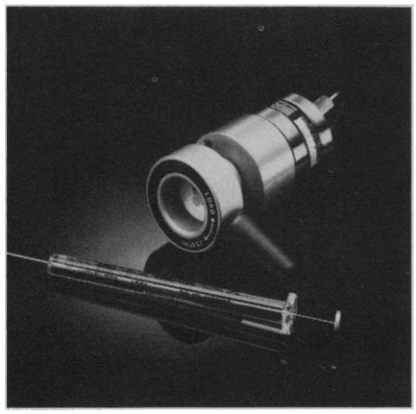

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LETTERS

Juvenile-Onset Diabetes: Significance of Findings

The Research News article, "Virus isolated from juvenile diabetic" (15 June, p. 1187) by Thomas H. Maugh II, contains a misstatement of fact. It is not true that encephalomyocarditis (EMC) and Venezuelan equine encephalomyelitis (VEE) viruses do not infect humans. On the contrary, EMC virus causes occasional febrile illnesses in humans with symptoms of central nervous system (CNS) involvement and lymphocytic pleocytosis in the cerebrospinal fluid. Thousands of cases, during epidemics, with accompanying fever, headache, and CNS involvement, attest to the pathogenicity of VEE virus in humans.

Thus, Maugh's statement that ". . . the significance of these [diabetogenic] findings to the human condition was questionable" is incorrect.

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Chemical Coal Cleaning

Luther J. Carter's informative article on sulfur oxide emissions from burning coal (News and Comment, 15 June, p. 1179) omits mention of a developing technology that may play a large role in reducing such emissions. It concerns precombustion removal of sulfur by selective chemical reaction or more simply, chemical coal cleaning. A number of approaches are under development, for example, use of molecular oxygen, chlorine, ferric ion, or nitric acid to selectively oxidize and remove the sulfur; use of microwave heating in combination with aqueous leachants; and enhancement of the magnetic susceptibility of pyrites before a magnetic separation step. In contrast to solvent refined coal processing, in which coal passes through the liquid state, chemical coal cleaning methods leave the coal intact. All chemical cleaning approaches under active development are capable of removing over 90 percent of pyritic sulfur, and some are able to remove one-third or more of the organic sulfur in coal.

An economic evaluation of six of the most promising technologies estimated typical annualized costs (operating plus capital, but not including feed coal) in the range of from $15 to $23 per ton of clean coal in 1977 (*1*, *2*). Add a feed coal cost of $20 per ton with an assumed 90 percent process yield to the higher of the annualized costs. The result is an overall cost of approximately $1.93 per million Btu's (British thermal units) or $1.83 per gigajoule. An estimated cost for coal-derived distillate fuel in 1977 is $3.35 per million Btu's (*3*). Coal liquefaction removes more sulfur than does chemical cleaning, and most liquefaction processes yield fuel in a preferred form, distillate liquid. If a lower sulfur removal and solid form of fuel are acceptable, however, clearly chemical coal cleaning offers economies.

Further cost reduction may be possible by combining chemical cleaning with the less expensive physical cleaning, or washing, with only a fraction of the coal subjected to chemical cleaning. For example, 137 coals were considered that would meet current Environmental Protection Agency New Source Performance Standards if all pyritic sulfur were removed. The costs of chemical coal cleaning was taken as $15 per ton processed, and the cost of physical cleaning ranged from $1.50 to $5 per ton depending on top size. By using the combinational approach, 93 percent of the coals could be cleaned at a cost less than $12 per ton and 70 percent for $6 or less (*1*). Again, to these figures must be added the cost of feed coal.

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2. R. R. Oder, L. Kulapaditharom, A. K. Lee, E. L. Ekholm, *Mining Congr. J.* **63**, 42 (1977).
3. W. L. Nelson, *Oil Gas J.* **77** (No. 17), 67 (1979).

Scientific Cooperation with Vietnam

The Vietnam war has been over for Americans for 4 years, but the Vietnamese are still living with its terrible aftermath. Each of the undersigned coordinators of the newly formed U.S. Committee for Scientific Cooperation with Vietnam has recently visited the major scientific institutions in Vietnam and witnessed the heavy responsibilities faced by our Vietnamese scientific colleagues in the rebuilding of their war-torn society. Because of the dominant role played by science and technology in the de-

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struction of Vietnam, we feel that responsible American scientists have a special reason for wanting to help our Vietnamese colleagues in this reconstruction effort. Consequently, we hope to develop a rapidly expanding scientific exchange program between the scientists of our two countries.

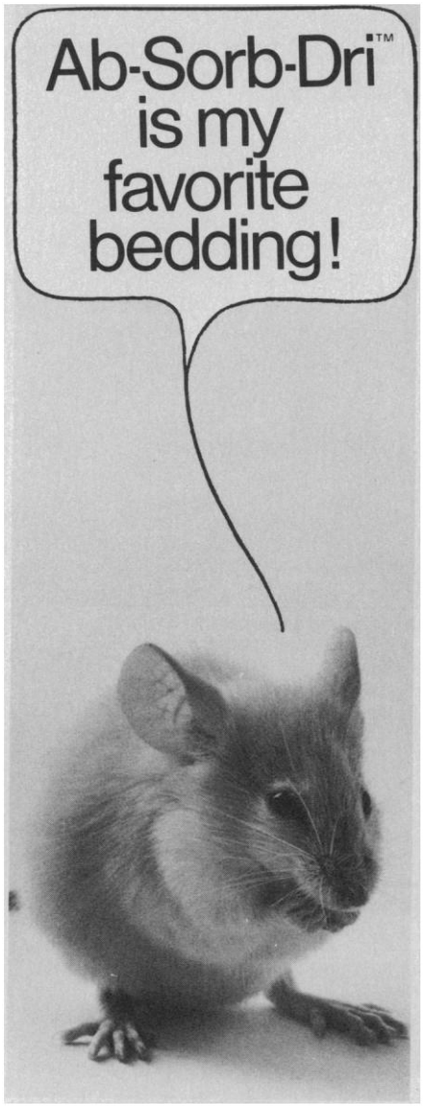
Last October the well-known physicist Nguyen Van Hieu, vice-director of the Vietnam Scientific Research Center in Hanoi, visited many universities and research centers in the United States. This April, Ton That Tung, director and chief surgeon of the Viet Duc Hospital in Hanoi, toured the United States as a guest of both our committee and the American Friends Service Committee. Tung is concerned with the long-range health problems caused by dioxin, an impurity in 2,4,5-T, a component of the Agent Orange used as a herbicide by the U.S. military in the southern part of Vietnam. He was among the first to point out the possible link between this herbicide and numerous abnormalities, including birth defects, liver cancer, and chronic weakness. Tung's clinical tests indicate that women exposed to this herbicide in the first few months of pregnancy have a higher than normal probability of birth defects, including spontaneous abortions and aberrations involving chromosomal modifications. Tung also suspects that dioxin is related to liver cancer. Although Vietnamese in both the northern and southern parts of the country have nearly identical diets, the incidence of liver cancer in the north has remained constant since 1962, while in the south the incidence has increased, moving liver cancer from the eighth to the third most frequent cause of cancer-related deaths.

Accordingly, Tung is appealing to the U.S. medical and scientific community to send a team of experts to Vietnam to carry out epidemiological studies related to these problems. He also would like to have a joint U.S.–Vietnamese Institute set up to train and equip Vietnamese specialists in the difficult task of analyzing dioxin in the parts-per-billion range or less. Tung feels that such a program will not only aid Vietnam, but may help the United States as well, since many former G.I.'s exposed to Agent Orange while in Vietnam may now be exhibiting the same symptoms as the Vietnamese. In the United States it will be more difficult to isolate the effects of Agent Orange, as dioxin is produced from many sources here.

Tung and Hieu, speaking on behalf of their colleagues, are eager to develop a scientific exchange program among scientists of our two countries. The Vietnamese government has agreed to send postdoctoral workers to the United States next year for periods of up to 1 year so that they may obtain advanced training in our universities, research laboratories, and medical centers. Several universities and research centers in the United States have agreed to receive Vietnamese colleagues. Reciprocally, our U.S. committee is assisting in the sending of U.S. scientists and medical experts to Vietnam to work with the Vietnamese. One of us (E.C.) recently spent 5 weeks in Hanoi giving a course on applications of neutron activation analysis in such areas as mineral research and protein determination in foodstuffs, and another member (Arthur W. Galston) has helped to set up a laboratory and train workers in plant physiology and biochemistry. Early this year, E. Hafner of Hampshire College presented a course on minicomputer applications, and current plans include sending experts in solar energy and wind energy applications to develop a prototype solar thermal rice dryer and to utilize the wind to store energy so that remote villages will be able to receive television programs. In the field of medicine, one of us (J.H.L.) has arranged for the donation of a cobalt-60 teletherapy unit for cancer treatment to a Hanoi Medical School hospital. Lawrence H. Lanzl of the University of Chicago will visit Vietnam this coming September to check out the machine and offer a short course in the application of radiation in cancer therapy.

Both in Ho Chi Minh City and Hanoi we found a high level of scientific competence, hampered mostly by the lack of certain types of equipment and recent Western journals. Accordingly, our committee has sent more than 50 tons of scientific and medical journals to Vietnam within the past 2 years, but there is still an urgent need for current journals, reprints, and advanced texts. As an example of the lack of simple equipment, in Ho Chi Minh City there is an urgent need for a basic ultramicrotome for use with an electron microscope.

Besides these specific examples in which individual cooperation and exchanges are desired, there are other projects in which a wider involvement of the U.S. scientific community is needed. One such project which could have a potentially major impact is developing regional agricultural research stations in order to perform systematic soil analyses. A prototype station, in Hai Hung province outside Hanoi, is now analyzing about 1000 soil samples every month.



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Crop yields in this province are up markedly, producing up to 7 tons of rice per hectare from three rice crops, as well as one vegetable crop per year. The basic equipment to set up these laboratories is not too expensive, but soil experts must visit Vietnam in order to assist Vietnamese in the choice of the right kind of standard "tropicalized" equipment items.

Vietnamese authorities at all levels have expressed a strong desire to convert the enmity of the recent past to a new era of cooperation. During a recent interview, Prime Minister Pham Van Dong referred to Albert Einstein's concern for making "science without frontiers" a common depository for all peoples, from which all can benefit. The Prime Minister felt that the scientific and technical development of Vietnam should have a high priority, since scientific and technical innovation can bring about changes in attitudes, in addition to improving living standards. This in turn can lead to friendship, mutual respect, and trust, which is most important if different societies are to avoid conflicts with each other in the future.

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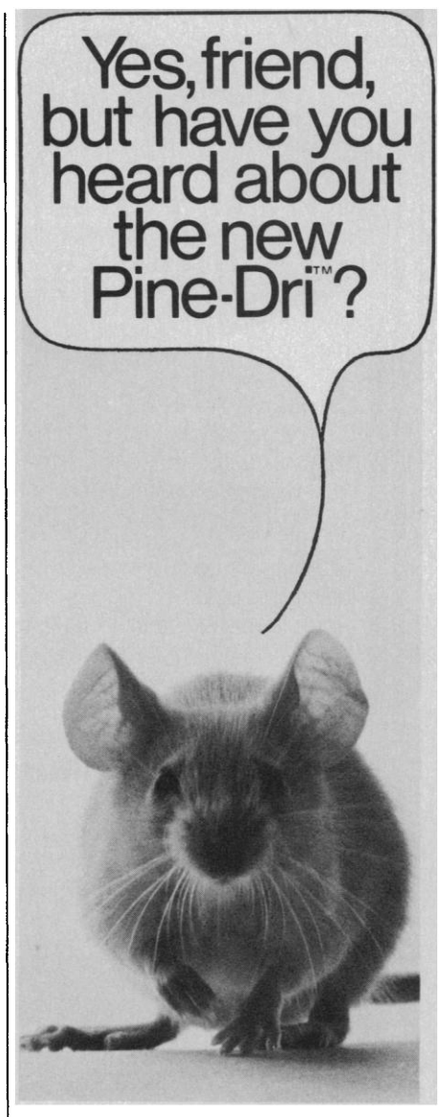
Nuclear Industry: Safety Record

I would like to provide my personal comments on Donald Parsons' letter in the 6 July issue of *Science* (p. 122). Parsons cites several statistics regarding nuclear power that are incorrect. The first error is his statement: ". . . the nuclear generating industry record is *no* fatalities after 20 years of operation." This statement should read ". . . no acute radiation-induced fatalities . . ." or ". . . no directly observable health impact on the general public . . ." in order to be completely accurate. The statement regarding the safety record of the commercial nuclear power plants does appear in the article by (former Nuclear Regulatory Commissioner) Mason (*1*) that was cited by Parsons, but in the cited article it is correctly qualified as pertaining to radiation deaths. Two workers as the Surry nuclear plant died as a result of a steam valve failure that occurred on 27 July 1972. Although this accident did not involve radiation overexposure and could



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