

## BIOLOGY

# Algae Farm Tested

► THE FIRST full-scale tests of the world's most efficient "farming" process are underway in Richmond, Calif.

The process developed by University of California engineers uses green algae to shortcut nature's system of cycling nutrients through plants, animals and soil.

Trapping and harnessing the sun's energy in a shallow pond, the new method is designed for the production of high-protein animal feeds from municipal sewage wastes.

Although it is not likely to replace traditional farming, the algae process shows promise as a way of increasing the world's protein supply while solving some difficult problems of water shortage and waste disposal.

Developing nations in tropical areas may be the first to benefit from its application, the California researchers believe.

Eventually its use may extend throughout the world . . . and even beyond:

An algae farm on the moon might well supply future lunar colonists with food-stuff, oxygen and water while providing effective disposal of organic waste products.

A miniaturized version, known as a "microterrella," is being developed in the California laboratory to sustain astronauts on future long-term space voyages.

Key parts of the algae process have been developed and tested in University of California research over the past ten years, with support from the National Institutes of Health. Heading the work are Dr. William J. Oswald, associate professor of sanitary

engineering and public health at Berkeley, and Dr. Clarence G. Golueke, associate research biologist—both members of the University's Sanitary Engineering Laboratory located at Richmond.

For the full-scale pilot tests now beginning, they are joined by Dr. James H. Meyer, dean of the College of Agriculture at the University's Davis campus, and Dr. Robert C. Cooper, assistant professor of public health at Berkeley.

Dean Meyer will supervise an extensive testing program at Davis to determine the suitability of the harvested algae as feed-stuff for sheep, cattle and other animals.

As the project progresses, Dr. Cooper will probe for any possible transmission of disease organisms or toxic substances from the sewage to the algae and thence to the animals that receive algal feeds.

The algae employed in the process include varieties of the single-celled green plant organisms that form the familiar green scum on stagnant ponds.

The California-developed process is known as a "continuous culture," meaning that algae and reclaimed water are being continuously withdrawn at a rate that balances the constant input of sewage effluent.

In the two-thirds-acre pond now in use at Richmond, organic substances in sewage are rapidly attacked and decomposed by natural bacteria. New substances formed by the bacterial action become "food" for algae cells. The algae grow and multiply at a

rapid rate, using the same photosynthesis process that enables green leaves to convert sunlight into food energy while releasing oxygen to the air.

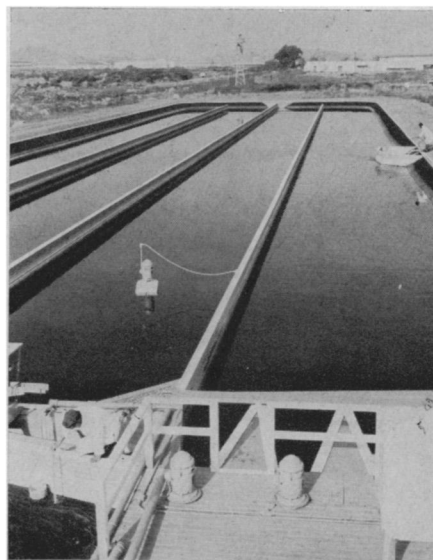
At the end of the system, the algae-water mixture is withdrawn and the algae separated in a large centrifuge and dried in a steam-heated drum dryer.

The dried algae—forming a green granular substance with an odor similar to that of fresh alfalfa—are now ready for use as animal feed.

The algae process is more than 50 times as efficient in the utilization of the sun's energy than farm production of conventional crops. The rating is even higher if the efficiency is calculated on the basis of protein production, for nearly half the substance in algae cells is vegetable protein.

Algae are also high in vitamin content, and their potential values as animal feeds or feed supplements have already been indicated in preliminary tests with small animals at Berkeley and Davis.

• Science News Letter, 84:370 Dec. 14, 1963



University of California

**ALGAE FARM**—Liquid sewage is converted to algae cells with the aid of bacteria and sunshine in this two-thirds acre pond at the University of California's Richmond Field Station.

## MEDICINE

# Oral Polio Vaccine Safe

► FOLLOWING REPORTS of successful mass immunization in a threatened polio epidemic in Jacksonville, Fla., the Journal of the American Medical Association, 186: 821, 1963, praises the safety of still another mass immunization program using oral vaccine.

Not a single "significant vaccine-associated illness" was found in Los Angeles County, Calif., where 7.5 million doses of Sabin vaccine were given, researchers said.

The oral live weakened vaccine, developed by Dr. Albert B. Sabin of Cincinnati, is usually given in flavored syrup or sugar lumps, compared to the Salk injections of killed virus vaccine which require needles.

Extreme caution was evidenced during 1962 by the Special Advisory Committee on Oral Poliomyelitis Vaccine to the Surgeon General because of a small number of paralytic disease cases, some of which resembled polio, among Sabin vaccines.

As a precaution, this committee warned that "because potential risks of the vaccine are believed by some to exist in adults, especially above the age of 30, vaccination should be used for adults only with the full knowledge of its very small risk."

The JAMA editorial said the present status of the problem appears to be that "while some persons believe the vaccine was responsible for some of the illnesses observed, firm proof is still lacking." Any vaccine requires persistent surveillance.

The extremely low rate of untoward reaction among millions of recipients makes this (Sabin oral vaccine) among the safest preventive agents, the editorial went on. It concluded that the greatest problem with the Sabin vaccine, as with other vaccines, is gaining public acceptance.

Reasons why more than half of the Los Angeles population chose not to be unimmunized deserve more attention, the editorial said.

The report on the Los Angeles Medical Society immunization program was written by Drs. Paul F. Wehrle, John M. Leedom, Bernard Portnoy, Nathaniel F. Pierce and Herbert H. Cowper, all of Los Angeles.

All three types of Sabin vaccine were given in the fall and winter of 1962 and 1963, the researchers said. All persons over three months old were urged to take the spaced dosages.

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## SURGERY

# Heart Valve Transplant Functions Two Years

► A HEART VALVE transplanted from one dog to another has functioned two years. Drs. Richard Lower and Norman Shumway of the Stanford University School of Medicine, Stanford, Calif., reported that this is the only study in dogs that shows a valve from another animal might possibly work indefinitely. The big question in the next few years will be whether living tissue grafts will prove more successful than synthetic materials or artificial devices. Artificial valves tend to cause blood clots and wear out.

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