

BOTANY

Algae To Feed Starving

Feeding of world's future populations by "educated" algae foreseen in first report on Carnegie Institution's investigation of the cultivation of one-celled plants.

► FUTURE POPULATIONS of the world will be kept from starving by production of improved or "educated" algae, related to the green scum on ponds.

These one-celled plants can provide food high in the protein which is in shortest world supply. Algae can utilize sunshine and air more efficiently than any living or mechanical process.

This is forecast in the first comprehensive report on a far-flung investigation on algal culture by the Carnegie Institution of Washington.

"The need of the world for additional sources of high-protein food is so great, especially in over-populated areas, that serious effort in tracking down every promising lead is certainly warranted," Dr. Vannevar Bush, president of the Carnegie Institution, explained.

"Such great advances in technology have already come from the coupling of engineering with biology that it seems inevitable that the production of food, at least in certain areas, will eventually be carried out by 'process' industries. The large-scale culture of algae may well become the first of them.

"In regions of the world where population is especially dense, and fertile land is limited, it is entirely possible that process-industry methods of producing food may furnish a respite from the threat of famine and so contribute toward more salutary conditions for civilized living. If algal culture can serve such a purpose, it is well worth development for that reason alone.

"It is hoped that such a development may take the form ultimately of a multitude of individually owned, relatively small establishments, combining the culture of algae perhaps with utilization of the product for animal feeding on the spot.

"The new industry that would result would thus enter into our economic life in such a manner as not to produce disruption, but rather to strengthen individual enterprise."

The first large-scale use of cultivated algae as human food took place in Venezuela a decade ago when lepers were fed successfully soup made from algae, the report reveals for the first time.

For centuries oriental peoples have eaten seaweeds, which are large-sized algae, and some are considered a delicacy. Scientists have been confident that some kinds of microscopic algae will be suitable and acceptable as human food.

From two pilot-plant productions of algae, one in Cambridge, Mass., and the other in Japan, *Chlorella* algae powder has

been sampled for taste and palatability. American experiments showed that *Chlorella* alone is too strong in flavor for one to enjoy eating large quantities of it, but it is pleasing as a garnish. It can be added up to 15% to a chicken-base soup successfully. Japanese reported that their product tastes like dried seaweed or powdered green tea, both popular in Japan.

Algae are expected to become an industrial raw material for protein, fat, vitamin or even antibiotic content. Moreover, experiments are in progress to find strains of algae that will have special qualities for food and other uses. There are about 17,000 different species.

The primitive character of the cells of microscopic algae is such that they are practically all food, without the waste present in stems, roots and leaves of higher plants. Dried cells are often more than half protein, more than in any higher plants. Algae can be made to produce a continuous crop regardless of weather and time of year.

In the larger scale tests, algae have been grown in plastic tubing exposed to sunlight, with nitrogen fertilizer and concentrated carbon dioxide supplied. Full, continuous

sunlight does not produce the most efficient results, for each green alga cell must have intermittent light and can utilize in photosynthesis only a limited amount of light energy at a time. Turbulent flow of the growing culture will be tried to produce the best conditions.

Plans are being made, it is stated in the report, which is edited by John S. Burlew, to build a demonstration plant covering about an acre when some of the problems discovered in the experimentation so far have been solved.

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MEDICINE

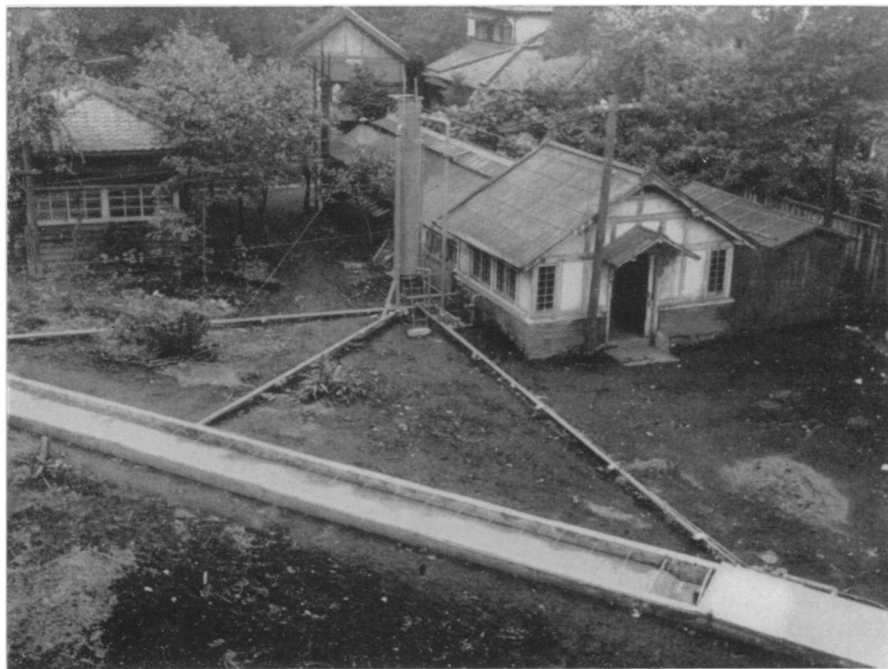
Drug Over Half Gold for Rheumatoid Arthritis

► A DRUG containing 54% gold can treat rheumatoid arthritis effectively, especially in the early stages of the disease, a New York physician, Dr. Robert C. Batterman, reports in the *Journal of the American Medical Association* (July 11).

Using an improved form of organic gold compound, aurothioglycanide, over an eight-year period, Dr. Batterman found that gold therapy, which in pre-cortisone days had been criticized for slowness in producing improvement and for toxicity, is suitable for use even since cortisone and ACTH have been discovered.

In 56% of his patients with early arthritis, the gold compound gave complete remission or major improvement. The treatment is less toxic than any other available gold compounds.

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PRE-PILOT-PLANT EXPERIMENTS—A general view of the culture unit built on a pre-pilot-plant scale by the Tokugawa Institute for Biological Research, Tokyo, to obtain information concerning large-scale algal culture.