SPACE

Tiny Space Device Run by Solar Energy

➤ A TINY thermoelectric converter, recently sent into orbit by the Air Force, has converted solar energy into electrical energy.

The Air Force Systems Command, which conducted the test at Vandenberg Air Force Base, Calif., says the test is a major step in proving the concept of converting solar energy into power for use in aerospace vehicles. Advantages claimed for the thermoelectric converter over silicon solar cells are lower cost and weight, and resistance to radiation damage.

• Science News Letter, 83:136 March 2, 1963

PHYSIOLOGY

Body's Response to Drugs May Depend on Timing

➤ THE BODY'S RESPONSE to drugs may eventually be found to depend on the time of day or night they are given.

This prediction is based on studies showing that the adrenal-stimulating hormone, ACTH, gives several times better results at the end of the working day than at the beginning of it.

In men and women, the adrenal hormone, cortisol, which enables them to withstand stress, begins to rise in the blood early in the morning. During periods when the blood level of the hormone is low, at evening, the adrenal glands respond to the stimulation of ACTH, but they are sluggish even to large doses when the blood level of the adrenal hormone is high.

Drs. Frank Ungar and Franz Halberg of the University of Minnesota, with Robert Ertel, have shown that timing of body processes determines many responses. Most recently they tested an adrenal inhibitor, called SU-4885. At one injection time, most animals survived without apparent ill effect. The same dose injected about 12 hours later proved highly toxic.

Further study is needed to understand the eventual implications of this research in relation to drug administration. The American Cancer Society is helping to support the Minnesota investigation on the adrenal cycle.

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GEOLOGY

Exotic Pacific Islands Exist Due to Earth Tear

➤ ELEVEN of the exotic Pacific islands of Melanesia owe their existence to a great tear in the earth that has helped to lift them up while most other islands have been sinking during the last several million years.

A geologist, Dr. J. Tuzo Wilson of the University of Toronto, Ontario, reported at Washington, D. C., that these 11 islands etxend in a great circle from the Samoa-Fiji channel to Easter Island. The general pattern is for ocean islands to sink, as suggested by Darwin. However, Dr. Wilson found there were certain exceptional islands, including the 11 Pacific ones, that have been rising rather than sinking. In the main ocean basins, the pattern of uplifted islands is simple, Dr. Wilson found.

Such islands are located on active mid-ocean ridges, on the far side of active island arcs or close to a great circle across the Pacific. This last is believed to be one of the great fracture lines of earth.

The pattern in the Pacific is like that of a thin plate with a tear in it. The plate, representing the Pacific Ocean floor, rests on an extremely thick fluid. The plate's outer edges have been forced down by earthquake activity, and flow of the viscous fluid has caused the plate to rise at distances of 120 to 450 miles from the edge.

The uplift is likely only a temporary and unusual state for the islands, Dr. Wilson reported in Science, 139:592, 1963. However, the regularity of the uplift pattern supports the view that in the earth an elastic surface layer rests upon a plastic or viscous layer.

• Science News Letter, 83:136 March 2, 1963

GENERAL SCIENCE

U.S. Forests Provide 2,000 Fifty-Mile Hikes

➤ WITH HIKING the talk of the town these days, Secretary of Agriculture Orville L. Freeman passed this bit of information along: National forests in this country have enough trails for a person to hike 50 miles a week on different terrain for the best part of his life.

"There are," he said, "106,830 miles of trails on 154 national forests throughout this country. If a person hiked 50 miles a week, probably on Saturday so he could rest on Sunday, he could hike for 2,136 weeks, or 41 years!

"There is fishing, hunting, camping, and skiing on the national forests, all of which can contribute to physical fitness and personal satisfaction."

• Science News Letter, 83:136 March 2, 1963

EDUCATION

Turkey to Have New Science High School

➤ TURKEY is facing its industrial problems by giving high school students a strong science education.

Specialized training in biology, chemistry, physics and mathematics will be offered to talented young people at a new national science high school, scheduled to open in the fall of 1964 in the capital city, Ankara.

The Turkish program, under a grant of $1.1 million from the Ford Foundation, New York, will encourage science as a career. It should help meet the general shortage of scientists that Turkey and many other developing countries face as they become more and more industrialized.

A three-year teacher training program will also be set up.

The Ford Foundation has also reported a recent grant of $2.3 million to the University of Ibadan, Nigeria, for expansion of research and graduate facilities.

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IN SCIEN

VITAL STATISTICS

45,000 Lose Lives In Non-Car Accidents

➤ THERE WERE 45,000 American lives lost because of accidents in the home and in public places last year, the National Safety Council has reported.

The toll, an increase of 3% from the 43,500 who died in 1961, was in addition to the 6.3 million persons who suffered injuries disabling beyond the day of the accident.

Together, the fatal and non-fatal accidents cost the nation $2.1 billion, an economic waste that includes wage losses, medical expenses and overhead costs of insurance.

Accidents in the home comprised most of the total, 28,000 deaths, up 4% from the 27,000 who died in 1961. Home accidents also accounted for 4.2 million of the disabling injuries and $1.15 billion of the monetary loss.

Accidents in public places, excluding motor vehicle accidents, took 17,000 lives, 3% more than the 16,500 in 1961, injured another 2.1 million and cost $950 million.

Falls caused more than two-fifths of the home deaths, fires and burns more than one-fifth, and all other accidents one-third. One out of three persons killed in the home was 75 years of age or older, and one out of five was a child under five.

In public accidents, falls and drownings not involving boats each accounted for one-fourth of the deaths.

Transportation accidents—rail, air, water and other, but not involving motor vehicles—together accounted for one-sixth of the toll. About a fifth of the public fatalities were in the 45 to 64 age group.

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PUBLIC HEALTH

Older Addicts Overcome Drug Habit More Easily

➤ DRUG ADDICTS who are over 30 years of age have a considerably greater ability to give up narcotics than younger persons. Public Health Service investigators, who reported at Ann Arbor, Mich., on a five-year study of 453 addicts released from the PHS hospital in Lexington, Ky., said that for all age groups the ability to give up drugs voluntarily after treatment steadily improves with time.

Six months after discharge, 67% were re-addicted, but at five years after discharge, only 46% were again taking narcotics. After-care or supervision of discharged addicts by communities is needed, Ben. Z. Locke, Henrietta Duvall and Leon Brill of the National Institutes of Health, Bethesda, Md., said.

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CE FIELDS

ARCHAEOLOGY

Pygmy Tools Found on Bay of Bengal Islands

➤ CRUDE STONE tools of the Pygmy people have been discovered on the Andaman Islands. The islands, located in the Bay of Bengal between India and Burma, are the home of a group of the Pygmys.

P. C. Dutta of the Indian Museum, Calcutta, who discovered the tools, said they show that the Pygmy society was based on hunting and collecting. Very little is known about the stone industry on these islands, Dr. Dutta reported in Nature, 197:624, 1963.

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VETERINARY MEDICINE

New Research Program On Foot-and-Mouth Virus

➤ A NEW SERIES of experiments has been started to examine beef from Argentine cattle as it is cut and cured for any trace of dread foot-and-mouth disease.

Scientists from Argentina and the United States intend to find out whether foot-and-mouth virus can survive in cured beef from Argentine cattle that have been vaccinated against the debilitating disease and then inoculated immediately before slaughter with "challenge strains" of the virus. The cattle will be examined for the presence of foot-and-mouth virus at various stages in the dressing of the carcass and the preparation of cured beef from it.

The short-term experiments are part of a cooperative program of research on the disease by veterinary scientists from the two countries, the Joint Argentine-United States Commission of Foot-and-Mouth Disease announced.

Three United States veterinary and food scientists will participate in the project, which is supported by the Agency for International Development (AID) as part of the Alliance for Progress program of assistance to Latin American nations. U. S. participation is under the scientific counsel of the National Academy of Sciences-National Research Council.

The joint Commission plans to develop methods to free certain Argentine processed meat products from foot-and-mouth virus and thus make them acceptable for import into the United States. Until last month, strict U. S. regulations required that all cooked beef from Argentina be re-cooked on entry into the United States. On Jan. 18 the U. S. Department of Agriculture relaxed the regulations so that products of certain modernized Argentine meat-processing plants are subject only to inspection on entry into the U. S.

As beef is a primary export commodity of Argentina, the Argentine government is concerned about the loss of North American markets for cured beef and strict U. S. regulations. It is carrying on programs of massive vaccination against the disease, as well as intense research on incidence and methods of inactivating the virus in edible meats by physical or chemical procedures.

The foot-and-mouth disease is the world's most serious animal affliction. It is a highly infectious virus that causes painful blisters on the feet and mouth of an animal so that it becomes lame and stops feeding. Cattle, sheep and swine are particularly susceptible. The disease has been stamped out in North America, Australia and New Zealand, but is found in many other parts of the world.

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BIOTECHNOLOGY

Adjusted, Maladjusted Diagnosed by Computers

➤ COMPUTERS are now telling psychologists who is well adjusted and who is not.

Dr. Benjamin Kleinmuntz of the Carnegie Institute of Technology reports that the personality tests of 126 college students were analyzed by a computer. The machine accurately decided who was well adjusted and who was maladjusted.

Psychologists themselves "taught" the computer how to interpret the personality test. The test, called the Minnesota Multiphasic Personality Inventory, is widely used to diagnose and predict the course of mental illness. An expert scorer said everything he was thinking as he worked on the test. The psychologists tape-recorded his words and translated them into "computer language" by changing them from descriptions to rules. Then the machine used the rules to judge the personality tests.

Dr. Kleinmuntz hopes that the rules will help guidance counselors detect emotional maladjustment from the test. He reported his work in Science, 139:416, 1963.

• Science News Letter, 83:137 March 2, 1963

TECHNOLOGY

Solar Space Power Unit To Generate Electricity

➤ A SPACE POWER plant designed to turn the sun's energy directly into electricity is being developed by Westinghouse Electric Corporation.

The work is being performed under contract with the Air Force Aeronautical Systems Division, Wright-Patterson Air Force Base, Ohio. Under terms of the contract, the company will build and test a solar powered thermoelectric generator capable of delivering at least 10 watts of power on the ground.

A thermoelectric generator operates on the principle that if heat is applied to the junction of two dissimilar materials, such as lead telluride and germanium bismuth telluride, the flow of electrons thus created produces electric power.

If the 10-watt unit operates successfully on the earth, a larger, more powerful unit may be developed for space applications.

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TECHNOLOGY

Use Isotopes in Study To Build Better Roads

➤ HIGHWAY engineers studying mixtures of stone and asphalt that make safer, longer-lasting roads can now get help from the use of radioactive isotopes or tracers to produce an autoradiograph for analysis.

How to use the technique was reported to the annual meeting of the Association of Asphalt Paving Technologists in San Francisco.

Profs. William H. Goetz and John E. Christian of Purdue University, collaborating with Prof. Donald R. Lamb of the University of Wyoming, developed the method to evaluate many different mixtures of asphalt and aggregate.

They reported that it could be a serviceable tool for roadbuilding engineers and may answer a number of questions for them as they try to find out why some roads do not last as well or remain as smooth as others.

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PUBLIC HEALTH

New Methods May Remove Smog Poison

➤ THE POSSIBILITY of economically removing a principal air poison has resulted from cheaper methods of producing industrial hydrogen, V. G. Mackenzie, head of the air pollution division of the U. S. Public Health Service, told SCIENCE SERVICE.

Sulphur oxides, industrial air pollutants which plague the entire U. S., can be removed from heavy residual oils by treating with hydrogen. With new methods of obtaining hydrogen the cost of treating the oils would add to the price between 20 cents to $1.25 per barrel. Efforts are being made to decrease this amount.

Smog is produced by automobile exhaust nitrogen oxides reacting with sunlight. When even small quantities of the sulphur compounds are present, the build-up of the small particles in the air which form smog is increased. The sulphur compounds contribute to the haze which results.

Air pollution from the sulphur oxides is caused by industrial burning of fuels such as coal and oil, the manufacture and use of acids, and "roasting of ores."

The residual oils are heavy petroleum products which are left from crude oil after gasoline, kerosene and the lighter furnace oils have been removed. They contain upwards of 1% to 5% of sulphur compounds.

One U. S. city, Los Angeles, prohibits the burning of a fuel oil which contains more than one-half of 1% sulphur by weight during seven months of the year. Other cities are considering restrictions of their use.

Gasolines, kerosenes and the heating fuels used in home furnaces do not contribute to the sulphur oxide air pollution. These petroleum products have been refined to remove the sulphur compounds.

The new methods were reported in a study by the Bureau of Mines for the U.S. Public Health Service.

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