

engineering sciences

Gathered at the 1969 New York meeting of the Institute of Electrical and Electronics Engineers

POWER TRANSMISSION

Microwaves to carry electricity

A plan is envisioned to substitute massive waveguides for the construction of costly and unesthetic high-power transmission towers and overhead lines, part of a growing trend in power transmission.

As explained by David Goerz Jr. of The Bechtel Corporation in San Francisco, electric power generated by nuclear power plants would be converted into microwaves and then transmitted like water through a 10-foot diameter pipe. The pipe, or waveguide, would carry the microwaves underground or under the sea down the coast to population centers. The microwaves would be converted back to AC or DC electricity. The reason for converting to microwaves in the first place is that they can carry tremendous quantities—billions of watts—of electricity more cheaply and efficiently than can present power lines and structures.

SEMICONDUCTORS

Ovonic devices for computers

The feasibility of using ovonic (glassy) semiconductors in computer memories has been successfully demonstrated, says David L. Nelson of Energy Conversion Devices, Inc., Troy, Mich. This amorphous type of non-crystalline semiconductor has been successfully fabricated into a small memory array of 25 bits or basic information units. Of importance to missile guidance systems is that ovonic semiconductors are not affected by nuclear radiation.

SENSORY AIDS

Eyeglasses to hear by

A pair of eyeglasses powered by a small battery that enables deaf people to distinguish between words that are practically indistinguishable by lip reading was described by its inventor Hubert W. Upton, an electronics engineer from Arlington, Tex. This visual speech reader contains five incandescent bulbs 0.03 inch in diameter that light up in patterns dependent on the sounds comprising the word. Although a deaf person would not be able to distinguish between two words such as toss and sat by lip reading, the different light patterns on the eyeglasses clearly point out the difference between the two.

The device also can act as a speech monitor for the deaf person, helping him to correct his own mispronunciations.

INTEGRATED CIRCUITS

Semiconductors vs. magnetic cores

Storing information in semiconductor integrated circuits (IC's) can offer advantages over information storage by magnetic cores—advantages such as quicker

retrieval and easier maintenance. The drawback to using IC's at this time, however, is their high cost compared to magnetic cores, says Dr. Gordon E. Moore of Intel Corporation in Mountain View, Calif.

Because of their close relationship to computer circuitry, IC's make input and retrieval of information easier than magnetic cores, which require a great deal of highly complex circuitry.

In a situation where a few bits of information are to be stored, the IC would be cheaper than the magnetic core because of less equipment needed to get the information in and out of the system. But on the large scale, where vast numbers of bits are stored, the magnetic cores pull ahead economically.

Dr. Moore predicts this situation will change over the next several years, and semiconductors will be cheaper for all random access memories, in which any bit of information is equally accessible.

OCEANOGRAPHY

New instruments fail

Virtually all new electronic equipment for oceanographic research fails during testing and evaluation, reports Gilbert Jaffe, director of the National Oceanographic Instrumentation Center in Washington, D.C.

The cause goes back to the lack of understanding of the ocean environment. Since none of the instruments, which are bought off-the-shelf, are designed for work under the ocean or aboard ship, they succumb to the rigors of sea activity.

Causes of equipment failure include leaking due to pressure, corrosion, increased humidity which causes short circuits, and simple banging against the side of a ship.

One reason, points out Jaffe, is that there are as yet no guidelines, or specifications, for designing oceanographic equipment.

LASERS

Disposable X-ray tube

Physicians at the Mallinckrodt Institute of Radiology of Washington University in St. Louis, Mo., are testing a disposable X-ray tube. The device, if successful, will enable physicians to see smaller structures than presently observable with conventional techniques.

The tube relies on a laser beam rather than conventional means, such as hot filaments, to produce electrons, explains Dr. Michel M. Ter-Pogossian. The laser beam strikes a cathode, generating electrons, which in turn strike a pinpoint anode. Because the X-rays come from this pinpoint source instead of a large area, they can pick out anatomical structures that would ordinarily be blurred.

In the process of generating the X-rays, the anode is destroyed by the electrons, but since the tube is simple in construction and made of low-cost materials, it can be discarded after use.

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