

## TECHNOLOGY

# How to Talk to a Machine

➤ A SPEECH recognition machine undoubtedly will find it as hard to understand your conversational English as your neighbor does.

You will have to sell the machine what you want; that is, tell the machine what you want. The "t" sound may give the machine the most trouble, since it may hear "sell" or "fell" when you said "tell."

Also you may have to speak without any "uhs," "ands" or "buts." Unfortunately people say "uh" more than anything else.

Peter B. Denes, acoustical research scientist of the Bell Telephone Laboratories, told the Acoustical Society of America meeting in Seattle that such difficulties and differences in speech will have to be overcome before machines can really know what you are talking about. He studied 23,000 words of typical conversations recorded in books used to teach the English language to foreigners.

Mr. Denes suggested a uniform standard be decided, to determine whether phone or street, formal or informal conversation

will be applied in addressing the machine properly and understandably. Knowledge of the frequency of sounds and words also will aid the machine.

The machine should know people use the first-person singular "I" more than any other complete word in conversation. According to a previous study done in the 1930's, the second-person "you" was used more often than today. Once ranked second, "you" now shows up less than "it," "a" and three other words in normal conversation.

Varying accents and rate of speech also may tend to confuse the machine but no data were available, since Mr. Denes worked from written records.

A machine, Madaline I, already exists and understands ten spoken words with 99 per cent accuracy. Such devices may prove particularly useful in programming computers by voice and in contacting a telephone number merely by asking for it, without dialing or speaking to an operator.

• Science News Letter, 82:333 November 24, 1962

## TECHNOLOGY

# Computers Use Lasers

➤ A NEW ERA of computing with light is being ushered in.

Instead of electronic tubes and transistors, computers are now being designed using optical devices called lasers, or optical masers. Scientists expect light-operated computers of the future to be a thousand times faster than electronic devices, Lewis C. Clapp of Bolt, Beranek and Newman, Cambridge, Mass., said at a meeting in Washington, D. C. Such fast computers may be used to measure atomic particle reactions.

The atoms in a laser can be excited to an "inverted" high energy state. These high-energy atoms give off radiation when they fall back to the normal low state. If the laser is struck with radiation of the same frequency that its atoms emit when moving from a higher energy state to a lower one, the resulting radiation forms a single intense beam.

Information in a digital computer must be recorded as "ones" and "zeros." If the number "zero" refers to the crystal when the majority of its atoms are in the low energy state and the number "one" is applied to the inverted high energy state, the laser can then speak in computer language.

When light hits a laser crystal in the "inverted" state, a high output signal is observed as the atoms move from a high energy level to a lower one. A negligible reaction occurs when energy is applied to a crystal in the "zero" state. The laser computer can switch from one to zero in one-billionth of a second.

Scientists are seeking methods of either storing many pieces of information in one crystal or storing single information pieces in extremely tiny laser units. The present

system of one bit of information for each relatively large crystal provides the world with "its most expensive bit," Mr. Clapp said.

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Lockheed

**ELECTRONIC EARS**—Part of the electronic array of the Atlantic Undersea Test and Evaluation Center (AUTECE) is being lowered for installation in the underwater acoustic range of the David Taylor Model Basin. The triangular devices are sonar reflectors.

## TECHNOLOGY

# Transistor Microphone Shows Great Sensitivity

➤ A NUCLEAR DEVICE exploding underground, a submarine moving quietly underwater or blood pulsating irregularly through the human heart some day may be detected more easily, because of a transistor microphone.

The microphone, which acts as its own amplifier, is four times more sensitive to sound waves than any mike currently in use. Since the transistor mike contains no electromagnet coils or carbon granules, it also can be made as small as a tiny button, although it correspondingly loses sensitivity as it becomes more compact.

Invented by M. E. Sikorski and Peter Andreach Jr. of Bell Telephone Laboratories, the microphone has many potential direct applications in hearing aids, telephone transmitters and phonographs. Its principle of operation can be applied in seismographs, accelerometers and devices measuring sound vibrations.

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## SPACE

# 24-Hour Flight Planned For Astronaut Cooper

➤ ASTRONAUT LEROY GORDON COOPER JR. will be the first American to take a whole day off in space.

His 24-hour whirl around the earth, scheduled for next April, will mark the end of the National Aeronautics and Space Administration's Project Mercury, a \$500 million program for manned space flight and the first step to get an American to the moon.

Thirty-five years of age and weighing less than 150 pounds, Astronaut Cooper is the youngest and lightest of the original seven Mercury space pilots selected by NASA in April, 1959. The brown-haired, blue-eyed test pilot, a captain in the U.S. Air Force, is known as the "flyingest" of the Mercury team since flying is his hobby as well as his vocation.

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## TECHNOLOGY

# Electronic Ear at Bottom of Atlantic

➤ THERE IS an electronic "ear" at the bottom in the sea in the Atlantic Ocean. Permanently placed in deep ocean waters in an undersea canyon, it is training U.S. Navy personnel and instruments to detect submarines. (See left.)

The underwater acoustic range consists of three basic parts, an electronic array to detect, amplify and transmit sound, a mooring system and a deep-sea cable system to connect the various parts of the array.

Noises made by fish and other undersea creatures as well as surface vessels and submarines will be recorded and transmitted to a shore station through cables. The installation was made by Lockheed Electronics Company.

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