

**BIOCHEMICAL
ECOLOGY OF
WATER POLLUTION**

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PREFACE

Biochemical ecology is here presented only in the context of water pollution. This is not to minimize the importance of land animals and plants in their environment or the significance of air pollution as it relates to ecology. It merely indicates that water pollution is a problem of sufficiently broad magnitude to warrant consideration by itself.

Water pollution is a problem which requires the attention of a variety of disciplines. The presentation tends therefore to follow the problem approach, as do most interdisciplinary topics. An appreciation of various viewpoints is needed among chemists, ecologists, economists, engineers, lawyers, limnologists, managers, microbiologists, and politicians, whose communications are often "hung up" in each other's jargon.

Perhaps the presentation is too elementary at times. This was done in an attempt to bridge the diverse backgrounds of those concerned with the subject. It is hoped that engineers, economists, biologists, public servants, and others will gain a greater appreciation of the interrelationship of gross observations and biological events that occur at the cellular and molecular level. Lack of such understanding is, to a large extent, the reason for our present environmental condition. At other times the presentation is perhaps too technical. This was done on the assumption that some information on chemical details may not be readily available but is desirable for an "in-depth" appreciation of the biochemical events encountered in water pollution.

The pattern of presentation is to give background information in relatively simple terms and then to support it with more detailed data. In this approach I would argue that it is the significance of reactions in the aquatic environment that is of importance. Consequently, the activities of organisms have significance to water pollution, whereas the numbers and names of the organisms are relegated to secondary considerations.

When specific reactions are discussed, it is implied that they are likely to proceed in the aquatic environment. For example, *Pseudomonas* species are very common to both soil and water. Their metabolic activities would likely be encountered in water, although they have been studied in the laboratory. I have avoided, wherever possible, using biochemical information that would not likely be encountered in the aquatic ecosystem.

In addition to the audience already mentioned, it is hoped that this monograph will be of value to both undergraduate and graduate students with an interest in the aquatic environment and to those individuals who avow an interest in the social-political-economic ramifications of an unbalanced ecosystem.

I would like to acknowledge my wife's patient assistance in the preparation of the manuscript, and to thank Dr. Jorgen Birkeland for valuable criticism and suggestions and Dr. Chester Randles for aid in preparing Chapter 11.

PATRICK R. DUGAN
September, 1971

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