

Nitrogen Oxides Removal by William H. Lewis, Noyes Data Corporation, Park Ridge, New Jersey, 1975, \$36.

The relevant U.S. patent literature since 1960 is reviewed in this book and over 200 processes are described for the removal of nitrogen oxides arising from motor car exhausts, coke ovens, nitric acid plants and other industrial sources. More than half of the review is devoted to catalytic processes, their application to motor car exhausts and industrial stack gases, and the design of catalytic converters. The other types of process described include sorption in beds of solid material, removal by liquid scrubbers, non-catalytic treatment of motor car exhausts and treatment by combustion or oxidation. Comparatively short sections of the book are devoted to recovery processes, analytical methods and air purification.

The book contains a wealth of data from the patent literature and achieves its objective of avoiding the legal jargon which can make patents difficult to read. Exact details are often given of catalyst composition and preparation, the design of equipment and of the performance of the processes where data is available. This makes the book an excellent text for the specialist but not the type of book for those with a more general interest in the subject to browse through.

The tacit assumption that the patent literature is a sufficient source of information on this subject is rather questionable. In general, the patent literature tends to gloss over fundamental aspects where these may not be fully understood by the reader. There is rarely any indication of process economics, since these usually become apparent at the pilot plant stage. One particular aspect which is not covered in this book is an indication of which patented processes have reached commercial maturity; surely an important point. The data provided could, therefore, be usefully augmented by information from the non-patent literature, possibly at the expense of technical detail which could be obtained by reference to the original patent where needed. This would provide a more critical appraisal of the patents reviewed and provide relevant background material. For example the use of cyclopentadiene to remove nitrogen oxides raises two queries. Firstly does the diene polymerise after prolonged use and secondly is there any indication that potentially explosive epoxides are formed in the presence of air and nitrogen dioxide. Neither the patent nor the reviewer make any comment about factors such as these. An in-depth publication as implied in the title should really give more in-depth coverage of both the fundamental and commercial aspects of the subject.

Inclusion of information from non-patent literature sources would also give more scope for comment on the environmental impact of nitrogen oxides, the prospects for recovery processes and analytical methods for their determination; all topics which are not well represented in the patent literature. Alternatively the title could make clear the restricted coverage. Despite these comments the book provides an excellent review of the patent literature

and will be a useful addition to technical libraries. Certainly anyone faced with the prospect of searching the patent literature on nitrogen oxides removal will be extremely grateful for its publication.

The book is indexed under inventor, company and U.S. patent number but the detailed table of contents is rather inadequate as a subject index for a book containing so much information. The small print size makes reading large sections of the book tiring but the standard of reproduction and binding is generally good.

C.J. JONES
S. WARING

Ecological Aspects of Used-Water Treatment, Vol. 1: The organisms and their ecology, edited by C.R. Curds and H.A. Hawkes, Academic Press, London, £ 12.50.

This volume presents a series of accounts concerning the general biology and ecology of the plant and animal life inhabiting various waste water biological treatment systems.

A great need is served in collating an extensive amount of material from very diverse sources. Few people can be familiar with all the groups considered in this volume which offers both a specialised and a comprehensive coverage of the organisms encountered.

In Chapter 1, the role of aerobic bacteria is discussed. Ecological methods are considered, pointing out the difficulties of drawing firm conclusions particularly from cultural studies. The ecology of the various aerobic sewage treatment processes is considered but it is disappointing to find very little consideration given to the effects of toxic industrial wastes on the bacterial population.

Chapter 2 on anaerobic bacteria distinguishes between the stages of polymer hydrolysis, acid formation, and methane production. Names of the species involved are scattered throughout the text and not drawn into a table. Again, as in Chapter 1, there is scant reference to any effects of industrial wastes on the organisms in anaerobic digestion.

Chapter 3 considers the role of fungi and their occurrence in the various sewage treatment processes. Cultivation methods and physiological studies are included together with comprehensive notes on named species. Detergent effects on fungal growth rates are recorded together with the effects of acid plating wastes in a percolating filter.

The 4th chapter on Algae and Bryophytes draws mainly on data obtained from habitats other than waste water treatment systems. A considerable