tention to other cultural activities, especially science, art, and religion, which involve the study of information, style, and beliefs rather than motor behavior. Leo S. Klejn, the lone Russian contributor, is a notable exception; while he considers factors of production to be paramount, he notes that Marxian archeologists are now paying more attention to economics, politics, and ideology (pp. 691–710). Among the non-Marxists, there appears to be an increasing interest in demographic and social, as opposed to cultural, factors. William L. Rathje's paper on Mayan social structure (pp. 731–757) is a complex example.

In this computer age, most of the authors have found it convenient to proceed by examining the variability in artifacts and nonartifactual remains within particular assemblages. By so doing, they focus upon microchanges, which have taken place at particular points in time and space, as opposed to macrochanges, which take place through the dimensions of time and space. The greatest gap in the volume, especially when it is compared with the two previous Seminar volumes, is its failure to deal with macrochange, involving long-term patterns of development—this despite the fact that archeology is especially well suited to the study of long-term patterns since it covers the total range of prehistory and history. Evolution, conceived as the overall pattern of development in nature and man, is scarcely mentioned at all, except by authors like Warwick Bray (pp. 73–92) who draw analogies between paleontological and archeological studies of change.

IRVING ROUSE
Department of Anthropology,
Yale University,
New Haven, Connecticut

Viruses and Chemotherapy

Selective Inhibitors of Viral Functions. WILLIAM A. CARTER, Ed. CRC Press (Chemical Rubber Co.), Cleveland, Ohio, 1973. x, 378 pp., illus. $39.95.

The purpose of this book is to provide a ready source of references and a better basis for experimental design in investigating antiviral compounds. Another aim is to categorize knowledge on the mode of action of viral inhibitors at the molecular, cellular, and clinical levels. The result is a series of essays that proceed from general aspects of the limitation of viral diseases to interferon induction and its biologic effects, then to specific groups of drugs that affect viral replication, concluding with inhibitors of some nucleic acid polymerases involved in viral transformation of cells and oncogenesis. An attempt to provide an overview of responses to viral infections fails owing to the largeness of the subject. The consideration given vaccines is not well integrated into the theme. Chapters on inhibitors of specific viral functions provide more than 2000 references and interpret them in a format that is enjoyable to read.

Research on interferon has established it as an integral part of the host defense response. Because of the large number of systems studied, some paradoxical results, and the unavailability of pure interferon, the authors must resort frequently to such phrases as "The mechanism is unknown, but the observations suggest . . . ." The result, however, is a good view of the present status of knowledge about interferon and a calling of attention to the many gaps that remain to be filled. The discussion proceeds from the molecular biology of induction of viral replication to differentiation of specific effects, how interferon reduces infections, and the potential for medical application. Naturally the molecular end is hypertrophied by comparison with the clinical. A little disappointment is that the molecular biology presented primarily pertains to chemical inducers and the induced cell. The protected cell in the two-cell system is treated lightly although at least species specificity, viral polymerases, concentration-dependent binding, and varying virus sensitivity are involved. The biologic problems of toxicity, enhancement, hyporeactivity, and immunogenicity of inducers are identified, but few insights into mechanisms are provided. The most provocative challenge is to replace the Jacob-Monod model with one to explain interferon production by eukaryotic cells.

Optimism is expressed that useful chemotherapeutic agents can be evolved through knowledge of chemical inhibitors of viruses that compete for specific active sites in viral replication. Viruses of a single group possess common features subject to biochemical attack. Different mechanisms of inhibition are recognizable among the compounds considered. Amantadine exemplifies attack during entry of the virus into the cell, thiosemicarbozones selective chelation, nucleic acid analogs selective inhibition of DNA precursors, guanidine and hydroxybenzimidazole reversible inhibition of RNA synthesis, and ansamycins selective binding and inhibition of RNA polymerases. Some presentations simply reiterate molecular dogma; some contain meager biochemical information; pharmacologic considerations are largely ignored. Time restrictions of the drug inhibitory effects, specificity, reversibility, helper activity, and mutational drug resistance exemplify the complexity of the problems facing clinical use.

Some important concepts noted are: formation of empty virions with cytotoxicity during drug blockage of infectious RNA virus, activation of latent virus genomes by drug treatment, and specific bivalent binding of drug to nucleic acid sites and polymerases. An "axiom" suggested by the last of these is that an inhibitor of an essential virus-directed polymerase can be lethal for the virus and therapeutically useful. The book fuels hope for the future of antiviral chemotherapy.

GEORGE GEE JACKSON
Department of Medicine, University of Illinois College of Medicine, Chicago

Metalloproteins

Iron-Sulfur Proteins. WALTER LOVENBERG, Ed. Academic Press, New York, 1973–74. Two volumes. Vol. 1, Biological Properties. xiv, 388 pp., illus. $33. Vol. 2, Molecular Properties. xiv, 344 pp., illus. $29. Molecular Biology Series.

In slightly less than 20 years there has developed a vast core of knowledge on the iron-sulfur proteins. Impetus for research on these unusual proteins was provided in 1962 by the discovery of a low-molecular-weight protein from a nitrogen-fixing bacterium, *Clostridium pasteurianum*. This brown iron-containing protein was found to promote the phosphoroclastic reaction involved in nitrogen fixation and consequently was given the name ferredoxin. Interest in relating this protein to other, previously discovered factors that contained iron led to a flurry of research on the biochemistry of these proteins and the nature of the iron-sulfur complex.

It has now become clear that the iron-sulfur proteins are vital for many important biochemical reactions in nearly every organism from the very primitive anaerobe to the highly sophisticated mammal. Indeed, one begins to wonder if all organisms will not eventually be shown to utilize some