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Instruction Manual

The compact, contoured case is 5½" long, 3" wide, 1¼" high and weighs only 8 oz.

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TECHNOLOGY

Fueling the future with water

In the ongoing quest for alternative energy sources, hydrogen is looked on with great favor because of its clean combustion, water being the only major by-product. A group of researchers from Pennsylvania State University has a system that electrically decomposes ordinary water into hydrogen and oxygen, using the sun to generate the necessary electricity.

It has long been known that many substances can be separated into their constituents by passing an electric current through them, a process called electrolysis. What's new here is that the scientists have harnessed the power of the sun to generate the electricity using a titanium oxide electrode (source of electric current). Sunlight striking the electrode is converted to electricity with 0.8 percent efficiency (amount of incident solar energy versus electrical energy produced). Although this doesn't seem like much, it is the best yet obtained using a "practical" system, the scientists report. Other electrolysis systems use exotic, single crystals, which are expensive and difficult to produce. John F. Houlihan, David P. Madacsi, Edward J. Walsh and Laxman N. Mulay claim that their technique, on the other hand, requires electrodes easily made. Furthermore, they report, the efficiency of the method may be improved to 2 percent in less than two years.

In addition to being a clean-burning fuel, hydrogen is necessary in the process to make synthetic natural gas and oil, two other promising energy sources for the future. One needn't fear a lack of it either, since hydrogen is by far the most abundant element in the universe.

Telephone capacity doubled

A "duobinary" electronic system will double the communication capacity of existing telephone cables. Many present-day telephone conversations travel over a web of 45 million circuit-miles of transcontinental cables. The new electronic system, developed by General Telephone and Electronics (GTE), will increase from 24 to 48 the number of conversations that can be carried by the old cable installations.

The equipment affected by this recent development works by using a communications technique called "pulse code modulation" (PCM). Voice signals are converted into electrically coded pulses that yield a high-quality telephone transmission even after traveling over large cable distances. The "duobinary" system technique, originated by Adam Lender of GTE, in Stamford, Conn., manages to "squeeze" more pulsed conversations into the same bandwidth (a rainbow of transmitting frequencies). The new 48-channel system also transmits with greater power and speed. These assets, however, make a system of this type highly susceptible to unwanted electronic "noise," which interferes with the primary signal. "Crosstalk," as it is called, was overcome within the system by using specially shielded cables. The new electronic modules will be delivered to telephone companies beginning in October.

Electricity from the Gulf of Kutch

The concept, in simplest terms, requires water to pass through electricity-generating turbines as it "falls" to slightly lower-lying land. There, it is evaporated by the sun's heat. Scientists from Jadavpur University, in Calcutta, think they have found an area whose topography makes it an ideal candidate for testing this scheme. The Little Rann of Kutch, on the northwest bank of India, offers water from the Arabian Sea, high temperatures and a dry season with high evaporation rates. Dams built on the Gulf of Kutch could make a three-meter waterfall producing at least 25 megawatts of electricity year round.