some apparent differences the issue is still not at all clear.

A further new discovery concerning myosin is that of Godfrey and Harrington (*Biochemistry*, **9**, 886; 1970), who find that a monomer–dimer equilibrium, not previously detected, is present in myosin solutions, and suggest that its existence, which in the ultracentrifuge is offset by non-ideality effects, is responsible for much of the confusion that has in the past bedevilled molecular weight determinations on this most refractory protein. The interaction depends on *p*H and ionic strength, and is considered in relation to the mechanism of filament formation (Godfrey and Harrington, *Biochemistry*, **9**, 894; 1970).

POLLUTION

Enriching the Waters

from a Correspondent

THE cost of removing unwanted algae and waterweeds from British waters is an estimated £2·5 million each year. Delegates to the symposium on eutrophication held by the Society for Water Treatment and Examination in London on March 24 and 25 were told by Dr A. L. Downing (Water Pollution Research Laboratory) that this was the cost of coping with the increased growth of algae in lakes and water impoundments, and of attached waterweeds in rivers and open waterways after enrichment with nutrient substances. The cost was not expected to more than double by the end of the century, he said, but research into the control of such growths was clearly warranted.

Much of the meeting was concerned with concentrations of nitrogen and phosphorus, the principal elements which support algal growths. Dr G. W. Cooke (Rothamsted Experimental Station) pointed out that in agricultural areas, arable land to which fertilizers had been added was the principal source of these nutrients, which found their way into waterways through runoff and land drains. Much of this process was inevitable with a proportion of applied fertilizers being leached from the soil, although he had come across appalling examples of pollution resulting from the siting of fertilizer stacks and manure piles adjacent to streams. Britain was now committed to a policy of adding fertilizers to arable land because insufficient nutrients were cycled by natural processes to support the growing population density, he said. But losses of inorganic nutrients were less from some crops than others, and this might influence the choice of crop in future.

Dr M. Owens (Water Pollution Research Laboratory) emphasized that although sewage effluents and industrial wastes were often thought of as major sources of pollution, studies on the River Great Ouse had shown that, apart from phosphates, they contributed only a small proportion of the total inorganic nutrients, and this should be borne in mind before going to great lengths to clean up point sources of pollutants.

According to Dr J. W. G. Lund (Freshwater Biological Association), phosphorus was probably the element most commonly limiting algal growth in natural waters, and consequently was the one whose increase would be most likely to cause eutrophic conditions. The blue-green algae seemed to be the most troublesome algae and were particularly noted for the waterblooms they produced in response to eutrophication. Mr A. E. Walsby (Westfield College, London) showed that certain of the bacterial characteristics of these algae contributed to their success in forming waterblooms, and should be considered when control measures are applied. These characteristics included the ability to fix atmospheric nitrogen, which made the algae independent of supplies of combined nitrogen, and the gas vacuoles, which conferred buoyancy and gave the alga the potential to control their position in a water column. Methods of controlling these algae directed at collapsing their gas vacuoles were under investigation, Walsby said. Biological control was now a fashionable answer to man-made environmental problems and maybe cyanophages, viruses which attack blue-green algae selectively, would provide an answer to controlling these organisms.

BACTERIA

Bugs in Field and Lab

from our Microbiology Correspondent

THE hazards facing the microbial ecologist have been stressed again. To be successful it is essential to be able to correlate data obtained in laboratory and field, but this is fraught with difficulties, as Thomas D. Brock and his colleagues at the University of Indiana have shown recently (Kelly and Brock, *J. Gen. Microbiol.*, **59**, 153; 1969). Their investigations of the temperature, salinity and *p*H requirements of the marine bacterium *Leucothrix mucor* have underlined the hazards of inferring responses of natural populations from data obtained with laboratory cultures.

When such pitfalls are widely recognized, it might well be asked why methods for *in situ* study have not been devised to overcome them. Even less understandable is the apparent reluctance of many microbial ecologists to make use of the technological innovations that have been achieved. For example, there is the open, continuous-flow system developed by Macura (*Folia Microbiol.*, **6**, 328; 1961) for studying changes in soil metabolism, which has had a disappointing impact on soil microbiology.

Brock (*Science*, **155**, 81; 1967) reported a very elegant micro-autoradiographic method for determining growth rates of *Leucothrix mucor* in its natural environment. The percentage of labelled cells after feeding with tritiated thymidine gave a good estimation of growth. Later, Kelly and Brock found that incorporation of the label determined by liquid scintillation counting completely vindicated the autoradiographic technique. Kelly and Brock have used these methods to assess the significance of certain environmental parameters on the development of *Leucothrix*. Field experiments were carried out in various habitats in Puget Sound, Washington, and in Loch Ewe, Scotland. In laboratory conditions the optimum temperature for growth of *L. mucor* was 25° to 28° C, regardless of the temperature of the habitat. In field, however, temperature optima were lower, varying according to habitat from 6·5° to 25° C. Kelly and Brock were unable to demonstrate adaptation to low temperatures in short term experiments; the optimum for incorporation of ^{3}H-thymidine was about 26° C, even though the bacterium was cultured in temperatures of 2° to 30° C. On the other hand, the *p*H and salinity optima for growth as defined by laboratory experiments were