

ELECTRONICS

New Telephone Technique

By "PCM," brief samples of many conversations can be sent simultaneously at rate of 8,000 per second using pattern of pulses to prevent interference.

➤ BETTER communication by long-distance telephone is promised by a new technique which makes use of a new vacuum tube and what is known as pulse code modulation. The remarkably clear transmission which the new system affords was demonstrated by Bell Telephone Laboratory scientists to the New York section of the Institute of Radio Engineers.

The pulse code modulation technique, known as PCM for short, is entirely different from earlier forms of pulse modulation by means of which the voice is carried by short timed bursts of electrical energy on specific wavelengths. It promises marked freedom from noise and interference.

Pulse modulation is so named because the continuous speech wave is not transmitted. What is sent is what are called samples of the wave, bits of them taken at a rate of some 8,000 a second. These brief samples are enough to reconstruct the original wave at the receiving end with high fidelity.

Since the information regarding the samples can be sent very quickly, in roughly a millionth of a second, the system can carry many different conversations at the same time. It actually carries a sample from one conversation, then one from another and so forth, repeating the sampling cycle through as many conversations as are being transmitted. Each is reassembled at the receiving end by proper equipment.

PCM differs from other pulse modulation methods by using a set of patterns or codes, each one of which conveys specific information about the sample which it represents. Each of these patterns consists of an arrangement of electrical pulses which always contains a definite and constant number of pulses. These pulses are either "on" or "off", that is, either present or absent. The more code patterns there are available, the better the voice wave may be reconstructed. Experiments show that patterns or code-groups using six or seven pulses are satisfactory.

The new vacuum tube is responsible for the coding. It looks like a ten-inch

radio tube, but within it is a special plate perforated in appropriate order for the various codes to be used. The plate is so placed that a beam of electrons can sweep across the seven elements of any one code-group, giving an "on" pulse when it goes through the holes, and an "off" pulse when it is blocked.

Science News Letter, October 11, 1947

MEDICINE

Streptomycin May Conquer Epidemic Infant Diarrhea

➤ STREPTOMYCIN may become the conqueror of epidemic infant diarrhea, the scourge of maternity hospital nurseries which gained nation-wide attention when it attacked babies on Army "bride ships."

At least four babies stricken with this disease are alive today because of streptomycin, in the opinion of Maj. Irvin J. Cohen, the Army medical officer under whom some of the bride ship babies were treated.

The mold chemical, disease-fighting ally of penicillin, was used in treatment of 13 cases of infant diarrhea, Maj. Edwin J. Pulaski and Col. William H. Amspacher, of the Army Medical Center at Fort Sam Houston, report in the *New England Medical Journal* (Sept. 18). Eight of the infants were from an Army bride ship. The first seven, because of lack of experience with the mold remedy in this disease were given small doses. Two of these died as a result of severe toxemia and involvement of the brain and central nervous system. The others were sent home from the hospital in good condition and on full diets between the fifteenth and thirtieth days after admission to the hospital.

One baby girl who had facial paralysis and convulsion was in a state of collapse and almost dead when the streptomycin treatment was started. Within 12 days she was well enough to be taken home, having gained one pound five ounces, and with only a mild facial palsy left from her severe illness.



FOR CLEARER CALLS—This is the new PCM tube with which it is possible to transmit many long distance conversations simultaneously without interference.

The number of babies treated is too small to warrant any conclusions, the Army medical officers state. But when a proper routine and dosage for using streptomycin has been worked out they believe deaths from epidemic infant diarrhea will definitely be reduced. The remedy seems to shorten the period of illness, control starvation and malnutrition and reduce the time the babies must stay in the hospital.

Further studies of the remedy for this disease are urged.

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ORNITHOLOGY

Bird Protection Results In Increase of Waterfowl

➤ BIRD protection in the Netherlands has resulted in the increase of many species, Prof. G. J. van Oordt of the University of Utrecht told the British Association for the Advancement of Science. Notable among these are eider-ducks, gulls, Sandwich terns and cormorants. A few species, however, have suffered from the competition set up by increase in other birds' numbers, among them the common tern and the sheldrake.

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Pure white sugar contains no vitamins or minerals.