

PSYCHOLOGY

How Sound Is Heard

► **WHETHER A PERSON** hears a speaker say "bit," "bet" or "bat" depends not only on the sound of the word as it is spoken but also on the sound of other words uttered by the same voice.

This was disclosed when British scientists studied how people heard words pronounced by a machine that synthesizes speech.

The robot speaker, known as the Parametric artificial talking device, produces synthetic speech that sounds so natural it is invariably confused with ordinary recorded speech. However, the elements of the letter sounds can be exactly controlled.

Whether a person is listening to normal speech or to the artificial talking machine, he is able to distinguish one vowel from another because of differences in what scientists call "formants," that is, the region of the auditory spectrum in which the largest proportion of the sound energy of that letter occurs.

Now the British research team has also found that perception is affected not only by the sound frequency of that particular vowel but also on the formants of the preceding words.

The investigators fed into the talking machine two versions of the phrase "Please say

what this word is—." The test word was identical in both versions. In one case, the preceding word had a formant from 300 to 675 cycles per second. In the other version, it was between 150 and 400 c.p.s.

In the first case, 20 out of 30 listeners heard the test word as "bit" and 10 heard it as "bet." In the second case, 19 listeners heard the same word as "bet" and 11 thought it was "bat."

There is a similar influence on the visual perception of an object by surrounding objects.

MEDICINE

Multiple Sclerosis Break

► **THE EXACT PLACE** in the human nervous system hit by multiple sclerosis, the most serious disabling disease of young adults, has been pinpointed for the first time.

The discovery is called the "most important advance in the fight against multiple sclerosis in more than 125 years," and comparable to discovery that the polio virus affects nerve cells.

The site of disabling multiple sclerosis is a structure called the glial cell, Dr. Sarah A. Luse of Washington University School of Medicine, St. Louis, has discovered. Heretofore scientists have thought the disease struck myelin, a fatty material surrounding nerves like a sheath.

The glial cell, which also is around nerve fibers, produces the protective myelin sheath. It is the glial cell and not the myelin, however, that degenerates in multiple sclerosis.

Dr. Luse showed her findings in electron microscope pictures of the glial cells and their myelin production at a conference on myelin held in St. Louis under the auspices of the National Multiple Sclerosis Society.

Examples presented by Dr. Luse showed the myelin in various stages, from embryonic through maturity. Her pictures indicate that myelin in the central nervous system is composed of laminated, or concentric, membranes. It had previously been thought that myelin was a structureless mass.

Production of a condition in guinea pigs similar to multiple sclerosis in humans was announced at the same conference by Dr. George Clark of the University of Buffalo, N. Y. Dr. Clark produced the condition by sending an electric charge through the brains of guinea pigs.

This is believed the first time a condition like multiple sclerosis has been produced in laboratory animals, although a strain of rabbits and one of mice that develop a similar condition spontaneously has been bred by Dr. Pinckney J. Harman of Seton Hall College Medical School, New Jersey:

Thus, the scientists point out, a sheet of paper will be called white whether it is seen outdoors in bright sunlight or inside in an artificially illuminated room, despite the wide differences in the spectra of light reflected by the paper. In each case, the paper is seen in comparison with the appearance of neighboring objects, thus compensating for the differences.

The scientists who report their study in *Nature* (Oct. 13) are Dr. D. E. Broadbent of the British Medical Research Council, Applied Psychology Research Unit, Cambridge; Dr. Peter Ladefoged of the phonetics department, University of Edinburgh, and Dr. W. Lawrence of the Ministry of Supply, Signals Research and Development Establishment.

Science News Letter, October 27, 1956

What causes the glial cell destruction in multiple sclerosis is not known. Nor is any cure for it yet known, but with laboratory animals available for study and Dr. Luse's finding about the glial cells, scientists hope



NERVE STRUCTURE—This electron microscope photograph shows the definite laminated structure of myelin surrounding the nerve fiber in the central nervous system. Layers of myelin increase in number from embryonic stage until adult maturity is reached. Myelin is created by the glial cell, which is attacked in multiple sclerosis.

for faster progress toward conquest of the disease.

Multiple sclerosis is a degenerative disease of the central nervous system, the brain and spinal cord, often leading to paralysis. It strikes mainly at persons between the ages of 20 and 40.

Science News Letter, October 27, 1956

PHYSIOLOGY

Fattest Persons Lose Most Fat on Reducing

► **THE MORE FAT** on a person's body, the more fat he will lose on a low calorie diet. Likewise, those parts of the body where the fat is thickest will lose most fat.

The slimmed down figure will not, however, have a different contour. The parts of the body that were fatter than other parts before weight reduction will be fatter than other parts after weight reduction.

Studies on 13 healthy, active young white men who went on a 1,000-calorie-a-day diet for 24 days show this. The studies are reported by Drs. Stanley M. Garn and Josef Brozek of Fels Research Institute, Antioch College, Yellow Springs, Ohio, and the University of Minnesota, Minneapolis, in *Science* (Oct. 12).

The importance of taking the size of the bones into account in determining what a man or woman of a given age and height should weigh is stressed in another report by Dr. Brozek. He has devised a formula using four bone dimensions and age for predicting what a person should weigh.

Leanness-fatness is thus added to underweight-overweight as a second dimension describing the human body.

"Women in comparison with men," Dr. Brozek states, "would be classified as 'light but fat' while football players or steelworkers would be typically 'heavy but lean.'"

Science News Letter, October 27, 1956