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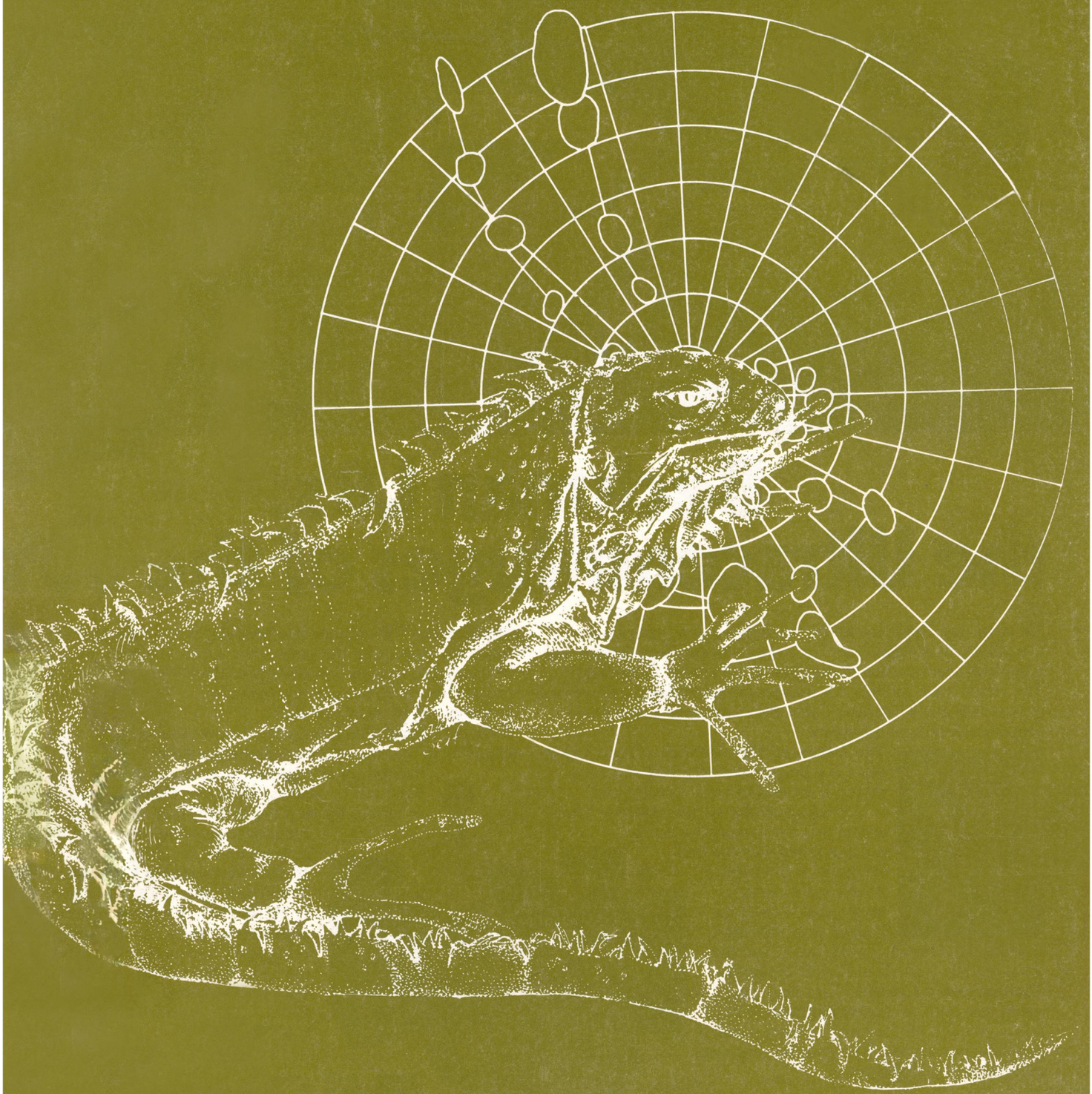

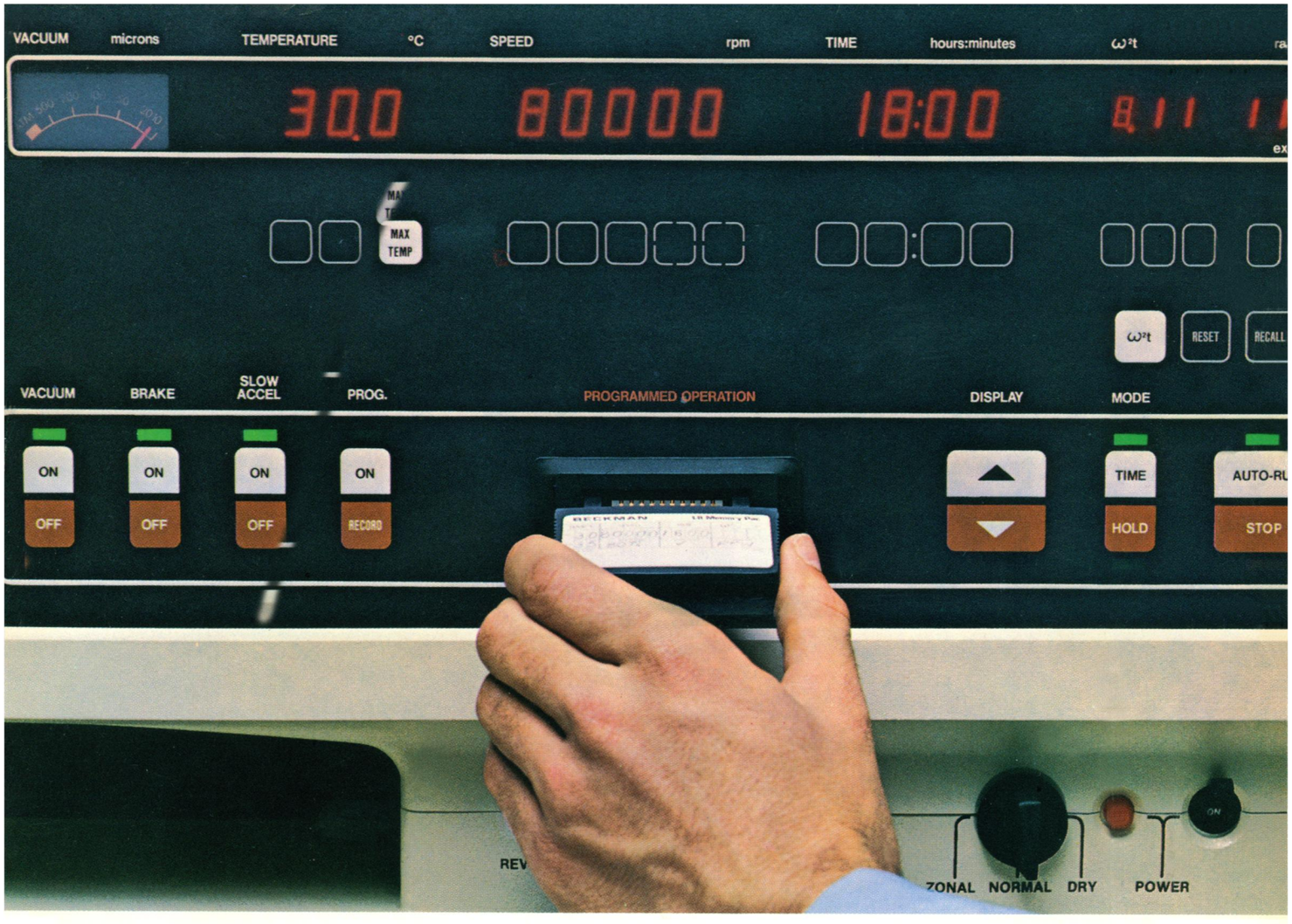

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SCIENCE

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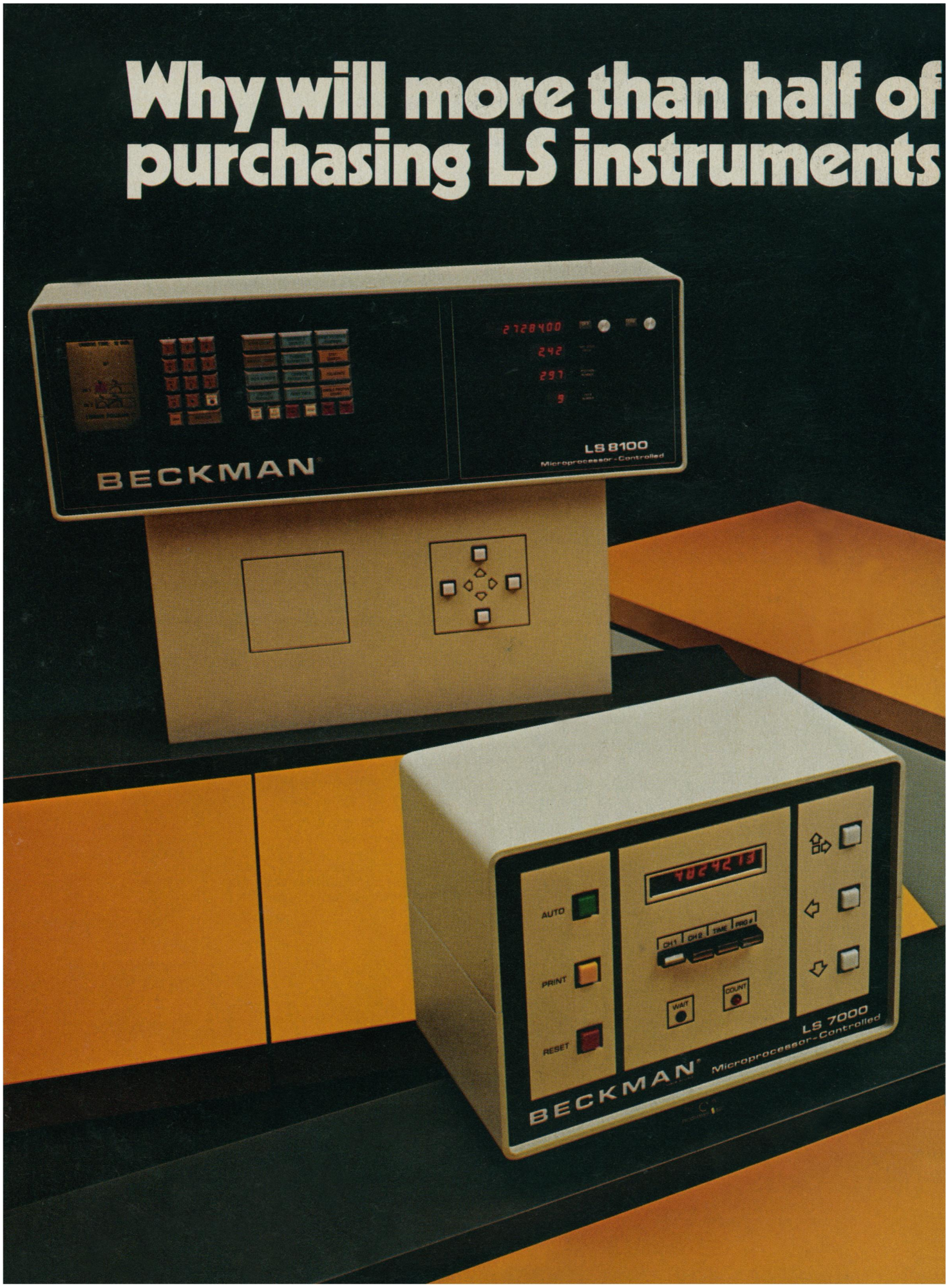
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

Sketch of the lizard, *Iguana iguana*, with the eye superimposed upon a map of visual space. The small circles within the map represent visual receptive fields of cells in the optic tectum. See page 595. [Susan Seis, Visual Education Department, Medical College of Virginia, Richmond]

Why will more than half of purchasing LS instruments



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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.

CHARLES H. CALISHER
Arbovirus Reference Branch,
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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.

JOHN A. RUETHER
Pittsburgh Energy Technology Center,
U.S. Department of Energy,
Pittsburgh, Pennsylvania 15213

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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.

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.

E. COOPERMAN
Department of Physics, California State University, Fullerton 92634

J. H. LEVAN
Departments of Physiology and *Radiology, Chicago Medical School, North Chicago, Illinois 60064*

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

have happened at a fossil-fueled power plant, it did occur at a nuclear plant and therefore makes Parsons' statement, as it was printed, inaccurate.

The statements concerning the potential health impact of the Three Mile Island accident are also inaccurate. The potential *lifetime* impact of that accident, estimated by an interagency task group (*2*), was less than two fatal cancers and two nonfatal cancers to the entire population within 50 miles of the Three Mile Island site (approximately 2,164,000 people) and not per 100,000 individuals as Parsons and the footnote in Mason's article stated.

The total number of cancer deaths that would be expected to occur normally over the lifetime of the 50-mile enclosed population would be approximately 325,000. This total number is a more appropriate statistic for comparison with the lifetime risk of the accident than the annual cancer death rate (4500 cancer deaths *per year*) cited by both Parsons and Mason.

HAROLD T. PETERSON, JR.*
Office of Standards Development, Nuclear Regulatory Commission, Washington, D.C. 20555

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* Member, Ad Hoc Interagency Dose Assessment Group for the Three Mile Island Accident.

Weather Prediction

With regard to the cover of the 29 June issue and the caption thereto on page 1365 reporting Seasat data for 14 September 1979 (at 17:15 G.M.T. no less!), I can only exclaim, "Wow! *That's* weather prediction!"

Or I might perorate with these words of Thomas Hood (*The Plea of Midsummer Fairies*, XCII):

We will not woo foul weather all too soon,
Or nurse November on the lap of June.

ROBIN WILSON
Office of Academic Affairs, Ohio State University, Columbus 43210

Erratum: In the issue of 22 June, in the News and Comment article, "Congress says bioassay reports are stalled" (p. 1288), Philippe Shubik is identified as the "former director" of the University of Nebraska's Eppley Institute for Research in Cancer. Shubik is in fact on leave from that post until 1 July 1980. Norman Cromwell has been named acting director while Shubik is on leave.

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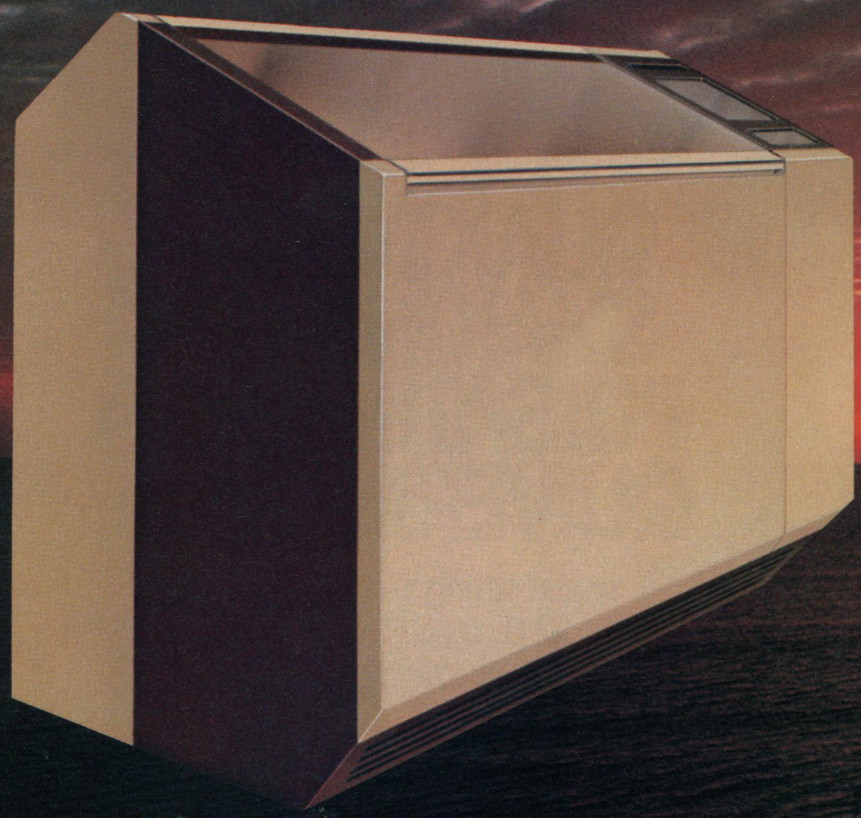

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SCIENCE

Self-Care: A Nation's Best Health Insurance

Even though this is the richest nation in the world, the average American family, which spent $2115 for health care in 1978, is finding it cannot afford to be ill. President Carter and Senator Edward Kennedy have both proposed national health insurance plans that would relieve Americans of much of this burden. But as the debate over these multibillion-dollar plans heats up, the nation risks losing sight of the fact that one of the cheapest and most effective ways to put a cap on spiraling health care costs is through greater self-care.

Most illnesses run their own course and are seldom life-threatening, permitting most people to provide themselves and their families with rudimentary health care without professional medical help. Studies in Denmark by Poul A. Pedersen and in Great Britain by C. P. Elliott-Binns have shown that five out of ten people visiting a general practitioner have already begun self-prescribed treatment that is beneficial 60 to 80 percent of the time. Better health education—so that people know the best way to treat common illnesses themselves and the best time to see a physician—could improve the effectiveness of this health resource.

About 5 million people in the United States now belong to physical or mental self-help groups of some kind—including everything from Alcoholics Anonymous to feminist health collectives. Surveys by Helen I. Marieskind of women seeking health care have found that those who regularly attend gynecological self-help clinics better understand their anatomy and the frequency with which various medical examinations should be performed than women who attend other types of medical facilities. Their "health-care literacy" can mean early detection of breast and cervical cancer. The potential human and economic savings inherent in such efforts argues strongly that self-help groups should be encouraged and promoted.

Organized self-care programs have proved especially effective among those suffering chronic illnesses, which represent a growing proportion of the diseases afflicting Americans. In a self-care program with hemophiliacs at the Tufts New England Medical Center, total costs per patient were lowered 45 percent. A diabetics' self-care program run by the University of Southern California reduced the number of patients experiencing diabetic coma by two-thirds and halved the number of emergency room visits. Hospitals and consumers saved $1.7 million over a 2-year period, a mere fraction of the overall savings that could be realized if self-care became the first line of medical defense nationwide.

Even the best self-care will not necessarily keep people from becoming patients. In life-threatening situations, the ill should have the benefit of the best medical expertise, drugs, and medical technology that they and society can afford. Since this is usually beyond the means of the average family, national medical insurance for catastrophic illnesses is essential.

To ensure that such a comprehensive health care plan does not lead to ever higher medical costs, national insurance should be tied to a program that would encourage people to take more responsibility for their own health. Self-care incentives should be built into any national health plan. If the first $500 or $1000 that families spend on health care each year came out of their own pockets, there would be a built-in incentive to limit trips to the doctor and to practice more self-care. To enable people to do this effectively, the government should use the money saved by providing less than full insurance coverage to finance courses for consumers on basic health care and the home treatment of chronic illnesses. Such a national health plan could help create a public awareness that runaway health care costs are, in part, a social problem arising from overreliance on the medical system for treatment of even the simplest illnesses and that cost containment is a joint government and individual responsibility.—BRUCE STOKES, *Worldwatch Institute, 1776 Massachusetts Avenue, NW, Washington, D.C. 20036*

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Although it is too late to submit suggestions for symposia for this Annual Meeting, contributed papers can be sent in up to 7 September 1979. Instructions for abstracts are given below and a sample is shown. Contributed paper sessions are of the POSTER type; in such sessions each contributor will have a bulletin board on which to place text and graphic material (of an oversized nature) for an extended period of time so that the work can be discussed with all interested parties (see *Science*, 28 June 1974, page 1361).

Please note that all contributions must be submitted (and signed) by an AAAS member or fellow (although this person need not be one of the authors).

Instructions for Contributors

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Oxi-One is a microprocessor-controlled sample oxidizer. Control of sample combustion ensures proper handling of even volatile samples labeled with tritium or carbon-14 for liquid scintillation counting. The trapping device is glass to assure cleanliness and to reduce retention of radioactivity in the system. The instrument features automatic test functions to assist in maintenance. Oxi-One will accommodate standard or miniature counting vials. Radiomatic Instruments & Chemical. Circle 785.

Hand-Held Calculator that Interfaces with Peripherals

The alphanumeric HP-41C hand-held calculator features 130 programmed scientific and mathematic functions. It also accepts additional programs created by the user or purchased from its manufacturer. It offers continuous memory and has a liquid crystal display. Peripherals for the basic unit include up to four memory modules to raise the base from 400 lines or 63 data-storage registers to as many as 2000 lines or 319 registers, a card reader, a portable thermal printer, a wand to read and enter programs or data from bar codes, and 16 plug-in application modules that offer up to 4000 program steps. The hand-held unit has four ports to connect these peripherals. Hewlett-Packard. Circle 784.

Wiped-Film Molecular Stills

Three models (2-, 4-, and 6-inch) of wiped-film evaporator/concentrator minimize the problems of vacuum concentration and distillation of heat-sensitive, viscous, or nonconductive materials. Slotted wiper blades spread the distilland evenly over the entire evaporative surface in a thin film and propel it rapidly downward to limit heating time. The slots prevent curling of the distilland in front of the wiper blades to eliminate formation of channels or hot spots. This in turn assures complete wetting of the evaporative surface and maximum heat transfer. Pope Scientific. Circle 786.

Literature

Clinical Products includes RIA kits, radioassay reagents, radiopharmaceuticals, and supplies for gamma counting. Amersham. Circle 787.

Electroencephalographs is devoted to the Accutrace 100 and 200 which are mobile and provide eight to ten and eight to twenty channels, respectively. Beckman Instruments, Electronic Instruments Division. Circle 788.

Chemical Kits features environmental, commercial, and specialty chemical kits for a wide variety of standard analytic procedures. Chem Service. Circle 789.

Plasticware lists over two dozen new products in addition to a complete line of shatterproof and corrosion-free laboratory ware. Mallinckrodt, Science Products Division. Circle 790.

Chromatography Chemicals and Accessories are featured in a 176-page catalog for gas, liquid, and thin-layer techniques. Foxboro Analytical. Circle 791.

Research Materials includes a variety of chemicals, instruments, accessories, and supplies for scientific applications. Research Products International. Circle 792.

Scanning Electron Microscope details the features, specifications, and capabilities of the Stereoscan 604 instrument. Cambridge Imanco. Circle 793.

Newly offered instrumentation, apparatus, and laboratory materials of interest to researchers in all disciplines in academic, industrial, and government organizations are featured in this space. Emphasis is given to purpose, chief characteristics, and availability of products and materials. Endorsement by *Science* or AAAS is not implied. Additional information may be obtained from the manufacturers or suppliers named by circling the appropriate number on the Reader Service Card (on pages 550A and 606A) and placing it in the mailbox. Postage is free.

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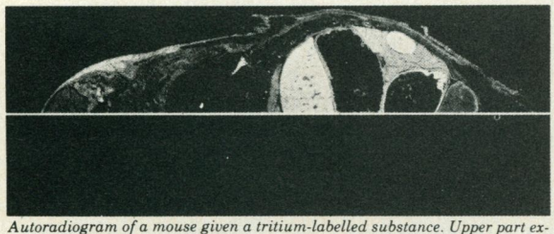

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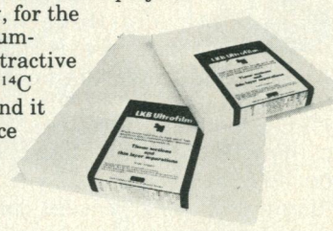

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(Continued from page 579)

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