BOTANY

Algae May Avert Famine

➤ THE teeming world population of the twenty-first century, which some scientists already prophesy will be in a state of constant famine, may possibly escape this doom by learning to live on a plant that multiplies even faster than mankind's most prolific races. This possibility is held out as a speculative hope by two botanists of the Carnegie Institution of Washington, Drs. H. A. Spoehr and Harold W. Milner.

The plant is the microscopic freshwater alga known as Chlorella. Its whole body consists of a single globular cell containing a cup-shaped bit of chlorophyll wherewith it captures sunlight energy to use in compounding foods out of inorganic raw materials which it gets from the water. It reproduces simply by dividing into two parts, both of which grow up to the original size and then divide again. As long as water, sunlight and the raw materials for food manufacture hold out, it can do this several times every day. Theoretically it could swamp the whole world with its growth, but limiting factors always intervene to keep it under control.

Drs. Spoehr and Milner have discovered that they can make Chlorella produce high yields of either protein or fat at will, by manipulating its environment and mineral supply. Under such controls it can produce as much as half its dry weight as protein, or up to three-fourths its weight as fat. Their calculations indicate that a maximum of 1,390 pounds of fat might be produced in a growing season by an acre of water surface in Chlorella, as against 227 pounds of soybean oil or 360 pounds of peanut oil on an acre of land.

These figures are of course as yet wholly theoretical, for mass production of Chlorella has not so far been undertaken on even a pilot-plant scale. However, the two researchers have given some thought to the engineering problems involved, weighing possible advantages of growing the plant in glass tubes as against spreading it out in three-inch-deep tanks. They take into account also the age-old conservatism of both producers and consumers of foods, as well as possible difficulties of processing the dried Chlorella masses into products palatable either to human beings or to domestic animals that might translate the alga into terms of meat and milk.

Nevertheless, the possibility cannot be dismissed as mere speculation. Already, mass culturing of yeasts for feeding livestock has become economic in some parts of the world, and there are projects afoot that may make this culture a large-scale success in our own country. And whereas yeasts must be supplied with ready-made carbohydrate foods, as well as the necessary mineral salts, Chlorella needs only the latter and can manufacture its own basal carbohydrate foodstuffs.

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AERONAUTICS

Plane Stall-Proof System

➤ AN AIRPLANE with an automatic stall-proof system, which is capable of flying in all sorts of weather, was demonstrated by the U. S. Navy. The same equipment makes it possible for the plane to make instrument landings, following a radio glide path beam down to the runway.

Stall is a dangerous condition encountered in flight when the plane's angle of attack is so increased that the airflow leaves the under surface of the wings and forms a turbulent wake. The angle of attack is the angle between the plane of the airfoil and the apparent direction of the wind flowing over the airfoil or wing.

This stall-proof system is a joint development of the Office of Naval Research and the Minneapolis-Honeywell Regulator Company. It is called an angle-of-attack automatic-pilot. Its unique advantage is that the power to the engines is controlled by an element which is sensitive to the angle of attack of the plane.

The control surfaces are automatically operated in a manner not particularly different from that of a conventional autopilot in that gyroscopes provide the initial sensing of roll and pitch. This angle-of-attack control makes use of the fact that the stalling of an airplane is dependent not on its airspeed but on its angle of attack, which is in turn dependent on the shape of the airfoil. Being sensitive to the airplane's angle of attack, which determines its stall point, this device is said to provide virtually fool-proof stall characteristics, regardless of whether the plane is climbing or turning.

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WILDLIFE

Egg-Laying Ant-Eaters Brought from Australia

➤ EGG-LAYING mammals related to the duck-billed platypus, that feed on insects like ant-eaters and have protective armor of spines like porcupines, are among the rare specimens brought back to the American Museum of Natural History in New York from the "Never-Never Land" of northern Australia by the newly-returned 1948 Archbold Cape York Expedition. The creatures are sometimes called spiny ant-eaters, though they belong to a different, much more primitive animal group than the true ant-eaters.

Another great prize is one specimen of a kangaroo that lives in the treetops like a monkey. It was shot down by a member of the expedition during the last month in the field.

In addition to the many hundreds of animal specimens, the expedition brought back 11,600 sheets of pressed plants of the Cape York region. These will be deposited with the Arnold Arboretum of Harvard University.

Special studies of the life forms on northward-jutting Cape York are being made because of the light they are expected to shed on the connection, ages ago, between northern Australia and southern New Guinea. Kangaroos and related animals in New Guinea are believed to have migrated along a land bridge that once joined the two land masses, while some of the plants of the Cape York region are apparently of New Guinea origin.

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GEOLOGY

Uranium-Containing Mud In Fjords of Norway

➤ URANIUM-containing black mud can be dredged up from the bottoms of some of the fjords that cut deeply into the coast of Norway, states Dr. Kaare M. Strom of the University of Oslo in a communication to the editor of the British scientific journal, NATURE (Dec. 11).

The atomic-energy element, however, is not present in high enough concentration to justify scooping out the mud and working it as an ore. It is of interest primarily as a possible means of determining under what geologic conditions the uranium-containing black shales now found in the Norway hills may have been formed, perhaps half a billion years ago.

Uranium concentrations in present-day fjord-bottom muds range from 13 to 60 grams per metric ton, Dr. Strom's analyses show. This is roughly equivalent to a range of from one-half ounce to two ounces per English long ton of 2240 pounds. This is far below present levels for workable uranium ores; the U. S. Atomic Energy Commission will purchase such ores only when they contain more than two pounds of uranium oxide per ton.

As having possible bearing on the question of the origin of uranium-containing shales, Dr. Strom points out that the highest concentrations are in the blackest of the fjord-bottom muds, which come from situations where little oxygen penetrates and where only bacteria of the anerobic, or "airless", type can thrive. Well-ventilated muds, inhabited by air-using bacteria, are lighter in color and lower in uranium content.

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