merit, and range from stimulating to boring. Unfortunately, a large proportion of the papers have little new or suggestive to communicate. Too many authors present little information that enhances our understanding of how the cell cycle operates or what its role in differentiation might be. Several authors working with either plant or animal systems are content with merely comparing changes in duration of the cell cycle and its component parts in different regions of a given organism or in different stages of development. Such information, although important for subsequent experimentation, is too often presented as isolated observations which have little meaning for readers not working in the immediate area under discussion.

In contrast, several contributions describe inventive approaches or provide new and provocative information regarding the cell cycle and its possible relation to differentiation. For example, the idea that histone synthesis and DNA synthesis are necessarily tightly coupled is questioned by Giudice, who presents evidence that, during oogenesis in the sea urchin, synthesis of histones becomes uncoupled from DNA replication. Other papers of interest include communications which probe the mechanisms by which erythropoietin stimulates erythropoiesis and by which lymphocytes respond to various mitogens, and an article which ascribes a possible role for cell-cell interaction during hemopoiesis in the embryonic mouse.

The Cell Cycle in Development and Differentiation is not meant or suited as a textbook but rather is directed at investigators actively working in the field of development. It describes a large number of biological systems that are currently being investigated and exploited. It includes studies which use materials ranging from protozoans to plant shoots, from the naturally synchronous slime mold *Physarum polycephalum* to mammalian fetal liver, and from root meristems to molluskan embryos. Because of the diversity of approaches described in the contributed papers, this book may also interest new investigators searching for biological systems that lend themselves to experimentation and that promise to yield insight into some of the questions raised during the course of the book.

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Pollution Indicators

Air Pollution and Lichens. B. W. FERRY, M. S. BADDELEY, and D. L. HAWKSWORTH, Ed. University of Toronto Press, Buffalo, N.Y., 1973. x, 390 pp., illus. $16.50.

Over the last 15 years, the potential use of lichens as biological indicators of air pollution has gradually become widely recognized. Casual suppositions by naturalists during the last century have been supported, then questioned, and finally established through a series of carefully made field and laboratory experiments and observations. This book provides a generally good assessment of the field.

The volume is a mixture of review articles and research papers written by various authors, all but two of whom have done most of their work in the United Kingdom. Although the slant is definitely toward British research (with some chapters specifically on British topics), I believe the book succeeds in presenting a good overall picture. In one chapter or another, almost everything ever published on the subject is listed. Field studies, especially those involving mapping techniques, the effects of SO_2, fluoride, and heavy metal pollution on lichens, and physiological studies all receive close attention. The important introductory and summary chapters are especially well done.

The field approach is thoroughly reviewed by Hawksworth in a chapter on "mapping studies" which covers considerably more than that. Largely on the basis of his own experience in England, the author offers a number of recommendations and guidelines for evaluating pollution levels with the use of lichen vegetation. While I do not agree with all of them, they will undoubtedly be very helpful to those wishing to start a project of their own. A large amount of overlap is encountered in Laundon's fine review of "urban lichen studies," since most urban studies have, in fact, been mapping studies.

Overlap is most serious, however, in the chapters on physiological effects of pollution on lichens. A chapter on general lichen physiology by Farrar follows the presumably more specialized coverage of air pollution and lichen physiology, and precedes separate chapters on SO_2 and photosynthesis and on SO_2 and respiration. Those chapters could well have been combined. A single treatment of the effects of SO_2 on photosynthesis and respiration and other physiological effects (such as the breakdown of chlorophyll) in conjunction with expanded comments on pertinent aspects of lichen physiology would have permitted more logical comparisons and more integrated conclusions. Pearson's chapter on "air pollution and lichen physiology" adds nothing to the excellent, though brief, chapters on photosynthesis and respiration effects.

The possibility that lichens may disappear in towns as a result of city-induced drought and not pollution receives attention in most chapters, and is the subject of a separate and well-written treatment by Coppins. Certainly urban droughtiness can now no longer be regarded as having anything more than a weak secondary effect on lichen vegetation. Sadly, one of the most convincing sets of evidence, based on transplants (see Guderian and Schönbeck, *Proceedings of the Second International Clean Air Congress*, H. M. Englund and W. T. Beery, Eds., Academic Press, 1971, and references therein) is not cited.

Transplant techniques receive differing treatments by different authors. Farrar dismisses them saying they cannot be adequately controlled; Hawksworth believes they can be useful, but mainly in testing the sensitivity of various species; Baddeley and Ferry state that transplant experiments are extremely valuable and have a great future.

There are a few typographical errors, but they do not detract from an otherwise attractively put together book. Certainly, everyone interested in the monitoring of atmospheric pollution should find himself a copy of this book, and those interested in lichen biology will learn a great deal from it.

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Freshwater Invertebrates

Biology of Hydra. ALLISON L. BURNETT, Ed. Academic Press, New York, 1973. xvi, 466 pp., illus. $29.

For more than two centuries, the freshwater hydra has served biologists both as an experimental animal and as a subject for classroom study. From the time of its discovery, many biological phenomena were first observed through the study of hydra. For example, in 1701 Leeuwenhoek described in