# RANDOM SAMPLES

edited by CONSTANCE HOLDEN

## Neutrino Detector Checks Out

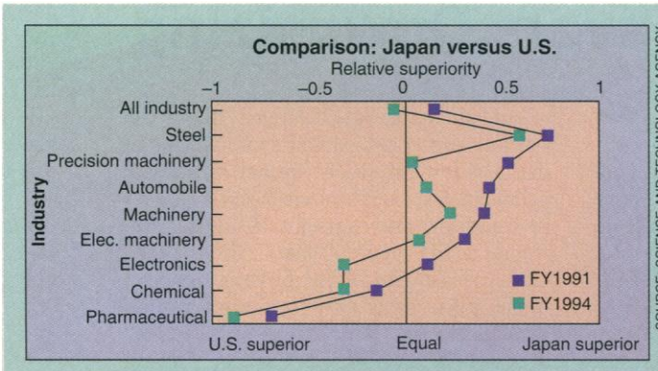
A stream of artificially produced neutrinos, flowing under an Italian mountain, has scientists wondering anew about how the sun really works. These presumably massless subatomic particles have been vexing physicists for some time: All the theories about the sun's nuclear processes say there should be up to three times as many solar neutrinos as have been found.

If the theories are right, then, scientists speculate, there must be something wrong with the detectors. They enable scientists to spot neutrinos only indirectly, by observing how they convert atoms when they pass through a chemical soup. "High-energy physicists have always been critical of this radiochemical technique: these huge pots of liquids, a lot of chemistry ... they find it highly suspect," says Till Kirsten of the Max Planck Institute of Nuclear Physics in Heidelberg and spokesperson for GALLEX, a neutrino detector that operates in the Gran Sasso Tunnel under the Italian Apennine mountains.

Now the GALLEX collaborators think they've solved their credibility problem—by testing it with an artificial neutrino source, in the first experiment of its kind. In the 12 January issue of *Physics Letters B* the GALLEX researchers report that scientists at France's atomic energy commission in Grenoble irradiated with neutrons a chrome sample enriched with chromium-50 isotopes. The isotopes were transmuted into chromium-51 isotopes, which, as they decay, release neutrinos whose energy level corresponds to that of solar neutrinos—the strongest neutrino source ever produced artificially.

From June to October the scientists repeatedly shot these neutrinos into the GALLEX detector, looking for their signatures. They found that the neutrinos registered as expected. An analysis of the first seven of the 11 runs showed the detector had only a 10% error margin.

John Bahcall of the Institute for Advanced Study in Princeton says this experiment "increases the confidence in the other radiochemical experiments." Unfortunately, it also saps confidence in theories of the sun's inner workings.




### Japan Worries About High-Tech Lags

Japan's high-tech elite feel they are being overtaken by the United States and other countries in electronics, automotive design, and other areas, according to a survey conducted last fall by Japan's Science and Technology Agency (STA). And it's a dramatic change from a similar survey conducted in 1991, when high-tech companies felt they were comfortably ahead of the United States in everything but chemicals and pharmaceuticals (see chart).

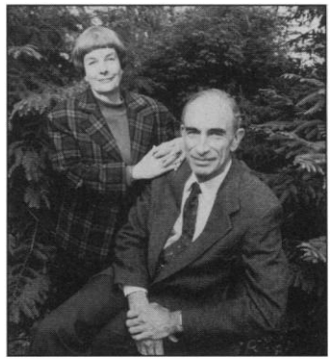
Improvements in U.S. productivity and efficiency in machinery, autos, and electronics are termed "remarkable" by STA's annual White Paper, released last November. An official notes, for example, that the U.S. auto industry has turned itself around both by improving quality and by more aggressively marketing its wares in Japan. As for electronics, he notes that U.S. computer makers have led the trend toward workstations and personal computers, while Japanese companies were still focused on mainframes (Japan is still strong in PC components, but U.S. companies dominate the market for overall systems.) Something of a puzzle, even to the STA, is the change in the area of precision instruments, a category that includes advanced medical devices, where the United States is strong, and cameras, where the United States is not even in the picture.

The about-face, in part, reflects larger economic cycles: In 1991, the United States was in a recession while Japan was riding high; now Japan is just pulling out of a protracted recession, and the bloated yen is making it difficult to buy research as well as sell goods abroad. Yasutsugu Takeda, who is in charge of research and development at Hitachi Ltd., notes that Japanese firms are just now beginning the kind of restructuring that U.S. industry has been undergoing for several years. "Now we have to make greater efforts," says Takeda—especially with the Asian tigers also breathing down Japan's neck. Half the companies in the recent survey said the competitive environment is going to get more rugged as other Asian economies expand; about one third predicted that it will only be 3 to 5 years before Chinese companies are in full roar.

## Heinz Joins Mega-Prizes

Individuals toiling in the arts, public policy, technology, the environment, and "the human condition" and whose "selfless vision, hard work, and commitment often go unnoticed" need labor in obscurity no longer: Six have just received a quarter of a million dollars each in the form of The Heinz Awards, newly established by Theresa Heinz, widow of the late Senator John Heinz (R–PA), who died in 1991.

And who are the unheralded winners? At least in the categories of technology and the environment, the names may ring a bell. At a ceremony last week in Washington, Paul and Ann Ehrlich, the Stanford biologists long known for their advocacy of population control, species preservation, environmental cleanup, and the curbing of nuclear weapons, were given the environmental prize. In technology, the winner was Intel President and CEO Andrew Grove, godfather of the Pentium chip. Grove may have been obscure until last fall, when he received worldwide attention for turning the Pentium's relatively minor calculating problems into a major public relations disaster.



JIM HARRISON

**Unnoticed?** Paul and Anne Ehrlich.

Honorees are selected by a panel* handpicked by Mrs. Heinz. "The common link," she said, is that all winners have a "vision of a better world and [an] unwavering commitment to make their vision a reality." This is, then, an award that will give a researcher a quarter of a million dollars for caring.

* Among the 43 jurors were epidemiologist Devra Davis, mathematician Marina Whitman, energy specialist John Holdren, ecologist Thomas Lovejoy, microbiologist Eugene Cota-Robles, transplant surgeon Thomas Starzl, and psychiatrist David Hamburg.