



KERR ILLUSTRATION

Tethered between a float and an anchor, a piezoelectric panel generates electricity when stretched by ocean waves.

ENERGY

WAVE POWER

A new type of generator uses the mechanical energy of ocean waves and currents to produce electricity. With few moving parts, the "hydropiezoelectric" generator offers a simple way to extract power from an enormous source of renewable energy.

Developed by Ocean Power Technologies of Princeton, New Jersey, the generator is a slender panel tethered be-

tween a float and an anchor. Early models of the panel are 50 feet long, about an inch thick, and a foot wide, and consist of 50 to 100 thin sheets of a plastic called polyvinylidene fluoride, or PVDF. As the float rises and falls, the panel is alternately stretched and released.

PVDF is a piezoelectric material: It generates electricity when pressure is applied. Within the material, which is polarized during processing, individual molecules are aligned in a crystalline structure. As waves stretch the material, the pressure displaces some of the molecules, causing positive and negative electrical charges to appear on opposite sides of the panel. Electrodes attached to the panel capture the charges. The electricity is stored in batteries or transmitted to shore by underwater cable.

Small hydropiezoelectric generators could provide power for navigation, sonar, and weather buoys. An intermediate size is designed for offshore oil platforms and lighthouses. Large versions could generate power for electric utilities. According to company vice president Charles Dunleavy, an array of generators covering five square kilometers could supply electricity for 250,000 people at a cost of one to three cents per kilowatt-hour—less expensive than electricity produced from fossil fuels.

The company plans to deploy a prototype this winter in the Gulf of Mexico. It will replace a diesel generator on an oil platform.—*Carol Brighton*

PHYSICS

VERDICT: NOT GUILTY

American Physical Society concluded that scientific reviews "show no consistent, significant link between cancer and power line fields.... No plausible biophysical mechanisms for the

tween a specific type of cancer and a specific level of exposure has emerged.

Robert Park, a spokesman for the American Physical Society, says its members decided

OPTICS

GIANT BINOX

The house shivered slightly—as it does during a mild earthquake—when a scowling deliveryman from United Parcel Service deposited a carton onto the porch. It bore a "more than 80 lbs." sticker. Inside, Cyrillic lettering identified the contents: Observation Binocular PNB-1.

The name is short for Pogranichny Nabludatelnny Binokl, or Border Observation Binocular. The workers who assembled it at Russia's Novosibirsk Instrument Making Plant wisely chose not to include a neck strap, an accessory that could easily lead to strangulation. At 43 pounds, the binocular is strictly intended for mounting on a hefty tripod or a ship's railing.

The 110-millimeter objective lenses admit lots of light, providing excellent image brightness and depth perception under low-light conditions. The ability to spot a pair of silent helicopters hovering about two miles away in the dim twilight during a recent military exercise in Roswell, New Mexico, impressed me to no end.

The overall construction of the PNB-1 is sturdy and rough, as with many things Russian, though real craftsmanship is invested in the sharp 15X magnification optics. So what accounts for the rest of those "more than 80 lbs." on the shipping label? A soulful Baltic birch plywood chest, which supports the mammoth peepers in felt-padded cradles secured by steel bars and wing nuts.

It's not difficult for Americans with ready cash to get their hands on these Russian optics. A San Diego firm, Moonlight Products, sells the binocular for \$2,495.—*Stuart F. Brown*

