

PHYSICAL CHEMISTRY

Sun May Power Satellite

► A sun-powered chemical battery that would last as long as the satellite containing it is foreseen using acridine dyes.

Dr. Gerald Oster of the Polytechnic Institute of Brooklyn, N. Y., has been able to set free more than one volt of electrical energy by putting the dyes first in light, then in the dark. Earth satellites such as the sputniks spend part-time in the sun, part in the earth's shadow.

Acridine dyes are multi-ring organic compounds containing nitrogen, and are usually yellow.

Such a sun-powered chemical battery using acridine dyes would also have application as an energy source for remote areas or where conventional methods of generating electricity are very expensive. Solar energy is readily available, but the processes that have so far been worked out for harnessing it are cumbersome, costly and inefficient.

The new battery works, in principle, much like the conventional lead-acid storage battery, in which electrical energy is used to reduce lead ions to metallic lead during the charging phase. During the

discharge phase, the metallic lead is converted to lead ions, giving off an electric current.

In Dr. Oster's chemical battery, the acridine dyes are irradiated with sunlight in the presence of a reducing agent such as potassium borohydride. Nearly 25% of the light absorbed by the dye converts into chemical products that, if made one chamber of an electrical cell, would produce electricity.

The action occurring in light is equivalent to the conventional battery's charging phase, and the reaction in the dark is equivalent to the discharge phase. The energy absorbed by the light reaction and set free by the dark reaction is equivalent to 1.2 to 1.4 volts.

Dr. Oster is continuing his studies, made under the auspices of the Air Force Office of Scientific Research, with the aim of making the overall reaction completely reversible.

Once mastered, complete reversal would mean the ability to store the sun's energy, then to release it at will.

Science News Letter, January 4, 1958

MEDICINE

Charged Air Kills Pain

► THE NEED for large doses of pain-killing narcotics for badly burned patients has been eliminated by the use of electrically charged air, Dr. Theodore A. David, North-eastern Hospital, Philadelphia, Pa., reported.

Dr. David, associate in surgery at the hospital, has used the negatively ionized air on about 75 burn cases of all degrees during the last two years.

The air is generated in a portable machine that blows the ionized air out into the patient's room. After two exposures to the air, lasting 20 minutes each, the patient seldom needs any more narcotics, Dr. David told SCIENCE SERVICE.

Negatively ionized air is composed of air molecules that have been given a negative charge. The air gets its charge in an electrostatic generator by being blown over a high voltage wire carrying a large current.

The ionized air is now standard treatment for all the hospital's thermal burn cases, that is, burns caused by excessive heat. Burns caused by chemicals, however, do not respond as well.

A striking example of the success of the treatment is one patient who suffered burns of all degrees over 50% to 60% of his body. Because of the ionized air, he requires no regular doses of narcotics. Even the dressings on the burns can be changed without the painkillers.

The usual case that is burned this badly would need narcotics for two or three weeks, Dr. David said.

How the ionized air goes about killing pain is still a mystery. Studies made with

an electroencephalograph to record brain waves indicate the ionized air creates effects similar to those caused by the tranquilizing drugs.

The treatment could be very important in the event of mass casualties since large numbers of burns could be treated at the same time by ionization.

Associated with Dr. David in the studies are Drs. John R. Minehart and Jean Fasano, of the Hospital, and Dr. Igho H. Kornbluh, Graduate Hospital of the University of Pennsylvania, Philadelphia, who has been studying the medical uses of ionized air for the past five years.

The equipment being used was designed and built by the advanced studies group of the Philco Corporation, Philadelphia.

Science News Letter, January 4, 1958

MEDICINE

New Salk Technique May Aid Cancer Study

► A NEW and simple technique for measuring the amount of antibody in blood serum is reported in *Science* (Dec. 27) by Dr. Jonas E. Salk, the scientist famed for his work with polio vaccine, and Elsie N. Ward, University of Pittsburgh, Pa.

The test was used to study antibodies from monkeys which had been inoculated with continuously propagating heart cells. The relationship between these cells and cancer cells is not yet understood.

In response to a flurry of popular interest

in the possibility of a vaccine against cancer, Dr. Salk was quoted as saying: "We are not now working on a cancer vaccine. We are doing basic studies on the nature of cells. This has no practical significance now."

To determine the potency of an antibody-containing serum, it has been the customary practice to continue diluting the serum until it loses its cell-killing effect on a constant concentration of metabolizing cells.

In the new technique, instead of diluting the serum, the number of cells on which it is tested is varied. Thus, the more potent the serum is as far as antibody content is concerned, the greater number of cells it will act against.

The serum solutions are prepared so that a changing color will indicate the number of cells affected. In this way, indications of trends are often evident overnight.

When the test was used to study continuously propagating heart cells, it was found that monkeys inoculated with these cells developed a type of antibody which was not destructive to other types of monkey cells but only to the propagating type.

On the other hand, chicks developed an antibody that killed both the propagating cells and other cells.

"It is apparent that considerable further study is required before any conclusions can be drawn," the scientists report.

Science News Letter, January 4, 1958



GIANT WHIRLER—This huge centrifuge, designed and built by the Rucker Company, Oakland, Calif., will be used to test components of the Atlas intercontinental ballistic missile at the Convair Division of General Dynamics Corporation. The streamlined compartment in the foreground can hold a one-ton load, whirled at 121 revolutions per minute. The ten-ton steel boom is 40-feet long. Extremes of temperature and acceleration can be tested simultaneously.