endocytic indices and by the results of experiments in which the uptake of polyvinylpyrrolidone was measured in the presence of ^{127}I -labelled albumin. A more likely explanation is that endocytic index cannot be simply equated with the rate of internalization of medium, substrates being internalized both in the fluid phase and adsorbed on the plasma membrane. If this is so, it is clear that albumin is more strongly adsorbed than polyvinylpyrrolidone and that the concentration ranges used in these experiments fall well below the dissociation constants for the surface-substrate complexes.

The results are discussed in relation to theoretical analyses of the kinetics of pinocytosis (see e.g. Jacques, 1969).

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Biology of Water Pollution: Effects and Control

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The discharges of different industrial effluents into rivers have different ecological effects and may thereby cause different types of pollution. Metal mining and processing and chemical manufacturing industries produce toxic effluents that if discharged into a stream have a simple poisoning effect, lowering both the numbers of species and numbers of individuals present. Coal mining and china-clay industry may produce effluents containing a high concentration of suspended solids that produce turbidity in the receiving water, preventing the light penetration necessary for photosynthesis and smothering the animals on the river bed when it settles. This may be considered as a form of physical pollution, another example of which is the discharge of heated effluents at temperatures that adversely affect the life in the river. Industries concerned with the processing of

biological materials, such as food, textiles etc., produce effluents characterized by their high concentration of putrescible organic matter. It is with this type of organic pollution that the industrial biochemist will be more concerned.

The discharge of such effluents has similar effects to the discharge of domestic sewage. The increase in organic matter in the water initially encourages the development of the heterotrophic component of the ecosystem, producing an imbalance in the system. As a result of the heterotrophic activity the organic content in the water is lowered, leading to the re-establishment of a balanced heterotrophic–autotrophic system, a process known as self-purification. In the process, however, oxygen is utilized, and this results in deoxygenation with consequent adverse effects on fish and other life in the river. Factors affecting the oxygen balance in rivers polluted with organic matter have been studied to provide formulations for predicting the deoxygenating effects of a known load of organic pollutant. Under complete deoxygenation anaerobic breakdown of organic matter may occur, especially in the bottom muds of rivers. If toxic material is present in the river the biochemical activity is suppressed and self-purification is retarded. Although the oxygen depletion may be less severe under such conditions, life in the river is affected by the toxicity. As self-purification proceeds the increase in plant nutrients, especially in the case of sewage effluents, results in increased algal growth. The photosynthetic activity contributes to the re-oxygenation of the water.

In the control of organic pollution by different treatment methods, use is made of these natural biochemical purification processes occurring in rivers. Settleable organic matter is separated by sedimentation and is then subjected to anaerobic ‘digestion’. Organic matter in solution and suspension is subjected to biological oxidation, the oxygen being supplied either by ventilation, as in the percolating filter, or by aeration, as in the activated-sludge process. In the oxidation-pond process photosynthesis contributes to the oxygen supply. The efficient operation of such biological-treatment plants involves the controlled activity of the requisite population of organisms and the transfer of materials between the waste and the organisms involved.