are affected by environmental factors, and the effects are variable and largely indeterminate at present.

While all societies take note of movement through the life cycles and tend to mark transitions from one grade to another, persons in the same age grade do not universally create age groups. S. N. Eisenstadt attempted more than two decades ago to explain this transformation among youth in terms of the replacement of familistic social structures by universalistic structures. The present volume repeatedly refers to Eisenstadt without, however, expressing much interest in the utility of his theory. And the useful research of Irving Rosow on the social integration of the aged in modern societies receives no attention at all. In sum, then, Riley and her associates do not claim to provide a theory of age stratification or to test propositions derived from theory. They are as good as their word. *Aging and Society: A Sociology of Age Stratification* is nonetheless an important and useful volume.

Riley and associates make an effective case for cohort analysis in sociological research. Most, if not all, research on social processes has badly confounded behavior which might be attributable to age (as a proxy for maturation), to cohort (as a proxy for specific historic experiences), and to the interaction between age and cohort at particular points in time within particular environments. Conventional wisdom bolstered by demonstrably inadequate evidence has it that individuals become politically conservative as they age and experience irreversible intellectual decline. The hearty persistence of these and similar inaccuracies is impressive. What is more impressive is the continuing insensitivity of so many investigators to the methodological demands of research on human aging. This volume itself gives evidence of how persistently life course differences are confounded with cohort differences. If behavioral and social scientists intend to present more than static, quickly outdated, and inadequate characterizations of social and biosocial phenomena, they will have to utilize cohort analysis. Riley and associates provide some fundamental guidelines for adequate research, and this is the real strength of the volume.

Two substantive chapters already remarked upon warrant further attention. Foner's review of research on age and politics demonstrates the necessity as well as the difficulty of cohort analysis. Cohort differences appear to be more related than age per se to political attitudes, political participation, and voting behavior, but observed changes in the political behavior of specific age cohorts more often than not mirror changes in the general political environment. Foner argues persuasively that such correlates of age as length of identification with a political party or residential stability are more explanatory than age per se. Unfortunately, she notes but does not assess the potential for the emergence of politics of age in the United States at the national and local levels. Although there is not much evidence that the elderly 10 to 15 percent of the national electorate has been or is likely to be mobilized as an effective political force, in many local areas the elderly constitute upward of 20 percent of the electorate. The reader is left to speculate about the possibility and probability of politics of age involving either the young or the old.

Zuckerman and Merton's chapter on the age structures of science is certainly one of the most rewarding pieces in the volume. Their topic is substantively interesting and they cleverly tap some unusual data sources. They report that, in general, there is little evidence of age discrimination in science. If anything, in rapidly expanding disciplines the young are more likely to discriminate against the elders than the reverse. But age per se consistently turns out to be less salient than the degree of quantification and theoretical specificity in accounting for observed stratification (power, prestige, advancement) in various disciplines.

This volume convincingly argues, though often implicitly, against the utility of chronological age per se as a sociological variable. The principal focus is on understanding the collectivity of cohorts which constitute a given society and on the ways in which that society prepares successive cohorts for future roles and allocates resources to them. Riley and her associates have made a reasonably effective case for a sociology of age stratification. Whether cohort analysis can actually provide an increasingly accurate and useful explanation of social behavior and societal processes is a question for future research to answer.

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New Light on a Pavlovian Idea

Inhibition and Learning. A conference, Sussex, England, Apr. 1971. R. A. BOAKES and M. S. HALLIDAY, Eds. Academic Press, New York, 1972. xvi, 568 pp., illus. $22.50.

For Pavlov, inhibition was a central process that could suppress behavior and produce other, less direct effects. The inhibitory process was labile and complex; Pavlov called it "accursed," yet found it fundamental to the control of unconditioned and conditioned responses. In Western psychology, however, the study of inhibition languished, a victim of inappropriate methods and of the complexity that made a workable behavioral definition difficult to establish. Now new methods and fresh data are rapidly reviving interest in the concept, with an especially strong stimulus coming from studies of instrumental (or "operant") behavior, formerly relatively barren of such work.

Definition is still a problem; the authors of the 20 contributions to this volume use the term "inhibition" to cover many kinds of observation. The reader would do well to start with Hearst's thoughtful analysis (chapter 1) before following his interests to other selections. A familiarity with the first 100 pages of Pavlov's *Conditioned Reflexes* is equally useful; in fact, there seems no better way to suggest the book's content than to choose a few Pavlovian concepts and see what becomes of them here.

One such concept is "conditioned inhibition," which arose from Pavlov's finding that, through conditioning, he could give an arbitrary stimulus the power to depress behavior below a level to be seen when the stimulus was absent. Conditioned inhibition embodies in a direct way the notion of active suppression, and it is relatively close to the idea of inhibitory neural interaction. For these reasons, it is considered by Hearst and others the central focus of inhibition research. Wagner and Rescorla (chapter 12) show how conditioned inhibition flows from their model of the conditioning process. It arises not from some particular operation (such as nonreinforcement) but from certain conjunctions of stimuli that (as it were) lead the subject to predict more reinforcement than is actually forthcoming. Though their model touches only a limited range of inhibitory effects, Wagner and Rescorla present impressive data that can probably be extended.

If stimuli can acquire inhibitory

properties, it is no surprise to find operant researchers attempting to relate these properties to one of their main concerns, reinforcement. Terrace (chapter 4) reiterates his evidence that negative discriminative stimuli are negative reinforcers: an animal will work to get rid of them. Honig *et al.* (chapter 2) use the reinforcing property in their "advance procedure," arguing that the speed with which a subject rids himself of a negative stimulus is a more sensitive measure of inhibition than is a reduction of responsiveness in the presence of the stimulus. Weisman and Litner (chapter 10) suggest that the appearance of a Pavlovian fear inhibitor serves to reinforce avoidance responding. Despite these various claims, it remains uncertain to what extent the inhibitory and the reinforcing effects of stimuli go hand in hand.

Pavlov demonstrated with dramatic effect the recovery of a weak response in the presence of an unfamiliar stimulus; such "disinhibition" provided impressive evidence that the response had been actively suppressed, not permanently weakened. However, analogous demonstrations in instrumental conditioning have been relatively recent. Brimer (chapter 8) suppressed lever-pressing in various ways (even satiation!), and then revived the response by presenting a novel stimulus. He proposes that such disinhibition is the best way to detect inhibition. Hearst, on the other hand, relegates disinhibition to "symptoms or byproducts" of inhibitory control. There seems to be general recognition, however, that the more fundamental issue concerns not so much the "best measure" as how the various phenomena are interrelated and whether they reflect a common process.

Pavlovian "induction" and instrumental "behavioral contrast" have been thought to reflect inhibition in roughly the same fashion as do contrast effects in sensory systems. Unfortunately, the argument that such is the case, at least for behavioral contrast, is far from clear. While Ison and Krane (chapter 7) attribute behavioral contrast to a temporary aftereffect of nonreinforcement, Halliday and Boakes (chapter 3) find no simple account adequate. Despite numerous studies, it is not evident that behavioral contrast occurs in many species, or is generally important.

Pavlov has often been criticized for his heavy reliance on physiological speculation. The final section of this volume provides a sample of work that is gradually giving substance to a neurophysiology of behavioral inhibition. Several authors, particularly Douglas (chapter 20), strongly implicate the hippocampus in the control of "withheld" responses in such instances as extinction, habituation, waiting tasks, and successive discrimination. Both behavioral techniques and physiological methods are gaining in sophistication, but as yet no single description of mechanisms for inhibitory control commands general agreement.

This brief review cannot hope to suggest the variety of data, method, and cogent discussion to be found in this volume. Though some papers fail in clarity or content, most have something to say. The variety, applicability, and generality of the inhibition concept are scrutinized, its relations to attention and frustration are examined, its temporal properties probed, and its place in motivational and reflex systems is considered. Contributions come from widely separated laboratories, including Eastern Europe and the Soviet Union. Though the specialist will have encountered most of the essential ideas and data in journals or other symposia, he will find this a convenient source book, and he will appreciate the relative brevity and clarity with which some of the best-known authors restate their work. Advanced students and nonspecialists will find represented in this volume a large proportion of the most central ideas and data of this now rapidly expanding area.

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Enzyme Proteins

Hemoglobin and Myoglobin in Their Reactions with Ligands. ERALDO ANTONINI and MAURIZIO BRUNORI. North-Holland, Amsterdam, 1971 (U.S. distributor, Elsevier, New York). xx, 436 pp., illus. $30. Frontiers of Biology, vol. 21.

This is a book which focuses on the relationship between structure and function in hemoglobin and myoglobin, which are far and away the best studied of proteins. The first four chapters give details of preparation of the proteins, encyclopedic information about the chemical, optical, and electronic properties of various derivatives and their liganded forms, and finally an excellent discussion of molecular structure, drawing heavily on x-ray data.

The middle chapters of the book constitute an intensive review of what is known about ligand binding in hemoglobin and myoglobin from different points of view. The greatest strength of the book is well illustrated in these chapters, for these proteins are seen to be especially well-studied examples of what are after all general properties of many if not most enzyme proteins. In most cases, the especial advantage of knowing so much about structure and being able to relate this to functional data is emphasized.

A discussion of association-dissociation behavior and ligand-dependent changes in conformation and the presentation of detailed information on the equilibrium and kinetics of the reactions of these heme proteins with ligands and on the functional behavior of chemically modified protein, as well as on the oxidation-reduction behavior of these heme proteins, constitute the bulk of the book. The book has an excellent penultimate chapter on structure-function relationships, and the final chapter is a summary of the various theories of ligand binding in which Hüfner, Hill, Adair, and Pauling are paid due respect for their pioneer efforts. Finally, the various modern theories and quantitative models which attempt to take account of conformation changes as the basis of regulatory phenomena are explored. The Monod-Wyman-Changeux model and the Koshland induced-fit model are the two best known in this group, and they are impartially presented.

The book as a whole is coherent and tightly written, with a plethora of detail in the middle chapters. For anyone who works on hemoglobin or contemplates doing so, this book will be a unique and invaluable asset. For anyone interested in the general problem of structure-function relationships in proteins the book will make interesting reading. The stated aim of the book was to give a comprehensive account of the present knowledge of these heme proteins with ligands. In this the authors have succeeded.

This book is weighty testimony to the enormous experimental contribution of the "Rome" group to our understanding of hemoglobin and myoglobin. If the reader is not careful he may even come to the conclusion that hemoglobin is after all an Italian molecule.

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