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BACTERIOPHAGE ASSEMBLY

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on Bacteriophage Assembly
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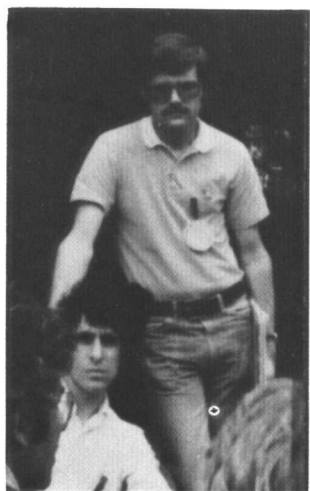
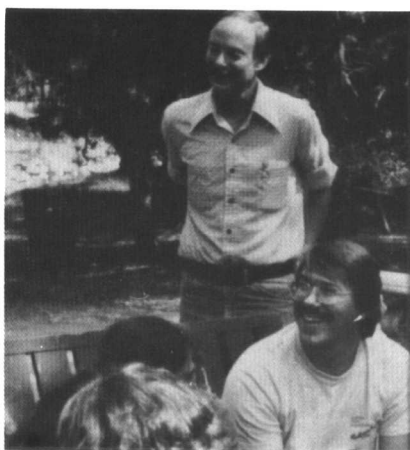
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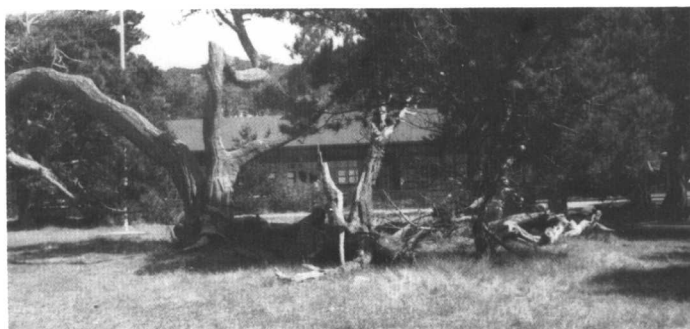
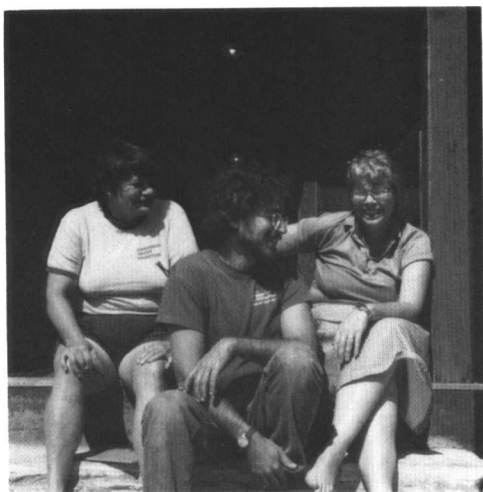
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Administration Building, Asilomar Conference Grounds

Introduction

The mechanisms which regulate the synthesis, size, shape, and construction of biological macromolecules into three-dimensional assemblages are an area of fundamental interest to many biologists. Up to the present time, the assembly of these macromolecules into complex supramolecular structures such as virus particles remains a frontier that has yet to be tamed. The self-assembly of small, RNA plant viruses such as Tobacco Mosaic Virus has provided many insights into the mechanisms by which a morphologically distinct biological object is constructed. Over the previous four decades, bacteriophages have proven to be uniquely productive model systems in the development of theories and techniques for the study of more complex macromolecular structures and assembly pathways. Their diversity of size, shape, and composition, coupled with their ease of genetic and biochemical manipulation, have all contributed to their utilization in the study of building biological assemblages. Bacteriophage assembly now encompasses wide-ranging areas of study such as protein-protein and protein-nucleic acid interactions, three-dimensional structure analysis, membrane-protein interactions, and host-virus interactions. As this monograph will detail, an impressive array of old and new techniques have been applied for these studies and interesting and provocative information generated with approaches ranging from "toothpicking" colonies and plaques to Laser-Raman spectroscopy and computer analysis of sequence and structural data.

Every two years, bacteriophage morphogeneticists gather together to exchange new information and ideas, and 1980 witnessed the seventh such biennial event. This year it was held at the Asilomar Conference Grounds in Monterey, California, and was organized by Richard Calendar. The pleasant surroundings and cooperative weather contributed to the flow of information and it became obvious during the meeting, as had been summarized, that phage assembly answers questions which the rest of biology has not yet reached the stage to propose.

This volume grew out of the meeting at Asilomar and is a compilation of the proceedings divided into five sections, each beginning with a summary or review of some of the major aspects of that particular section. In addition, the first chapter is an invited overview article by Steven Harrison on virus configuration and its relationship to the mechanisms governing phage form

and construction. The next five sections contain summaries plus contributions derived from papers presented at the conference. Lastly, the final chapter contains an invited review article on the assembly of selected animal viruses by an ex-phage morphogeneticist, Ronald Luftig. It is my hope that this volume will illustrate how phage assembly can contribute valuable information to the structure-function relationships of host and virus components and how these are designed and built to form such structures.

This book is set from camera-ready typescript in an effort to speed publication of these proceedings in a timely manner. I would like to thank Fumio Arisaka for providing most of the pictures of conference participants shown in the preceding pages. I am also grateful to Ms Paulette Cohen and the staff of Alan R. Liss, Inc., for their patience and generosity in the publication of this volume. Lastly, I would like to thank all of the contributors for helping to produce the finest volume possible and especially to D. Bamford, L. Black, K. Dunker, C. Georgopoulos, S. Harrison, L. Kozloff, R. Luftig, and K. Tilly for their excellent overviews above and beyond the call of duty.

Michael S. DuBow
Montreal, Quebec, Canada
1981

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