TECHNOLOGY

How to Make "Brains" Talk

➤ THERE SEEMS TO BE one big problem the giant electronic "brains" cannot solve for themselves: how to talk with one another. But their builders, the big electronic and automation corporations, appear ready to standardize the brains' language or in some other manner let the brains work and talk together.

By making the brains compatible, the companies hope to make automation cheaper.

The problem: one company's brain thinks differently from another's. They use different systems of calculation.

Thus, if a company has a lot of International Business Machines Corporation equipment, it can not readily buy and use Sperry-Rand improvements, or vice versa.

And if one government agency with one kind of equipment seeks to use data from another agency with a competing kind of equipment. the conversion may be tough or downright impossible.

This kind of inefficiency is expensive. If the machines can be standardized, the result will be a saving of millions of dollars annually by customers, Alfred J. Ball, president of the Office Equipment Manufacturers Institute in Washington, D. C., believes.

Dr. Joseph W. Barker, consultant in New York to OEMI's new X-3 committee on data processing standardization, said in an interview that the standardization will lower the cost of automation. But he said standardization had pitfalls.

"We must standardize without blocking technological development."

Twenty-four manufacturers of automation equipment are cooperating in the standardization venture.

Some of these companies' machines can work with each other now, via translating devices called transverters. Dr. Barker feels that improved and standardized transverters may turn out to be the fullest solution possible.

But ultimately, Dr. Barker hopes, standardization will permit data processing machines made by different companies to be hooked up and worked in concert via telephone lines.

• Science News Letter, 78:359 December 3, 1960

PHYSICS

Low Temperature Component Developed

➤ A SIMPLY CONSTRUCTED device for use in low-temperature electronic circuits has been developed.

The new device, called a tunneltron, may extend the range of low-temperature, or cryogenic, instruments to include low-noise amplifiers, high-frequency oscillators and computer components.

Physicists working at Arthur D. Little, Inc., Cambridge, Mass., observed an unexpected "switch-back action" or negative resistance region when current was passed through a metal-dielectric-metal sandwich at temperatures approaching absolute zero, or 459.7 degrees below zero Fahrenheit. The resistance effect stems from the ability of electrons to pierce or "tunnel" through extremely thin layers, about a millionth of an inch thick, of material normally considered to be insulating.

The tunneltron is based on the principle of using a changing magnetic field to control the tendency of certain metals to lose electrical resistance at low temperatures. Dr. James Nicol, Dr. Sidney Shapiro and Paul H. Smith reported their work in the Physical Review Letters, 5:461, 1960.

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NEON TELEPHONE NETWORK—Telephone voices are carried through neon gas tubes that make up the "switching network" of an electronic central office developed by Bell Telephone Laboratories. The tubes are used to connect one telephone with another, a task that was earlier performed by electro-mechanical relays.

PHYSICS

Atomic Vibrations Cool Refrigerators

➤ A NEW WAY of studying atomic vibrations important to the average household was reported to the National Academy of Sciences meeting at the University of Pennsylvania in Philadelphia.

These are atomic vibrations that interact with electrons. Not all of them do; but those moving with the electrons are responsible for the functioning of such household items as electric heaters, the conventional light bulb and the refrigerator.

The interacting vibrations also are the major cause of the resistance of electric conductors and are behind the resulting power losses encountered in long power lines.

Drs. Kurt Hubner and Nobelist William Shockley of the Shockley Transistor Unit, Palo Alto, Calif., have designed an experiment using semiconductor and transistor technology to study the waves or motions (called phonons) produced by an electric current of electrons on thin platelets of single crystal silicon in three layers.

The outer layers are treated so that they are conductive to electrons while the mid-portion forms an insulating layer between them. This makes possible a study of the electron-phonon interactions at the source, propagation medium and receiver.

Apart from the purely scientific results, the scientists reported that the practical application of their experiments makes possible a direct current transformer.

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TECHNOLOGY

Color Maps Produced By Electrostatic Printing

➤ COLORED MAPS can now be produced in less time with a new electrostatic printing machine. The heart of the process is a photoconductive coating that insulates in the dark and conducts in light when applied to paper.

The experimental machine, built by Radio Corporation of America, was developed for one-color map production at the U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va.

Tests are expected to lead to a five-color electrostatic printing machine that can turn out 2,000 multicolor maps per hour.

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