

Food from Solar Energy Within Two Years Goal Of Stanford Scientists

PALO ALTO, Calif. — AP — Within two years Stanford University scientists expect to be able to show hungry peoples around the world how to use sunlight to produce nutritious food cheaply and in great quantities.

They have worked out a comparatively large-scale method of controlling the process of photosynthesis. This is the process by which plants use sunlight to convert water, carbon and a few other simple chemicals into the tissues of which all living things are made.

All the major scientific problems have been licked. The remaining job mainly is to work

out the technical and engineering details which will give the greatest yield for the smallest expenditure of materials and energy. Some minor scientific problems remain but given another two years, says Paul M. Cook, chemical engineer in charge of the project, the researchers should have enough data to launch this spectacular undertaking on an industrial basis. Just now the scientists are starting their first small pilot plant. It is a futuristic-looking collection of barrels and shallow rectangular tanks atop the Stanford chemical engineering lab. Into each tank the researchers will put something less than 100 gallons of water which has been "spiked" with a few ounces of nitrates and a few pinches of minerals such as magnesium, iron and sulfur compounds. A few hundred little green one-celled plants, too small to be seen individually, will be dumped into the tanks. Small pumps will stir the water and add carbon dioxide now and then. Sunlight will do the rest. These little plants are a type of algae or seaweed called *Chlorella pyrenoidosa*. Each contains

chlorophyll, the stuff which makes plants green and converts chemicals into cell substances with the aid of light.

The walls of the cells soak up a little of the spiked water. When sunlight strikes them their chlorophyll goes to work. Soon the cell gets so big it splits in half and forms two complete cells. This goes on at a great rate until the *Chlorella* is so thick that the water turns dark green. Then the harvest starts. Automatic controls drain off some of the *Chlorella*-laden water and add more clear spiked water to the tank. From the drained water the *Chlorella* is separated, then dried. In that state it is a blackish green substance with a 50 percent protein content.

It is two to three times as rich in protein as any ordinary agricultural plant. The protein contains all the amino acids necessary for human and most animal growth. There is one drawback. It tastes like alfalfa. But the operators have produced in a few hours the essential food of man and beast. They have done it without soil, without labor and without waiting through a growing season. They have completely short circuited conventional agriculture.

Since the Stanford pilot plant is small, the yield will be limited. Each tank, 10 feet long and 4 feet wide, should produce about one pound of dry *Chlorella* every three days. But the process is continuous. The *Chlorella* in the tanks keep on growing indefinitely. Only the surplus is harvested and the flow of surplus never stops.

Once the engineering plans are worked out, tanks may be built hundreds of times larger and yields measured in hundreds of thousands of pounds. As it is, the pilot tanks should be producing enough to start the experimental feeding of chickens with *Chlorella* in a couple of months, Cook said. It already is being used in test feeding of laboratory rats.

Although the initial outlook is that *Chlorella* will be used mainly as a feed for livestock there is no apparent reason why it could not be used directly as human food. It boils down to a question of palatability. You could sprinkle a couple of spoonfuls of it on a serving of meat and get that much additional protein in your meal without any appreciable change in taste, Cook said.

The raw materials for *Chlorella* production are available almost everywhere. Nitrates perhaps are the greatest problem

Fidelity Link Plans Benefit Program



Fidelity Link No. 11, Order of the Golden Chain, will conduct a country fair and square dance on Sunday night at 8 o'clock in Hano Auditorium of Har Sinai Temple. The public is invited. Proceeds will be

turned over to the Link's local milk fund and to the camp for underprivileged children at Blairstown in Warren County. Assisting with the plans are, seated left to right, Miss Anne Goldstein, worthy matron of

the Link; Mrs. Milton Haveson, general chairman of the program, and Mrs. Irvin Manulkin. Standing are Irvin Manulkin (left) and Maurice Cohn, worthy patron and chairman.

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in some places but their essential ingredient, nitrogen, can be obtained even from the air if nowhere else.

Water is not much of a problem. The same water can be used over and over, with the addition of a little extra now and then. The sunshine is free. So is *Chlorella*.

Chlorella can be made to produce fat as well as protein. All the scientists have to do is to put down a little on its nitrates and the *Chlorella* grows up with a fat content of as high as 85 percent. Thus it could be a source of oils as well as meat.

This versatility of *Chlorella* was discovered several years ago by Dr. H. A. Spoehr and Dr. Harold W. Milner, of the Carnegie Institution's plant biology laboratory at Stanford.

The Stanford scientists will give no estimate of large scale production costs but concede that at the outset at least the protein they produce will be more expensive than that produced by conventional farm methods.

However, in small scale experiments they have succeeded in utilizing two percent of the total solar ration in the protein making process. This is a substantial gain over the rate of solar utilization in agriculture which at best is three-tenths of one percent, they say.

With this greater efficiency, they add, it is conceivable that some day the process will yield protein at a lower cost than farmers can produce it. The main object of the pilot plant is to see how far they can go toward increasing efficiency and reducing costs before any big scale operation is undertaken.

The process does not necessarily need direct sunlight to operate. The yield, Cook said, is almost directly proportional to the intensity of the visible light cast upon the tanks. This means a slowing down of production on cloudy or dark days but as long as there is some light there is a corresponding amount of production.

Fort Dix Soldier Finds Lost Wife

HOBOKEN, N. J. — AP — A telephone call to her husband ended a seven-day search for a 22-year-old Hungarian bride, missing since her arrival in this country on February 13.

Private Lincoln Harris, soldier stationed at Fort Dix, told police his wife had phoned him yesterday and planned to join him Sunday.

Harris had been delayed three hours in reaching the pier after his wife phoned him upon arrival here. When he found her gone, he notified police and a 12-State alarm was broadcast.

The bride, whose name is Wilhelmie Wick Harris, is in Decatur, Ill., her husband said. She had been met at the pier by her sister and brother-in-law, Maria and Jack Fitzpatrick of Decatur, who had driven her there, police said.

Mrs. Harris arrived in this country on the Holland-America liner Noordam from Rotterdam. Harris said he had married her while on occupation duty in Germany.

WRONG PLYMOUTH FARMINGTON, Me. — UP —

The 10-man Farmington State Teachers College basketball squad piled into two automobiles for a trip to play the Plymouth Teachers College team. Farmington lost the game at Plymouth, N. H. One car with half the squad went to Plymouth, Mass., by mistake.

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Rate Schedule At State Parks Is Announced

New rates, effective this Summer, for State park facilities were announced today by State Conservation Commissioner Erdman.

The charge for cabins will be \$25 a week. A reservation will cost \$3 extra, payable in advance and not returned if the reservation is cancelled.

Canoes will be rented at \$2 a day, and rowboats at \$1.50. Campsites will cost \$3.50 a week. There will be a 50-cent reservation charge for boats and campsites.

Picnic facilities, on a first come first served basis, are free when a parking charge is collected. This applies to Cheesecake, Hacklebarney, Hopatcong, Ringwood Manor and Swartswood Parks and Parvin Grove at Parvin Park.

There will be a parking charge of 50 cents on Saturdays, Sundays and holidays from May 30 to Labor Day. On other days the fee will be 25 cents. Rates will be double for buses and trucks carrying 10 or more persons.

Parking will be free at Stephens, Voorhees and Washington Crossing Parks and portions of Parvin Park other than the grove. There will be a picnic charge at these parks of five cents for each adult, the minimum being 25 cents for each party.

Admission to the Manor House at Ringwood Park is free under the new schedule.

RIGHT FIT IMPORTANT
BOSTON — UP — The 9,872 foot doctors in the United States would lose 75 percent of their patients if people wore the right kind of shoes, according to the National Foot Health Council. Ninety-nine percent of the people are born with perfect feet, the council said, but are started on the road to ruin by improper shoes.

Methodist WSCS Meets Tomorrow

Members of the WSCS of Central Methodist Church will meet tomorrow evening at 8 p. m. at 138 Jackson Street, with the president, Miss Estelle LaRue in charge. Devotions will be led by Mrs. Walter Edwards, and the lesson study will be conducted by Mrs. Howard Scarborough. Mrs. Edwards and Mrs. Alonza Bellerjeau will be in charge of the ensuing social hour.

On Friday afternoon at 2 p. m., a "World Day of Prayer" service will be held at the Fourth Presbyterian Church. All ladies are invited to attend.

At noon, the temperature of the moon is hotter than boiling water, but it falls to several hundred degrees below zero at night.

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