BIOLOGY

Sewage "Farms" Yield Food

Problem of mounting waste disposal and of producing high protein food could be solved by putting sewage into an oxidation pond with algae.

➤ SEWAGE "FARMS" which will greatly simplify the mounting problem of waste disposal and at the same time produce high protein food and industrial raw materials are suggested by research at the University of California.

Scientists on a sanitary engineering project have completed a laboratory study, with encouraging results, and are now building a pilot model pond for further tests.

The basic idea is to put sewage into an oxidation pond along with algae, single-celled aquatic plants. The algae grow well in such a media, and they produce oxygen which could be used to treat the sewage.

At the present time a large part of the cost of sewage treatment lies in the expensive pumps and other installations needed to supply oxygen.

The scientists have found that, within limits, the faster sewage is put through their experimental apparatus, the faster algae grow. The faster they grow the more oxgen they produce; and the more oxygen, the faster the sewage is treated.

Under controlled conditions they have converted sewage almost completely into algae in one day, in comparison to about 25 days for sewage processing in existing pond operations.

Algae, which contain up to 50% protein, are currently hailed as a promising source of food and industrial raw materials.

The Berkeley scientists feel that for psychological reasons sewage-grown algae would not ever be used for human consumption. Nevertheless, in the process of drying the algae, harmful bacteria would be largely eliminated. While the dried algae probably could be fed to cattle, chickens and hogs, the scientists say that inexpensive pasteurization should be applied as an added health measure.

With such a source of food for domestic animals, a great deal of the acreage now devoted to growing fodder could be used to produce food for human consumption.

Moreover, the algae crops could provide chemicals, fats, alcohol, oils for paints and varnishes, synthetic fibers, and basic materials for hormones and drugs.

The proposed sewage "farms" offer spectacular possibilities. The engineers say that 1,000 to 1,500 pounds of dry algae could be produced per million gallons of sewage per day. In the San Francisco Bay area alone some 200 to 250 million gallons of sewage are produced every day. Thus sewage "farms" could be an important source of raw materials.

Some 500 tons of algae could be grown in the same area as 30 tons of soybeans, which is probably the most productive agricultural crop known. Moreover, algae grow continuously and are harvested daily.

The method would get around one of the big stumbling blocks encountered by other experiments in growing algae for food. In artificial cultures, nitrogen and other expensive nutrients must be added, which increase the cost beyond practical limits.

Such additions would not be needed in sewage "farms" because all growth elements are present in the sewage or richly provided by bacterial action in the sewage. These nutritional requirements are nitrogen, phosphorus, carbon dioxide and minor nutrients.

Such "farms" would also conserve valuable nutrient elements now being poured into the sea in huge quantity. Algae, in growing, reclaim the nitrogen and other valuable elements that are otherwise lost.

The investigation was originated by Harvey F. Ludwig, now an officer of the U. S. Public Health Service. William J. Oswald, research engineer, supervises the project under the faculty direction of Prof. Harold B. Gotaas, chairman of the division of civil engineering and irrigation in the University.

Science News Letter, June 21, 1952

ENGINEERING

Scientists Study Pipes Without Digging Ditches

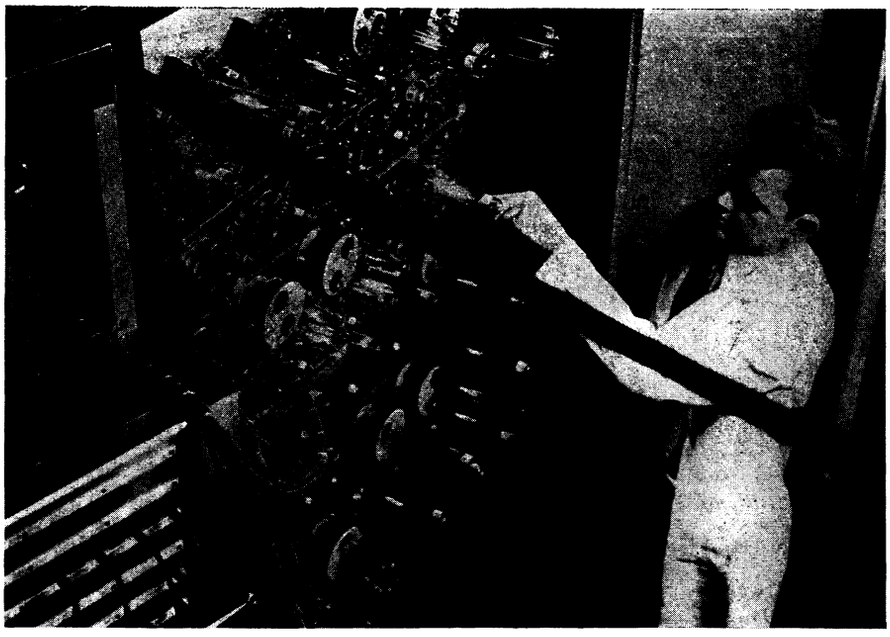
➤ SCIENTISTS AT the Midwest Research Institute, Kansas City, Mo., can know the flow inside city water-distribution pipelines without having to dig a single ditch. Instead of working on actual pipes, they use a complex maze of electric light bulbs, wires and meters to feel the future pulse of underground networks.

The complicated electric device is called a pipeline-network analyzer. Its secret is an array of special light bulbs that represent different pipe lengths, diameters and roughnesses. When a problem is being worked, the brighter a bulb glows, the greater is the pressure drop in the pipe it represents.

The instruments can be set up to imitate flows and pressure drops for networks that have as many as 104 different pipelines. Pressure drops between any two points can be determined by a single measurement.

In addition to water-distribution systems, the experts can use the device to study natural gas lines, steam-heating networks, oil pipelines and even air-conditioning systems.

Science News Letter, June 21, 1952



ELECTRICITY MEASURES PRESSURE—A bird's-eye view of a pipeline network analyzer that can predict how yet-to-be-built pipeline systems will work. The light bulbs have special filaments that glow more brilliantly as the pressure loss increases in the pipes they represent.