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.

Science News Letter, July 14, 1934

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.

Science News Letter, July 14, 1934

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

conditions under which vitamin A is stored have already been examined and the results suggest that much of this vitamin may be destroyed in the digestive tract.

The value of roots, tubers, leaves and fruits is little understood. Fruitful field for research also lies in the direction of texture of foods, about which dentists are particularly concerned at present, and food allergy or sensitiveness.

Science News Letter, July 14, 1934

NUTRITION

New Knowledge of Foods May Favor the Farmer

FARMERS will be helped by the new knowledge scientists have gained about food values, vitamins and the like. This new factor in agricultural aid was discussed by Prof. H. C. Sherman of Columbia University before the American Home Economics Association.

The importance of milk, fruit and vegetables in the diet is the specific discovery in nutrition which will aid the farmer. Knowledge of the value of these foods is gradually reaching the people and already is causing shifts in consumer demand among the different types of food.

"The net effect of these shifts is to favor the farm by furnishing a market for the product of a fuller and more up-to-date use of its acres and of the farmer's time and effort," Prof. Sherman stated.

"Such an evolution, wholesome alike from the standpoint of food production and food consumption, of agriculture and of consumer nutrition and health, we should not allow to be unduly retarded by the prejudice of general custom or the bias of any special group," he added.

"There is sound health reason for and no sound economic reason against the growing prominence of the protective foods in the general food supply."

The protective foods to which Prof. Sherman referred are milk, fruit, vegetables and eggs. They are called protective because their rich supply of vitamins and minerals will, if eaten in sufficient amounts, protect the consumer against the greatest dangers of dietary deficiency. Prominence of these foods in the diet also helps the body to protect itself against several kinds of infections, Prof. Sherman pointed out. He gave the following specific advice on diet:

"I think it is well to provide at least half of the needed calories in the form of the protective foods; and also that at least half of the breadstuffs and cereals used be in the 'whole grain' or 'dark' or 'unskimmed' forms. These two simple suggestions take account of all known nutritional needs."

The place of eggs in the diet and the question of how much of the protective foods are needed to get the full benefit which they are capable of yielding are two points on which further research is needed, Prof. Sherman said. His two-point dietary advice is based on present knowledge of this last question.

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LANGUAGE

Science Takes Measure Of Roosevelt Vocabulary

WHEN President Roosevelt comes before the microphone to talk to the people about the affairs of the United States, he uses a vocabulary almost as simple as that of the famous Lincoln Gettysburg address.

This is the report of Dr. Richard S. Schultz of the Psychological Corporation in New York City, announced in the educational journal, *School and Society.*

Dr. Schultz was led to make a statistical study of President Roosevelt's radio vocabulary because choice of language is vitally important to any speaker who would mould public opinion.

Comparing President Roosevelt's inaugural address and a radio message on national conditions given October 23, 1933, with lists of the most common words in the language, Dr. Schultz found that 70 per cent. of the words used on these two occasions occur among the 500 most common words found in general reading material. President Lincoln spoke even more simply at Gettysburg. Over 77 per cent. of his words are among the 500 most common words.

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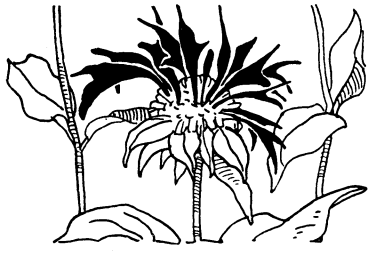
BOTANY

NATURE RAMBLINGS by Frank Thone



Monarda

NOW is the year's high tide for the genus *Monarda,* a most interesting group of plants belonging to the mint family. Various species are popularly known as Oswego Tea, Horsemint, Wild Bergamot, and by other names. They are interesting and attractive plants, the commonest species with tousled blue heads of flowers, making a ragged but bright hedge beside the road, and straggling through open, sun-streaked woodland reaches.

The whole brotherhood is recognizable as of the mint tribe at a glance. They have the square stem that marks the mints, and their long-throated flowers divide yawningly at the top into the two-lipped irregular corolla that has given the mint family the general name of Labiateae. And if any doubt were left, one only needs to crush the leaves and smell them. The odor is not that of mint; it is stronger, and to most nostrils ranker, but its kinship is indubitable.

During the World War one species of this genus came in for a brief commercial exploitation. It contains the valuable drug thymol, but not enough of it to make extraction pay at usual prices. However, when the German supply was cut off the price went up, and several small establishments came into being for the duration of the war.

Although the color affected by most of the species is blue, one Monarda, from Texas, has crashed into our gardens with a bright red note. It is hard to find a place where this plant will harmonize with anything but white flowers, because it is one of the most impossible reds imaginable: a vivid, hot, screaming cerise. Nevertheless, the plant is much cultivated.

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