

# ENERGY

## Waving Japan onward

Caught off balance by spiraling oil prices, the energy-hungry Japanese are looking into an almost limitless energy source right on their doorstep: wave power. According to Japan's Ocean Science and Technology Center, the energy of waves pounding the coasts of Japan is more than three times Japan's current electrical generating capacity. Wave-powered buoys and small lighthouses have been used in the past, but tapping Japan's sea potential in a big way is just beginning.

In one scheme, waves set up an air current that spins a power-producing turbine. According to the research division of the Fuji Bank, Ltd., Tokyo, a 500-ton floating experiment station, the *Kaimei*, is now testing this technique off Tsuruoka in Yamagata Prefecture. The goal is to produce 2,000 kilowatts. If successful, a 20,000-kilowatt station will then be built and tested. The builders foresee commercial sea generators that would transmit electricity to shore by underwater cables. When far out to sea, stations could electrolyze seawater and ship liquefied hydrogen by tanker to land-based power stations. Moreover, since a floating power station cuts the size of passing waves, the builders foresee strings of offshore stations that would help create fish hatcheries, harbors or recreational areas.

## Sun spots

The evening weather report in 12 U.S. cities is going a bit solar. Beginning this month, select radio and television stations across the country will broadcast a daily Solar Index that tells just how much work the sun could have done that day. A brainchild of the U.S. Department of Energy, the index focuses on a common job of solar power: heating water. A number between one and 100 indicates the percent of household hot water that could have been supplied by a typical solar hot water system. Even on cloudy days, the index can hit 40 or 50 percent, while on sunny days readings of 80 or 90 are common.

The Solar Index was designed for DOE by the Martin Marietta Corp. Through computer simulation, it compares a conventional hot water system to the heating load and the cost benefits provided by a properly sized solar system. On a trial basis, DOE is having the index calculated for Atlanta, Columbus, Miami, New York, Washington, Dallas-Fort Worth, Oklahoma City, San Antonio, St. Louis, Albuquerque, Denver and Los Angeles. The index is based on the day's high and low temperatures and percent of sunshine. It also assumes a typical flat plate collector of about 60 square feet serving a family of four who use 80 gallons of water a day. "The index clearly shows what solar can do, even when you think clouds would drastically cut the effectiveness," Philip Keif of DOE told SCIENCE NEWS. After the trial, the index will probably be extended to other cities. DOE hopes the Solar Index will become as much a "weather word" as the pollen count or the air-quality index.

## Bittersweet bulb

The good news: A fluorescent light bulb that looks and acts like a regular incandescent bulb but runs on one-third the electricity has been developed. The bad news: It will retail for somewhere between \$5 and \$8. The bulb was developed by Thomas LoGiudice, an engineer in Manhattan. Since fluorescents need to be long in order to fluoresce efficiently, LoGiudice fits two glass shells together with partitions that add up to a long, winding channel. It has passed an evaluation by the National Bureau of Standards. The high cost is due to the complex glass case. Every fluorescent, moreover, needs a starting ballast. With the Fluro-bulb, it is squeezed into the base of an incandescent bulb fixture and alone represents about half the retail cost.

# BEHAVIOR

## est: Good for the motivated

Studies of the emotional effects of Erhard Seminars Training (est) have yielded mixed results, with each finding seeming to spark some sort of controversy (SN: 1/14/78, p. 27). Among the latest such research to be published is a study by Berkeley, Calif., psychiatrist Justin Simon in the June AMERICAN JOURNAL OF PSYCHIATRY.

Simon, a private practitioner who says he took est in 1973, reports that of 49 of his patients who took est during the course of psychotherapy, "30 were judged to show some positive response and 19 were rated unchanged." Of 18 additional patients that Simon saw only for follow up, "only four . . . demonstrated clear-cut evidence of a positive response," he says.

The psychiatrist assessed patients' responsiveness to est "in terms of individually predefined psychodynamics and treatment goals." Those patients whose illnesses were least severe tended to respond more positively to the training. "These observations suggest that the capacity to derive benefit from est is a function of good ego strength," Simon says. "In cases of dramatic response to est, it was evident that patients were strongly motivated and ready for change."

Five of the subjects in the "unchanged" group—including one of Simon's regular patients—suffered temporary setbacks after est but returned to relative stability within several months.

## Got problems? Listen to your heart

There are many things that trigger heart rate increases in humans. Physical exertion, such as jogging, biking and other activities, has been shown to produce jumps in rate similar in quantity to those resulting from psychological stress factors such as fear of pain, death, failure or a variety of everyday life pressures.

But a preliminary look at the *quality* of heartbeat indicates the heart may be able to distinguish between the physical and emotional sources of its increased rate. By examining mean heart rate and beat-to-beat variability, researchers at the Lovelace Medical Foundation in Albuquerque, N.M., report a noticeable difference in the beats following different kinds of stress.

"Basically what we've learned is that heart rate increases caused by laboratory psychological stress tests are not as rhythmic as increases caused by laboratory-controlled exercise," says David Hickman, Lovelace vice president and research administrator. "It appears that heart rate characteristics are a unique indicator of duress."

In the tests, performed with 10 Lovelace employees, physical stress was produced by riding an exercise bicycle, and psychological stress by placing the subject's foot in ice water for one minute and having him or her count backward by threes from 300 while being distracted.

## Stress and the lonely

Speaking of stress, a three-year follow-up study of more than 500 persons indicates that stressful life events cause more symptoms of depression among persons without a husband or wife and among the poor, report University of Florida sociologists George J. Warheit and Charles Holzer III. Perhaps more than the events themselves, a person's support structure is critical to his or her susceptibility to depression, they say, and close friends were chosen most often as ideal sources of support, with spouse and family doctor also seen as ideal. Women were shown to have more depressive symptoms than men and blacks more than whites, but older white men were found to suffer most from the death of a spouse. The pair addressed the recent American Psychiatric Association meeting.