting actual sounds.

One British journalist after hearing the reception went back home and told his readers the reproduction was "ghastly" in its reality. He looked for the gurgling water to run out of the loudspeaker and the scratching of a match to burn his hand.

Science News Letter, June 10, 1939

MEDICINE

Nicotinic Acid Clears Up Outbreak in Herd of Pigs

NICOTINIC acid, responsible for dramatic cures in desperate cases of human pellagra, has been used with striking effect to clear up an apparently similar disease in a herd of pigs at Pennsylvania State College.

The swine had been failing to gain in weight and had diarrhea and a bad scurf on their skins, when the nicotinic acid treatment was tried. They were restored to normal condition in six weeks.

The success of the treatment is reported (*Science,* May 26) by Drs. L. C. Madison, R. C. Miller and T. B. Keith.

Science News Letter, June 10, 1939