RADIO

Japanese Have New Means Of Secret Radio Telephony

THE JAPANESE are in possession of a secret which enables wireless stations to transmit the human voice so that it is entirely incomprehensible to the average listener-in, the Radio Research Committee of Japan's National Research Council has reported.

Dr. Shigetaro Chiba of the research laboratory of the Tokyo Electric Company says that his method is superior to other methods of secret telephony because of its simplicity and the good quality of speech received.

The set he uses is equipped with a microphone constructed so that the speech current is inverted with respect to frequency, making it unintelligible. At the receiving end the same sort of equipment is used, which demodulates the speech by inverting it back to normal. Anyone else listening in, however, hears only a queer jumble.

A more or less secret method of voice transmission is employed at present in transatlantic radio-telephone communication to keep radio fans from eavesdropping on private conversations.

This process is known as scrambling but it does not work in the same way as the Frequency Inversion Method employed by the Japanese. To "scramble," the radio waves produced by the voice are split into four parts. An instrument known as a Privacy Hybrid Set sends each part out over the air on a different wavelength. Anyone listening in would hear only the staccato sound of one of these parts.

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PHYSICS

Double-Weight Neutrons Added to Units of Matter

STILL another sub-atomic particle may have to be added to the rapidly growing list of matter's building-blocks which have been discovered during the past year. Double-weight neutrons may exist, Dr. M. A. Tuve of the Carnegie Institution of Washington suggested in a report to the American Association for the Advancement of Science.

Describing recent experiments performed jointly with his colleague, Dr. L. R. Hafstad, the Carnegie Institution scientist told of driving deutons, the hearts of atoms of heavy hydrogen, into a gas composed of the same substance. The atomic impacts drove streams of protons (the positive cores of ordinary hydrogen) out of the apparatus with varying ranges of flight. This difference in the length of path which the protons travel does not fit in with atomic theory.

Knowing the weights of the atomic particles involved, Dr. Tuve suggested that what is needed to explain the strange phenomena is a neutron of mass two, twice as heavy as the ordinary kind.

The reaction which may happen in the experiment is that two heavy hydrogen cores—the deutons—combine and then turn into two light hydrogen atoms and one neutron of mass two.

The existence of an over-weight neutron would also reconcile some of the differences of opinion about the exact weight of the ordinary neutron. Mixed up in this controversy is the possibility that there exists also a little, or light-weight neutron, called provisionally the neutrino. The neutrino, from the Italian, was suggested some years ago by Prof. E. Fermi, who recently discovered element No. 93. The English version of neutrino would be neutrette.

While the existence of the neutrino has not yet been proved, science has predicted some of its properties. A neutrino would be an electrically neutral particle like its big brother the neutron, but would weigh only about as much as an electron, that is, 1/1800 the mass of a hydrogen atom.

Physicists foresee that like most of the atomic particles the neutrino would spin on some axis (like the earth). But they predicted also that the spin might be either clockwise or counter-clockwise. The neutrino is spinning one way. Its twin, spinning in the reverse direction, has been given the name of anti-neutrino, although it too is yet unfound. The spin of the neutrino and the anti-neutrino would make it possible to account for some of the mysterious magnetic properties in atoms.

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NUTRITION

Average Man May Need More Than 3000 Calories

DOES the average man doing an average day's work need to get more or less than 3000 calories in his daily diet?

This is one of many questions in the field of nutrition which require further research, Prof. Lafayette B. Mendel of Yale University reported to the American Home Economics Association.

The 3000-calorie requirement, now almost universally accepted, is based on precise scientific calculation of energy requirement made during the World War, Prof. Mendel pointed out. It is now under discussion because of the declining need of energy foods in this day of labor-saving devices. In England at present some groups of scientists favor increasing the calorie requirement to 3400 with a reduction in the amount of protein foods.

"This gives an incentive for further investigation into what the real working status of the coming generation is to be," Prof. Mendel observed.

Another point requiring further research is the actual role of the vitamins in maintaining health. This is particularly important in relation to sub-acute disorders arising from partial rather than complete lack of certain essentials of diet. The malnutrition of certain types of alcoholism comes under this head.

The problem of storage depots in the body for reserve supplies of vitamins, water, fats, mineral nutrients and other substances needs investigation. The