there is little cost in the diffusion process that establishes superior systems throughout the species.

This volume is a masterly review of experimental population genetics. Like the two previous volumes of *Evolution and the Genetics of Populations*, the present one will become an indispensable reference for investigators, teachers, and graduate students in population genetics. One noteworthy feature is that concepts and lines of research are traced back to the first relevant contributions, many of which have been completely forgotten in current literature. For example, I presume that most population geneticists are unaware that H. J. Muller's 1950 thesis that every mutation contributes substantially the same amount of damage to a population in the long run, independently of the severity of its effects on individuals, had been proposed by C. Danforth 27 years earlier; or that the theory that accounts for the prevailing recessiveness of mutations by postulating evolution toward dominance at loci with initially intermediate heterozygotes, usually credited to a paper published by R. A. Fisher in 1928, was first advanced in 1919 by E. M. East and D. F. Jones.

In a few places, Wright brings in recent work in molecular biology that is relevant to population genetics. One instance is the experiment of Mills, Peterson, and Spiegelman showing selection in favor of smaller molecules in self-replicating RNA from the bacteriophage $Q\beta$. Of wider implication is the calculation of the maximum number of genes in a variety of organisms, based on measurements of the amount of DNA per nucleus. Wright observes that the numbers of genes obtained in such calculations are much too high. In his calculations, Wright takes into account that a fraction of the DNA consists of highly repetitive sequences, but he ignores recent evidence indicating that only about 10 percent of the DNA transcribed leaves the nucleus and becomes associated with polyribosomes and translated into polypeptide chains. When this additional consideration is taken into account (as well as the fact that the number of nucleotides per structural gene may be greater than the 1000 assumed by Wright), the numbers of structural genes calculated on the basis of the amount of DNA per nucleus are, for many organisms, not very different from estimates based on other evidence.

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Dealing with Retardation

The Mentally Retarded and Society. A Social Science Perspective. Proceedings of a conference, Niles, Mich., April 1974. MICHAEL J. BEGAB and STEPHEN A. RICHARDSON, Eds. University Park Press, Baltimore, 1975. xx, 492 pp. $17.50. NICHD Mental Retardation Research Center Series.

Writings having to do with mental retardation can be traced back to antiquity. But scientific concern with the subject is probably best dated from the publication of Itard's *The Wild Boy of Aveyron* in 1798. With the exception of the great debate concerning the nature-nurture issue, the early attempts to deal with mental retardation were almost completely atheoretical. Discussion revolved around the problems of defining and measuring intelligence, the problem of differential diagnosis, and individual case histories and family pedigrees such as those of the Jukes and the Kallikaks. Some of these efforts today strike us as quaint, but attempts to understand and ameliorate the effects of mental retardation led to developments of considerable importance. Particularly noteworthy in the history of the subject are the commitment to mental orthopedics of Binet, the moral training efforts of Seguin, and the rise of the asylum movement. As researchers began to discover the etiology of certain organic forms of mental retardation, we learned how very heterogeneous a phenomenon mental retardation is. Simple classification seemed out of reach, and the area became a disputatious one. Many workers took refuge in the view that mental retardation was too complex a phenomenon to permit the sort of basic theorizing that could lead to more promising research. If the experts were befuddled through this period, laymen, often challenged by unavoidable interchanges with retarded individuals, were totally at sea.

In 1958, in a book entitled *Mental Subnormality*, three distinguished scientists, R. L. Masland, S. B. Sarason, and T. Gladwin, reviewed what was then known about mental retardation. While some impressive efforts on the biological front could be documented, the psychological and anthropological work was considered to be thin in quantity and poor in quality. In general, the field appeared mysterious and unpromising.

The two decades since the effort by Masland *et al.* have witnessed a vast improvement in mental retardation research. This success story has involved certain institutional forces, certain individuals, and finally a Congress that had the wisdom to realize that our ability to help any group of individuals can never outdistance the verified knowledge we have about them. The concern of President Kennedy with mental retardation should certainly be noted, as well as the commitment to utilize research to improve the lives of retarded persons made by the National Association for Retarded Citizens and the Kennedy Foundation. In 1962 Congress took the pivotal step of legislating the existence of the National Institute of Child Health and Human Development (NICHD), which has spearheaded research efforts in this area.

And now, in *The Mentally Retarded and Society*, we have a new milestone book. The book deals with most of the important issues in the field's past and present and appears to anticipate many important questions of the near future. These issues are not presented in any unitary manner but run as themes from chapter to chapter and from section to section. Although the reader will have to work hard to extract the many important messages contained in the book, the effort will be worthwhile for almost everyone interested in mental retardation, including research workers, clinicians, social workers, educators, administrators of programs for the retarded, and those at every level of government involved in the construction of social policy concerning the retarded. Mental retardation costs our society approximately $5 billion annually and it is imperative that a book speak to all of these audiences simultaneously. The book under review makes a vital contribution by demonstrating how the efforts of scientific research workers can guide and assist those who must deal with the social problem of mental retardation.

The editors have not limited the book to contributions by those whose central concern is with mental retardation. We find very fine chapters on general problems of communication, attitude change, compensatory education, and the treatment of juvenile delinquency. In the reviewer's opinion this decision on the part of the editors was astute, for a major problem in work on mental retardation has been its parochial nature, with investigators too often speaking only to each other. What the field needs rather than "retardationologists" or "defectologists" is biologists, psychologists, sociologists, and anthropologists, whose efforts can enrich our understanding of mental retardation.

As the title indicates, the book is limited to social science issues and does not include the biological perspective. It is

lamentable that no serious attempts have been made to integrate the two perspectives. Perhaps the next phase of development in the field will be one in which biological and social scientists take each other seriously and work together.

Setting aside questions of scope, let us discuss the issues presented in the book beginning with the retarded individual himself. In this regard a specter haunts this book just as it has haunted the area for many decades—we have no definition of mental retardation that is either completely accepted by professionals or easily comprehended by laymen. (Many accept an IQ test score below 70 as a criterion, but this immediately becomes murky when one adds the other commonly used criteria, social incompetence and age of onset.) This definitional problem underlies a recurring theme of this book, the classification-labeling-stigma complex. There are some who argue that professionals create or exacerbate the problems of mental retardation by classifying individuals along an intellectual ability dimension, giving names (labels) to the lower categories, and thereby stigmatizing those who fit into them. Yet in its extreme form this view does not hold up. Whatever stigma a severely retarded person bears predates and will outlive the classification and labeling efforts of professionals. The sensible view that emerges from this book is that classification is necessary scientifically and useful practically.

The issue, then, is not whether to employ classification, but rather how to construct the most useful classificatory system. Experience in the field indicates that any classificatory effort must begin by distinguishing the mildly retarded (IQ between 50 and 70) from the more severely retarded (IQ less than 50). The book under review conveys a strong feeling that mental retardation is indeed a two-tiered phenomenon and that statements or views concerning one tier are pretty much inapplicable to the other. Deinstitutionalization and normalization, much discussed in this book, present quite different issues and problems for the mildly and for the severely retarded.

The clarity with which the two-tiered phenomenon emerges from the book leads the reviewer to propose that a convention be established whereby only individuals with IQ's below 50 would be classified as "mentally retarded." Those individuals with IQ's between 50 and 70 who are currently called retarded would then be regarded as representing the lower portion of the normal distribution of intelligence, and thus as an integral part of the normal population. What is badly needed in our terminology is some term parallel to "short," which we use to describe the lower portion of the naturally appearing distribution of height. If this classification proposal seems too drastic, I would remind workers in the field that the classification system proposed in 1959 by the American Association on Mental Deficiency, the leading professional organization concerned with the retarded in America, used an IQ of one standard deviation below the mean (that is, of 85) as a major criterion of retardation. We see in this instance how by fiat the number of retarded persons in our population jumped from approximately 5 million to approximately 30 million. The reclassification I propose would have the advantage of being consistent with what most laymen regard as constituting mental retardation. Further, such a definition would solve the "mystery" presented by that large group of individuals with IQ's above 50 for whom no organic cause of retardation can be found. Any serious consideration of the proposed system would of course require close analysis of the scientific and practical consequences of adopting it.

Related to the problem of definition is the issue of social competence, which is touched upon in many chapters in the book. Social competence, that is, ability to meet the demands of everyday living, is not adequately defined by an IQ score obtained on our standard intelligence tests, and the exact relation between intelligence and social competence remains unclear. The book under review points out the need for a widely accepted measure of social competence that can be used through the lifespan as IQ tests can. What is first required is a conceptual effort to give direction to the construction of such a measure. Schaefer has performed a real service toward this end by presenting the hierarchical model of adaptation included in his chapter. In Schaefer's model adaptation includes both social adjustment and social competence, and competence reflects both intelligence and task orientation. This view seems to be an excellent beginning point for clarifying the concept of social competence and its relation to other dimensions of human adaptability.

One need not await a final conceptual model to agree strongly with many of the contributors to this book that social competence reflects much more than an individual's ability as measured by IQ tests. In this regard, the book highlights such basic facts as the failure of the IQ to predict outcome in mental retardation and the striking variability in social adequacy displayed by individuals of the same IQ. Much work, including that of the reviewer, has made it abundantly clear that independent of formal cognitive or intellectual factors there are a variety of social, emotional, and motivational factors that are important in determining the ultimate level of performance by retarded persons. This book stands as a corrective to the common assumption that the lessened intellectual capacity of the retarded swamps all the variables that are known to influence behavior in nonretarded individuals. The emphasis on nonintellective factors in the adjustment of the retarded represents much more than a conceptual commitment, since a respect for these factors has immediate consequences in such practical matters as the early education and vocational training of the retarded.

Another factor of importance with respect to the retarded individual that is appropriately emphasized in this book is age. Much research and effort are expended on retarded children, and relatively little attention is given to retarded adolescents and adults. Many discussions in the book deal with the appropriate age for intervention efforts. It is unfortunate that a report by Levenstein of one of the truly outstanding programs of early intervention may perpetuate the idea that the years two through four are crucial for intervention. We have workers who have asserted that the individual is most responsive to such efforts in the prenatal period, in adolescence, and in every broad and narrow age range in between. Instead of searching for some magic period, we should recognize the continuity of human life and seek interventions appropriate for each developmental stage beginning with the prenatal and extending over the total life span. Workers should remain optimistic and should not give up their efforts because a retarded individual is beyond some supposed "critical period." The chapter by Halpern, Browning, and Brummer, which documents the success of training procedures used to teach the severely retarded vocational tasks once thought far beyond their capacities, shows that such optimism is appropriate.

A major portion of this book is devoted to issues pertaining to the treatment of the retarded, including mainstreaming, deinstitutionalization, normalization, foster family care, and vocational training. The message in the book is that currently such concepts are

little more than banners often waved. Certainly much more work must be done before we can assess the relative merits of special education and mainstreaming. Similarly, while most experienced workers agree that the general level of care in many large state institutions for the retarded is very bad, there are simply too many unanswered questions to warrant an unequivocal stance in favor of deinstitutionalization. While there is some evidence that the new caretaking settings for retarded are more humane than the large state schools we would like to depopulate, what evidence is there that the development of the retarded is superior in these new settings? What exactly are the cost implications of a deinstitutionalization policy? As can be inferred from Edgerton's chapter, the greatest danger in such a policy is the potential it holds for making the lives of the 200,000 retarded individuals now in the large institutions even worse in the future than they are today.

The concept of advocacy for the mentally retarded appears in various forms throughout the book. Although several government agencies have attempted to incorporate such an activity into ongoing programs, the concept badly needs some operational definition, for it has been exceedingly difficult to translate into action. In the meantime, the reviewer will continue to regard the activities of Elizabeth Boggs, America's premier advocate for the retarded, as providing a model on which such a definition could be based. The case studies presented in her chapter in this book will be invaluable reading for those researchers and service delivery people who are continually perplexed by the myriad decisions made in that land of Oz called Washington.

Given the rich discussion of so many major issues pertaining to mental retardation, this book could have benefited greatly from a synthesizing chapter. The final chapter, by Etzioni and Richardson, simply does not deliver what it promises. My suggestion is that the fine introductory chapter by Begab be read last. Begab touches on just about every issue to be found in this book, and his chapter can be used as the organizing rubric for the important themes appearing throughout the book. Setting aside carping concerns, I can report that a close reading of this book made me feel much more knowledgeable about the past, present, and future of the mental retardation field. More I cannot ask.

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Neuroendocrine Systems

Subcellular Mechanisms in Reproductive Neuroendocrinology. Papers from a symposium, Jamaica Plain, Mass., Oct. 1975. F. NAFTOLIN, K. J. RYAN, and I. J. DAVIES, Eds. Elsevier, New York, 1976. xii, 530 pp., illus. $59.75.

Even to one peripherally interested in the mechanisms of neuroendocrine control of reproduction, this field clearly is not one in which neatly solved problems abound. In fact, it appears to be a bewildering array of very basic unanswered questions: What cell types are responsible for the synthesis of hypophysiotropic hormones? What is their synthetic machinery? What are their afferent connections? What other types of input do they have in terms of control of hormone synthesis and release? If the questions that are basic to the understanding of subcellular mechanisms in neuronal and endocrine systems in general are added to this list, such as those concerning the importance of cyclic nucleotides, prostaglandins, and metal ions, the confusion is compounded still further. This fine collection of reviews helps to bring forth what order there is in the chaos.

Relationships between steroid hormones and neuroendocrine tissues are treated in a particularly thorough manner. The group of chapters on endogenous steroid levels in neuroendocrine tissues, specific steroid binding, and subcellular distribution of receptors provides the physicochemical and architectural framework for the establishment of functional correlates. Taken as a group, the several chapters on steroid metabolism in neuroendocrine tissues constitute a thorough review of the concept of circulating steroid hormones as prohormones to be converted to specific functional forms by biotransformation in the target tissues.

Elucidation of the mechanisms that control the biosynthesis and release of hypothalamic hypophysiotropic hormones has been painfully slow. It is becoming increasingly clear that there are two major obstacles to investigations of these mechanisms. First, the peptides are present in quantities that are minute even by today's standards of microanalysis, and their presence in a milieu that contains a large number of amino acids and peptides makes their isolation difficult. Second, active systems for biodegradation of the peptides appear to be ubiquitous in neuronal tissues. In successive chapters, Seymour Reichlin makes a strong case for the use of exhaustive purification procedures and control of peptide degradation when studying the biosynthesis of the hormones and Neville Marks provides a biochemical definition of the various peptide hormone degradation processes.

Also included in the volume are several seldom-reviewed topics with broad implications. For example, a chapter by Alan Poisner on the role of calcium in neuroendocrine systems brings into focus the importance of this metal not only for its role in hormone release, but also for its involvement in intracellular transport and storage mechanisms.

If any fault can be found with the volume, it is simply that the title is unnecessarily restrictive. Neuroendocrine systems have been treated quite broadly in the volume, and a wealth of information on systems not normally considered to be directly involved in reproduction is included.

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