CHEMISTRY

Organic Solar Battery

Development of the first organic solar battery holds the promise of man's being able to duplicate the living plants' efficient conversion of solar energy to chemical energy.

➤ DEVELOPMENT of first organic solar battery has been reported at the University of California.

David Kearns, graduate student, and Dr. Melvin Calvin, photosynthesis expert, report in the *Journal of Chemical Physics* (Oct.) that they have achieved a solar battery effect in a cell containing alternate layers of organic dyes.

Efficiency is extremely low. However, dyes, synthesized from coal and petroleum, are inexpensive and there is an almost unlimited variety to choose from.

Work grew out of investigation of the mystery of how plants store sunlight in energy-bearing compounds. Scientists long have known that the light is captured by chlorophyll, the green pigment found in bits of plant cells called chloroplasts.

Recently, scientists have shown that the chloroplasts have a quasi-crystalline structure with alternate layers of fat, protein, and chlorophyll. Dr. Calvin believed this looked structurally like the silicon photobattery cell, and he and Mr. Kearns began their research.

They press the dyes into tiny wafers three-eighths of an inch in diameter and one-sixteenth of an inch thick. These multi-colored wafers are then placed in alternate layers in a cell. When illuminated, the laminated unit yields an electrical current, showing that the cell converts sunlight into electricity.

Two dyes that have worked are phthalocyanine, a distant chemical cousin of chlorophyll, and phenylenediamine.

Currently the scientists are trying some of the large number of conducting organic dyes, in different colors of light and temperatures, factors that affect efficiency.

The scientists could not speculate on the cost of development of efficient organic solar batteries, since the work is in its early experimental stages. However, perfection of structure, which makes silicon solar batteries expensive and difficult, may not be necessary with the dyes.

Organic solar batteries someday may be important in space flight, for satellites and for specialized uses on earth.

Also observation on the macro scale of a photobattery effect that in photosynthesis occurs only on an unobservable micro scale is important in understanding this basic process of life.

Science News Letter, November 29, 1958

PUBLIC HEALTH

Suggest Radiocarbon Harmful as Fallout

➤ RADIATION from carbon-14, a by-product of nuclear testing previously believed insignificant from a health standpoint, may be potentially more harmful than that of any fallout material.

Dr. Linus Pauling, Nobel Prize-winning chemist of the California Institute of Technology, Pasadena, said he was "surprised" to find that the genetic effects of carbon-14 may be so great.

Carbon-14 is formed when neutrons from the test explosions react with nitrogen atoms in the air. It is longer-lasting than most products of the bombs, having a 5,600-year half-life (the time taken for its radioactivity to be reduced by half).

Dr. Pauling estimates in *Science* (Nov. 14) that one year of nuclear testing produces sufficient carbon-14 to cause a total "of about 55,000 children with gross physical or mental defects, 170,000 stillbirths and childhood deaths, and 425,000 embryonic and neonatal deaths" during the next 10,000 years or so.

These numbers, he says, "are about 17 times the numbers usually estimated as the probable effects of the fallout fission products from one year of testing."

He cautioned that his calculations are subject to great uncertainty and they may be anywhere from five times too high to five times too low. His estimates are based on a future birth rate five times above the present one and they contain an unknown amount of overlap in the three categories of damage.

The total number of cases of leukemia and bone cancer expected to be caused by carbon-14, Dr. Pauling estimated on the basis of certain assumptions, is about equal to that estimated for fission products.

His conclusions are similar to those of a recent Atomic Energy Commission report. Dr. Pauling, whose controversy with the AEC over the possible potential damage as a result of the bomb test has been widely publicized, told SCIENCE SERVICE that there "does not seem to be any disagreement any more."

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ANGELS—Radar scope "angels," spots that seem to be reflections of the radar beam from points in the sky where nothing can be seen visually, have been identified as seagulls and other birds. The photographs at the left shows a radar scope at Cape Cod, Mass., to which a bird-removing circuit was applied by Lincoln Laboratory scientists at Massachusetts Institute of Technology. The other photograph was taken 24 seconds later, without the bird-removing circuit in operation. Each dot represents one bird.