seems to be a far cry from the environmental movement. But they argue that differences between organizations such as the Sierra Club, a revisionist organization, and the Friends of the Earth, a more radical one, can be explained in this way. Their final step is to argue that American society is, and has always been, a border society. So there is plenty of room for sectarian groups, and center perspectives are weak.

Now, I agree that one explanation of radical attacks on the center may come from the organizational problems of dissident groups. Dissident groups have always had such problems to deal with. Moreover, America has been a seedbed of social movements and religious sectarianism. But Douglas and Wildavsky make no attempt to show how the environmental movement gained its prominence. The decades of the '60's and '70's saw the emergence of many social movements, from civil rights to gay rights, from prison rights to women's rights, from Greenpeace to the Symbionese Liberation Army. General processes of voluntary organization do not explain why some movements have wide appeal and others do not. Douglas and Wildavsky address this by examining the role of public interest groups and the growth of an educated class separate from industrial roles. Farmers or manufacturers tend to have a different view of ecological risk from members of the technical-service class. This seems true enough. But again what Douglas and Wildavsky say is applicable to all social movements. What is missing is an analysis of how the shape of the movements with which they are concerned grows out of central political and economic structures and ideological currents of our society. The environmental movement that worries about wetlands feeds into the movement opposed to nuclear power, which in turn has roots in the historic opposition to nuclear weapons. Each has its own organizational and ideological problems. Moreover, that government and corporations are vilified relates to large swings in populist ideology with deep roots in our history. Some social movements pick up this ideological thread, others do not. Yet Douglas and Wildavsky barely broach the issue. The search for an abstract cultural theory has in this case led away from a cultural-social map of this movement in our times.

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Bacillus subtilis

The Molecular Biology of the Bacilli. Vol. 1, *Bacillus subtilis*. DAVID A. DUBNAU, Ed. Academic Press, New York, 1982. xii, 380 pp., illus., $44. Molecular Biology.

Molecular Cloning and Gene Regulation in Bacilli. Papers from a conference, Stanford, Calif., June 1981. A. T. GANESAN, SHING CHANG, and JAMES A. HOCH, Eds. Academic Press, New York, 1982. xxii, 360 pp., illus. $29.50.

Bacillus subtilis has become an important subject in molecular biology. One reason for this is that *B. subtilis* undergoes a process of sporulation that shares with more complex forms of cellular differentiation temporally regulated gene expression. Another reason is that *B. subtilis* has potential industrial use as a molecular cloning host.

The two books under review are attempts to summarize the current knowledge of the molecular biology of the bacteria of the genus *Bacillus* with particular emphasis on *B. subtilis*. The books take different approaches. *The Molecular Biology of the Bacilli*, edited by Dubnau, consists of a series of in-depth review papers that cover such subjects as the *B. subtilis* genetic map, DNA replication, transcription, translation, transformation, sporulation, phage replication, specialized transduction, molecular cloning, and the industrial use of bacilli. *Molecular Cloning and Gene Regulation in Bacilli*, edited by Ganesan, Chang, and Hoch, consists of a series of research papers based on talks presented at the Cetus Conference on Genetics. The papers in this book are organized into sections on chromosome structure and gene arrangement, molecular cloning, expression of cloned genes, DNA metabolism, and transcription and translation. In contrast to those in the Dubnau book, the papers here are concerned with very specific topics, which permits the presentation of each subject in much greater detail.

Most subjects are covered well by the two books. The coverage of RNA polymerase and its apparent role in regulation of gene expression during spore formation is especially good. Since the early studies of Losick and Sonenshein it has been hypothesized that transcriptional controls are involved in the temporal regulation of spore genes. In the Dubnau book Roy Doi, in a very comprehensive overview of what is known about *B. subtilis* RNA polymerase, enumerates the various forms of RNA polymerase that have been found and discusses their subunit composition and whether they are found in vegetative or sporulating cells or in both. Though the fact that new forms of polymerase appear in sporulating cells has for years been used as evidence that transcriptional controls regulate the temporal expression of sporulation genes, it has been difficult to confirm that such regulation takes place, for it has been difficult to demonstrate that the different forms of RNA polymerase do actually have different template specificities and that the sporulation RNA polymerase forms are actually required for the transcription of sporulation genes.

In studies he reviews in the Dubnau book, Richard Losick and his colleagues cloned a fragment of the *B. subtilis* chromosome that contains vegetative and sporulation genes. Using the genes on this fragment they were able to demonstrate different template specificities for different forms of *B. subtilis* RNA polymerase. They found that the predominant form of polymerase in vegetative cells transcribed a cloned vegetative gene but not a sporulation gene whereas a sporulation form of polymerase transcribed the sporulation gene but not the vegetative gene.

Determination of the nucleotide sequences of several *B. subtilis* genes is covered in the Ganesan, Chang, and Hoch book. The genes that are transcribed by the major vegetative form of *B. subtilis* polymerase have conserved regions in their promoters that are similar to the -10 and -35 regions of *Escherichia coli* genes. Losick's group determined the sequence of the promoter region of a sporulation gene on their cloned fragment of *B. subtilis* DNA and found that it varies greatly from the promoters of the genes transcribed by the major vegetative polymerase.

The *B. subtilis* translational apparatus is thoroughly reviewed by Issar Smith in the Dubnau book. The review is timely, for it has been several years since the last such review.

It has been found that *B. subtilis* ribosomes will not translate *E. coli* mRNA even though *E. coli* ribosomes will translate both *B. subtilis* and *E. coli* mRNA's. The basis for this specificity resides in the 30*S* ribosomal subunit and is independent of the source of initiation factors. Cheryl Murray and Jesse Rabinowitz describe in the Ganesan, Chang, and Hoch book their observation that in several *B. subtilis* genes the complementarity between the apparent ribosome binding sites (Shine-Delgaro sequence) and the 3′ end of the *B. subtilis* 16*S* RNA

is greater than the corresponding complementarity between *E. coli* genes and *B. subtilis* 16*S* RNA. The complementarity with the ribosome binding sites of *E. coli* mRNA's may be insufficient to promote proper binding of *B. subtilis* ribosomes and consequently may be involved in the template specificity of *B. subtilis* ribosomes.

Another subject well covered in the two books is the development of a molecular cloning system in *B. subtilis*. The books describe the problems encountered in trying to develop such a system and the steps that have been taken to overcome them and give examples of genes that have been cloned in *B. subtilis*. Also covered is the development of several cloning vectors for use in *B. subtilis* and the development of shuttle vectors that replicate in either *B. subtilis* or *E. coli*.

The books are worthwhile additions to the literature. Because the Dubnau book is more of a review of the entire field it might hold greater interest for workers from other fields. In covering fewer topics in greater detail, the Ganesan, Chang, and Hoch book might be more valuable to researchers who study bacilli. In my view the books are complementary and are valued additions to my reference library.

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Neurobiology

Molecular Genetic Neuroscience. Papers from a meeting, Woods Hole, Mass. FRANCIS O. SCHMITT, STEPHANIE J. BIRD, and FLOYD E. BLOOM, Eds. Raven, New York, 1982, xx, 492 pp., illus. $74.

The recent meeting of the American Society for Neuroscience began with a talk on the cloning of acetylcholine receptor genes and ended with a talk on the cloning of neuroactive peptide genes from *Aplysia*. Neurobiologists who think that the trend toward molecular biology will continue should find *Molecular Genetic Neuroscience* to be interesting reading.

The book contains reports from a conference held under the auspices of the Neurosciences Research Program. The objectives of the conference were to introduce the concepts and practice of molecular biology, particularly genetic engineering, to neurobiologists and to introduce molecular biologists to the nervous system. Related manuscripts are grouped in sections, beginning with studies of nonneuronal gene expression and progressing to the application of immunological and molecular genetic techniques to the nervous system. The editors provide an introduction to each section consistent with a theme developed by Francis Schmitt in the introductory essay, that changes in gene expression may be part of the behaviorally relevant plasticity of neurons.

Overall, the quality of the papers in the book is quite high. Those in the sections on organization of DNA, control of gene expression, and application of somatic cell genetics to developmental problems are excellent summaries of research by leading laboratories in these subjects. A paper by Leroy Hood on the genetic mechanisms that generate antibody diversity describes a system that may be a paradigm for similar, but hitherto undiscovered, systems operative in the brain. The new microchemical methods that Hood describes for sequencing nanomolar amounts of protein so that the information gained can be used to synthesize oligonucleotide probes for genes encoding proteins present in minute quantities are clearly going to be widely used in neuroscience and developmental biology. An excellent paper by Richard Lerner describes another procedure of general interest to neurobiologists: the chemical synthesis of peptides using sequence information provided by DNA and the use of these peptides to raise antibodies to the native protein containing this sequence of amino acids. The most exciting results of molecular biology on neuroactive molecules are described in several papers on the structure and processing of neuropeptide precursors, as determined in large part by gene sequencing. Papers by William Hahn and François Gros and their colleagues provide an introduction to methods used to calculate the number of active genes in the nervous system and reasons for believing that the diversity of gene expression is higher in the nervous system than in other tissues. An outstanding paper by David Housman and James Gusella describes molecular genetic approaches to hereditary neural degenerative disorders, such as Huntington's disease. Finally, some cogent strategies for the application of molecular biology methods to neurobiology are offered by Hans Thoenen and Floyd Bloom.

Neurobiologists will find it well worth their while to read a judicious selection of the papers in this book, even though advances during the last year have dated some of them. Reports to appear shortly on cloning of the genes coding for nerve growth factor and the voltage-sensitive sodium channel emphasize how dramatic the impact of molecular genetics on neuroscience is likely to be. New methods using expression vector systems to isolate genes are more powerful than the classical technologies described in the book.

For neurobiologists, the book is highly recommended. Its chief defect is the lack of descriptive methodology, but "cloning cookbooks" such as *Molecular Cloning: A Laboratory Manual* (T. Maniatis, E. F. Fritsch, and J. Sambrook, Cold Spring Harbor Laboratory, 1982) are becoming available for neurobiologists who want to employ molecular genetic techniques. As an introduction to neuroscience for molecular biologists the volume is less successful. The diversity of research being pursued by neurobiologists is not well represented, and scientists interested in such material would do better to investigate the Neurosciences Study Program series or the *Annual Review of Neurobiology*.

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Ultramafic Magma

Komatiites. N. T. ARNDT and E. G. NISBET, Eds. Allen and Unwin, Boston, 1982. xviii, 526 pp., illus. $75.

Whether ultramafic melts exist was a subject of vigorous debate for more than 50 years. The debate was put to rest in the late 1960's by the definitive work of the Viljoen brothers on what were to become classic ultramafic melt occurrences in the Komati River Valley, Barberton Mountain Land. Ultramafic melts or komatiites now rank as the most exciting recent discovery in petrology, and it is not surprising that they have been the subject of many studies seeking to understand their nature and origin. Until the publication of *Komatiites*, however, there was no single work collating these studies, and there is no doubt that the book fills a hole in the geological literature. The question is, how well does it fill it?

The purchaser of *Komatiites* will get a collection of reviews of most of the ma-