the expertise of less-developed nations in natural methods of purification. A paper from the Sudan describes methods in which local clays or vascular plants are used as flocculants to purify Nile water for drinking purposes.

The chapter by Goldman and Ryther describing their work on waste reclamation through the use of an integrated food chain exemplifies the difficulties inherent in biological control of water pollution. Despite Ryther's wide experience in marine biology, he and his group have had serious technical difficulties to overcome, particularly the concentration of toxic chemicals and enteric viruses in the biota. These constraints are discussed by a number of contributors.

I am impressed by this book. It provides a new perspective on water pollution control. Ultimately we will have to conserve our water and material resources, and the integration of recycling with waste treatment will be a long, uphill struggle. The contributors to this conference are to be commended for facing the challenge.

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Evolutionary Phytochemistry

Biochemical Interaction between Plants and Insects. Proceedings of a meeting, Tampa, Fla., Aug. 1975. JAMES W. WALLACE and RICHARD L. MANSELL, Eds. Plenum, New York, 1976. xii, 426 pp. $35. Recent Advances in Phytochemistry, vol. 10.

This volume will be of particular importance to the field of phytochemistry because of two papers, that of Feeny and that of Rhoades and Cates. Taken together these papers provide a sound evolutionary foundation for the development of testable hypotheses in fields that have been essentially descriptive (phytochemistry) or have been concerned primarily with proximate mechanisms of plant-insect chemical interaction (insect physiology and behavior).

The correspondence between the basic theories outlined in these two papers is remarkable given their conceptually different points of origin and their independent development. Feeny's theory originated from his empirical studies of widely different categories of plant and phytophagous insect. On the basis of observed differences in the kinds of chemical defenses employed by oak trees and mustard plants and striking differences in the digestive strategies of phytophagous insects, he developed (in *Coevolution of Animals and Plants*, L. E. Gilbert and P. R. Raven, Eds., University of Texas Press, 1975) the basic aspects of the theory that is extended and elaborated in this volume as the theory of plant apparency.

In contrast, many of the empirical data in the paper by Rhoades and Cates were collected to test hypotheses initially developed by Orians (see Orians and Cates in *Unifying Concepts in Ecology*, W. H. van Dobben and B. H. Lowe-McConnell, Eds., Junk, 1975). The original predictions were that early-successional plants (because they escape in time and space) would not be toxic and that late-successional plants (because of their predictability to insects) would be toxic. Thus, the prediction was made that insects that feed on early-successional plants would be generalists and those that feed on late-successional plants would be specialists. Except in the case of a few herbivores (for example, banana slugs) empirical data tend to run counter to this prediction. Feeny's dichotomy of qualitative and quantitative defenses helps resolve the false paradox.

It is both reassuring and a tribute to careful selectionist thinking that the same basic theory of plant defensive chemistry would have been developed even had Feeny been a classical phytochemist. Although the theory is undoubtedly simplistic, I share Feeny's optimism that its broad framework is secure, and I believe it will organize much of phytochemical research in the near future.

While the remaining papers in this volume are more traditional offerings, two deserve special mention. The paper by Beck and Reese is an important contribution to the understanding of insect nutritional physiology in the context of allelochemics and should be consulted by researchers conducting feeding experiments with herbivorous insects. The paper by Roeske *et al.* is a lengthy summary of the authors' work on the processing of cardenolides by monarch butterflies. Of particular interest to ecologists is their technique for revealing the host plants used by larvae on the basis of the cardenolide content of adult tissue.

Two papers deal with the parallel occurrence of similar chemicals in plants and insects. The review by Rodriguez and Levin is a useful summary but the theoretical discussion is shallow. The paper by Hendry *et al.* would not be acceptable in a refereed journal as it is. The authors are confused about how natural selection operates and just what constitutes a scientific theory.

In the final paper Mothes provides a review of the classic work by himself and his colleagues on intraspecific genetic variation in the alkaloids of the opium poppy. Some of his evolutionary-philosophical remarks are almost mystical. I hope this is a problem of translation.

In summary, this volume is very spotty in terms of the quality and importance of its component papers. While I am pleased to have a copy (and feel most specialists in insect-plant research should have one), I do not feel that it is worth its price to a nonspecialist or to a graduate student.

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Phagocytic Cells

Immunobiology of the Macrophage. DAVID S. NELSON, Ed. Academic Press, New York, 1976. xviii, 634 pp., illus. $39.

Much credit should go to David Nelson for editing this timely, useful, and nicely produced collection of 23 articles concerned with many different aspects of the physiology and function of macrophages. Although these phagocytic cells do not possess an antigen-specific recognition system, they express on their surface several types of receptors for complement and antibody and do play a major role in the regulation of both humoral and cell-mediated immune responses; the importance of macrophages has been well established in cell-cell interactions, in inflammatory processes, in chemotaxis, and in defense against microbial infections, and they are implicated in the killing of tumor cells. All these topics are discussed in this volume.

The book suffers from the usual defects associated with multiple authorship: there is considerable overlap in material covered by different chapters, whereas some relevant matters receive relatively little attention. For example, at least four full chapters deal with the role of macrophages in vitro in antibody production, T-cell activation, and T- and B-cell collaboration; yet evaluation of controversial results is missing. Each group of workers uses its pet tissue culture system; presumably minor changes in culture, animal colonies, and source of antigen, as well as the difficulties associated with fractionation of macrophages or their complete removal from a lymphoid cell population, account for variability in the results. In contrast to the extensiveness of coverage of the in vitro exper-