method highly desirable in studies involving carbon-14 uptake and chlorophyll analysis.

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Conversion of Phytoplankton to Zooplankton

ONE of the major problems in the efficient production of food by mass cultivation of unicellular algae is harvesting the crop. Centrifugation, the accepted method in the harvest of algal suspensions, is an expensive operation. Other procedures which have been used are gravitational settling of the heavy cells¹ and flocculation by addition of special agents².

The conversion of phytoplankton to zooplankton by feeding algae to appropriate animals, and harvesting these animals, is another possibility. The feasibility of this procedure will depend on the efficiency of the conversion. Estimates based on the rate of growth and respiration of some zooplankton organisms indicated high efficiency for this conversion; up to 70 per cent of the metabolized plant material was converted to animal matter³.

Conversion efficiency so estimated refers to the percentage of the plant material which was ingested, digested, absorbed and metabolized, and does not indicate the efficiency in terms of total plant material used by the animal per weight of animal produced.

A preliminary experiment was performed to establish the approximate value of this more practical conversion efficiency. The green unicellular alga *Dunaliella viridis* was fed to the brine shrimp *Artemia*. The alga was cultivated in sea water enriched with 1 gm. potassium nitrate, 200 mgm. dipotassium hydrogen phosphate per litre under continuous illumination. A varying number of newly hatched *Artemia* nauplii were counted into several glass vessels containing 200 ml. of sea water. The vessels were kept in the dark, and equal quantities of algal suspensions were added daily. The packed volume of the algae in the added suspensions was determined at the same time. After nine days the animals were harvested, blotted and weighed. Dry weight was determined after drying overnight at 105° C. The total packed volume of algae fed during the experiment was 0.290 ml. per vessel. The wet and dry weights of 1,000 hatched *Artemia* nauplii before feeding were 14 and 2 mgm. respectively. The packed volume of the solids left in the water, including faecal pellets and uneaten algae, was

Table 1. CONVERSION OF PLANT TO ANIMAL MATERIAL

No. of animals	Initial wet weight (mgm.)	Final wet weight (mgm.)	Initial dry weight (mgm.)	Final dry weight (mgm.)	Packed volume of faecal pellets (ml.)
100	1.4	34	0.2	4.8	0.250
198	2.8	60	0.4	8.4	0.200
382	5.6	129	0.75	15.8	0.170
750	9.8	164	1.5	18.0	0.130

In each series the total packed volume of algae fed was 0.290 ml.

also determined. The results of this experiment are given in Table 1.

It is apparent that the conversion efficiency based on the wet weights of the animals and algae (assuming the specific gravity of the algae to be 1) could be as high as 53 per cent. The efficiency, as expected, is much lower when the amount of the available algal material per animal is in excess of the amount it is able to assimilate. The faecal pellets in this instance are dark green and are composed of partially digested algal cells.

An optimal concentration of algae per animal exists which will yield a maximum conversion efficiency. This concentration will vary with the age of the animals and should be determined experimentally.

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A Cytoplasmic Polyhedral Disease of the Gypsy Moth (*Lymantria dispar* L.)

DURING 1954 and 1955 we investigated an outbreak of the gypsy moth in middle Slovakia and collected material from infested oak forests. In some of the caterpillars reared from these samples the faeces were abnormally white. Examination of these under the optical microscope revealed the presence of great quantities of polyhedra-like bodies. This was

Figs. 1 and 2. Longitudinal sections of the gut epithelium of the larva of the gypsy moth *Lymantria dispar*, infected with a cytoplasmic polyhedrosis