BOOKS

Biological Fluidised Bed Treatment of Water and Wastewater, Edited by P. F. Cooper and D. Atkinson, Ellis Horwood Ltd., 411 pages; £99.95, John Wiley, New York (1981).

This volume presents a collection of papers given at the conference on "Biological Fluidized Bed Treatment of Water and Waste Water," held in Manchester, England in April 1980. The biological fluidized process is a waste treatment process in which the microorganisms responsible for the degradation of the organic contaminants of the waste are present in the form of microbial films on the surface and/or within the interstices of supporting materials which, in turn, function as fluidizing particles. The process is still in the developing stage; however pilot plant scale demonstrations on a variety of applications have yielded very promising results.

The proponents of the biological fluidized bed process considers it to be the most significant development in waste treatment technology since the establishment of the activated sludge process at the turn of this century. It is not difficult to understand their enthusiasm about the process even if one does not accept all the claims made in its behalf. The order of magnitude improvement of biomass build-up in the reactor under attached growth conditions as compared with the dispersed growth system means a significant size reduction of aeration tanks. Furthermore with attached growth, biomass is largely retained within the reactor, thus obviating the need of recycle. Finally, sludge formed in the process can be removed directly from the support materials. The load on the clarifier can be reduced accordingly. The recovered solids concentration may be higher than usually achieved by settling.

There is a great deal of difference among the twenty-four papers included in this volume. However, most of these articles dealt with practical problems associated with process development and data obtained from the pilot plant operations. The article by Lee and Buckley (Chapter 4, Fluid Mechanics and Aeration Characteristics of Fluidized Beds) gives a brief treatment of three phase fluidization. However, one may perhaps gain more on the same subject from the recently published book by Shah [Y. T. Shah, Gas-Liquid-Solid Reactor Design, McGraw-Hill, 1979]. The chapter on bacteria attachment and growth by Atkinson et al. [Chapter 5, The Characteristics of Solid Supports and Biomass Support Particles When Used in Fluidized Beds] gives a nice summary of Professor Atkinson's recent work in this area. It is regrettable that the book does not include any discussion on topics more characteristic of fluidized biochemical reactors. For example, since the substrate concentration decreased along the axial direction, the growth rate of biomass is expected to be higher at the inlet region of the reactor. On the other hand, the effective density of the fluidizing particles decreases and its effective size increases with the increase of the biofilm thickness. Particles coated with films of greater thickness therefore tend to move upward. The pattern and extent of solids mixing become an important operating variable and they are different from what is known in ordinary fluidization. It is rather surprising that this type of problem was not even mentioned throughout the book.

If one reads this book with the expectation of learning how to design fluidized biological reactors he would certainly be disappointed. The book does give a reasonably good survey and provides a nice introduction to an important and yet overlooked (at least by chemical engineers) subject. In this sense the reviewer was surprised to learn the price of this book. He can only wish that this rather rarefied level of price could stand unbreached at least for some time.

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