fail to note, however, that symbol-based models can often do so only in the way elephants can do seal tricks—somewhat unnaturally. Also, the connectionist "abolition" of higher-order symbols is an attractive scientific goal. For it would show there is a "deeper" reality to surface appearances, just as apparently unitary matter turns out to be made of microlevel parts that look as though they act as units.

If somewhat weak on analyzing the attraction of connectionist models, though, these papers are brilliantly apt in analyzing their present and perhaps permanent difficulties. Indeed, some of the critical arguments seem quite simply and straightforwardly correct, especially the general ones in the initial essay by Fodor and Pylyshyn (some of which are repeated in various forms in the later essays). It seems unlikely that connectionism in its present forms can cope with these difficulties; a connectionism that could cope would be one in which the basic equipment necessarily lost the stripped-down representational nature that constitutes much of the appeal of the present forms.

MICHAEL P. MARATSOS
Institute of Child Development, University of Minnesota, Minneapolis, MN 55455

A Burst of Phages

The Bacteriophages. RICHARD CALENDAR, Ed. In two volumes. Vol. 1, xviii, 596 pp., illus. $105. Vol. 2, xviii, 760 pp., illus. $125. Plenum, New York, 1988. The Viruses.

In these two volumes Calendar has assembled an excellent collection of papers summarizing the life history or the development of the major groups of bacteriophages. All the favorites are here, though λ is covered more as a collection of components than as an intact organism. Also reviewed are several lesser-known phages including the much-maligned T1 (Drexler remonstrates against those who live in dread of this phage), *Bacillus subtilis* phages, cyanophages, and the various viruses that parasitize the equally various archaebacteria.

Many of the phages whose life-style is described in these volumes have not been the subject of a comprehensive review for several years and, if for no other reason, their presence here is welcome. Others, T4 and Mu among them, are the subject of recent monographs, but Mosig and Eiserling (T4) and Harshey (Mu) have largely succeeded in avoiding duplication of detailed material.

The dust jackets of the volumes refer to two types of papers: discussions of issues exemplified by many kinds of phages and comprehensive reviews of individual phage families. Both volumes contain both types, and their order of presentation is randomly permuted. However, the chapters are all independent and are unlikely to be read in sequence. Nevertheless, I would have liked to have seen the detailed list of the contents of both volumes in each. I would also like to have seen a chapter including both a retrospective analysis of bacteriophage biology and an optimistic prognosis. We are still faced with many fundamental questions, the answers to which may best be obtained by studying these "simple" organisms. An enthusiastic, but considered, summary might have been infectious and helped stem the decline in popularity of phage research.

Including general reviews and specialized papers in one publication almost necessarily leads to repetition. This is especially noticeable when the chapters "Changes in RNA polymerase" and "Strategies of DNA replication" are compared with chapters on individual phages. Readers familiar with these topics will no doubt prefer the pertinent sections in the more specialized chapters, though even they may be rewarded by perusing these overviews. The introduction to "Strategies . . ." by Keppel *et al.* is particularly thoughtful.

Few of the papers on double-stranded DNA phages cover morphogenesis in detail, but this complex topic is thoroughly discussed in the contributions of Casjens and Hendrix (dsDNA phage assembly) and Black (DNA packaging). Both reviews are written with exceptional clarity, and even a casual reading of them should provide the nonspecialist with a good grasp of the subject and of the problems yet to be solved.

The reader will find little information on recombinant DNA technology in these pages. The use of phages as cloning or sequencing vectors receives only a couple of passing comments, and there is no description of phages that yield blue (or sometimes white) plaques. These topics are well covered elsewhere, and their absence from *The Bacteriophages* is probably intentional. What one will generally find, in the chapters on individual phage families, are comprehensive and often stimulating discussions of a diverse group of organisms. As might be expected, the contributions vary in quality, but any disappointments I may have had while reading some were more than compensated by the pleasures of reading others. Of several superb essays on individual phage families, that by Yarmolinsky and Sternberg stands out, partly because it occupies a quarter of a 13-chapter volume. Readers of this essay, while learning more than they thought possible about P1, can also feast on its fine English, its coarse French, and its humorous anecdotes.

These two volumes summarize our current knowledge of all the major groups of phages. The diversity of pathways used by one or another phage in subsuming the biosynthetic machinery of the host in order to promote its own development is truly remarkable. These strategies are well documented, with comprehensive reference lists extending into 1987 and even 1988. Anyone who wants to find a precedent for a particular mechanism of, for example, gene regulation is more than likely to find it in *The Bacteriophages*. These volumes contain a mine of information and ideas that are pertinent to all facets of biology. Both students and researchers should find them a valuable resource.

IAN MOLINEUX
Department of Microbiology, University of Texas, Austin, TX 78712

Cementation Patterns

Diagenesis of Sedimentary Sequences. J. D. MARSHALL, Ed. Published for the Geological Society by Blackwell Scientific, Palo Alto, CA, 1988. vii, 360 pp., illus., + plates. $135. Geological Society Special Publication no. 36. Based on a meeting, Liverpool, U.K., Sept. 1986.

The process known as diagenesis is the sum of physical inorganic chemical or biochemical changes, excluding metamorphism, in a sedimentary deposit after its initial accumulation. It involves compaction, addition of material, removal of material, and transformation of material by change of mineral phase or replacement of one mineral phase by another. The most important aspect of the process is the transformation of loose sedimentary particles into solid bedrock by cementation.

As well as being of academic interest diagenesis has applications in the industrial sphere. The location of oil, gas, and water depends on the presence of pores that have escaped cementation or have been created through dissolution of newly formed cement or of particles of the original sediment. Pores such as vugs, channels, and caves resulting from percolating subsurface dissolution of the rock generate space of possible use for the disposal of industrial waste.

The aim of the meeting at which the papers collected in this volume were presented was to bring together workers on different kinds of sedimentary rocks. The