tors in determining behavior has become apparent. As a result, researchers in personality face a crisis. This book addresses the crisis and is aimed toward resolving it by studying the interaction between personal and situational factors. Most of the 29 chapters were written by psychologists who are sympathetic to the traditional viewpoint. A variety of defenses and remedies are proposed.

Magnusson and Endler's introductory section makes some fine conceptual points; however, it is unnecessarily so full of jargon and so abstract that it would make little sense to anyone not already totally familiar with the issue.

The authors of the seven chapters in part 2 tend to deny that any crisis exists, either by retaining a belief in behavioral consistency or by down-playing the importance of the problem. Block, for example, concedes that overt behaviors have not been demonstrated to be consistent but blames this failure on inadequate research, not faulty theory. He points out that there is evidence of agreement over time in self-reports of personality, agreement between observers' ratings, and agreement between self and observer ratings.

Part 3 contains eight chapters which present some of the best traditional type of research on the person-situation interaction. The chapters by Fiedler and by Berkowitz, for example, each focus on one type of behavior (leadership and aggression) and investigate how personal and situational factors combine to determine behavior.

Part 4 presents three different methodological critiques. Nisbett's comments are particularly interesting. He points out some pitfalls of the traditional interactionist approach and warns against a wholesale switch in that direction. This is undoubtedly not a popular position to take at a symposium on interactional psychology. The chapter definitely merits reading.

The final section contains ten chapters which provide new strategies for investigating the person-situation interaction. Raush recommends an analysis of ongoing interpersonal interactions. This approach, which recognizes the dynamic relation between persons and situations (including other persons), is suggested in some form by a number of contributors. Mischel, a major instigator of the current crisis, provides a fine statement of his position. He also points out that interactions have been demonstrated repeatedly but have not been explained and suggests clarifying how situations influence behavior by investigating cognitive variables such as competencies, expectancies, and self-regulatory systems.

This book is not intended for the lay reader. The chapters vary considerably, but all assume some sophistication in psychology. This is a very valuable collection. The controversy itself is an important one and has served as a vehicle for discussing many important aspects of personality research and theory.

ANDREA ALLEN
Department of Psychology, University of Virginia, Charlottesville 22901

Developmental Interactions

Cell and Tissue Interactions. Papers from a meeting, Woods Hole, Mass., Sept. 1976. JAMES W. LASH and MAX M. BURGER, Eds. Raven, New York, 1977. xiv, 318 pp., illus. $23.50. Society of General Physiologists Series, vol. 32.

Understanding of the molecular events in cellular interactions that lead to new or altered patterns of gene expression will require fundamental knowledge of the makeup of the interaction interfaces between cells. These interfaces include not only the plasma membranes, with their component glycoproteins, but also extracellular macromolecules such as collagens and proteoglycans.

This collection of symposium papers offers a series of updated reviews of what is known about tissue interactions as they apply to the morphogenetic behavior and differentiation of selected developmental systems. The trick for a successful book of this kind is to provide an impact greater than the sum of the individual papers. It seems to me that the book has that potential, which can be realized by a reorganization of the papers into two integrated groups. The first such group are the papers on interaction-dependent adhesion and migration. Abercrombie *et al.* provide an updated view of the roles of intracellular organelles and cellular adhesivity in controlling the shape and locomotion of fibroblasts in vitro and emphasize the importance of the environment in regulating translocomotory activity. Seen in this light, the correlations between in vivo locomotion and the hyaluronate and proteoglycan constitution of extracellular matrices, discussed by Toole *et al.*, take on added significance. Similarly, since cell-cell recognition must occur during cell migration in the embryo, the papers on cell surface adhesion offer insight into that process, assessing the components, properties, and theoretical nature of the events in several model systems, including sponge reaggregation (Burger and Jumblatt) and neural retina reaggregation (Moscona and Hausman, Lilien and Rutz). In addition, Glaser *et al.* review their work on factors involved in neural retina–optic-tectum adhesion, an interaction that, in vivo, follows the migratory phase of axonal growth. Finally, the possibility that cell surface glycosyltransferases function in these recognition interactions is supported by the demonstration by Roth *et al.* of a correlation between such enzymatic activity and migratory cell types in the embryo. These papers culminate with the studies of Le Douarin, which suggest few, if any, innate migratory preferences in neural crest cells. Rather, the environment appears to dictate the migratory routes. However, acquisition of a final differentiated phenotype appears not to require migration but to be a function of the final environment in which the cell finds itself.

This conclusion leads to what could be seen as the second integrated section of the book, one dealing with tissue interactions and extracellular materials in the differentiative activities of defined or "localized" tissue or organ primordia. This group includes the general discussion by Saxén of such "classical" systems as kidney and integument and his introduction of the view that both permissive and directive influences are involved in embryonic determination. Papers on tooth development (Slavkin *et al.*), cartilage development in somites (Lash and Vasan) and limb (Toole *et al.*), and corneal development (Hay) provide evidence that tissue interactions lead to alterations in the composition of the extracellular matrix and that the extracellular matrix can alter the synthetic and secretory activity of the cells in developmentally significant ways. These conclusions are underscored by the reviews of Miller and Muir on the collagens and proteoglycans of extracellular matrices, precisely the molecules that are present and involved in developmental tissue interactions. Thus, cells respond to their environment and contribute to it and respond again as the environment alters. The interaction interface mediates the interaction.

These two themes are not all the book offers. The review of calcium ion and cyclic nucleotide involvement in cell surface regulatory events (Rasmussen) draws attention to the ionic composition of the environment as potentially instrumental in tissue interactions. The relations between these small molecules and the macromolecules of the extracellular matrix remain to be determined. Auerbach reports on the inductive capabilities

of teratoma cells that suggest that such cells might be useful models for analyzing tissue interactions, Nicholson *et al.* discuss adhesive interactions in tumor development, and De Petrocellis *et al.* report on the control of DNA replication via cell interactions in early development in sea urchins. The normal (Frank and Fischbach) and abnormal (Macagno) development of a functionally significant adhesive interaction, the synapse, is also discussed.

The book provides a valuable collection of papers that offer insight into the development of a number of systems. I recommend it for both students and investigators with interests in developmental biology.

BRIAN S. SPOONER
Medical Research Council Laboratory of Molecular Biology, Cambridge CB2 2QH, England

Plant Hormones

Hormone Action in the Whole Life of Plants. KENNETH V. THIMANN. University of Massachusetts Press, Amherst, 1977. xii, 448 pp., illus. $35.

The scientific career of Kenneth Thimann has coincided almost exactly with the vigorous development of the study of plant hormones, and, indeed, he and his students have contributed substantially to many aspects of that development. Like Dean Acheson at the United Nations, Thimann was "present at the creation"; as a young biochemist, he came into early and close contact with Frits Went, whose 1928 Ph.D. thesis conclusively established the existence in plants of the diffusible growth hormone, auxin. With Went, he wrote, in the late 1930's, a definitive monograph on the history, methodology, and state of our understanding of the physiology and biochemistry of plant hormones. First at Caltech, later at Harvard, now at Santa Cruz, he has continued his incisive exploration of auxin and other regulators of plant growth and development. In 1974, he accepted the invitation of the University of Massachusetts to collect many of his ideas, insights, and interpretations into a series of lectures surveying anew this entire enlarged field. This book, which is based on the lectures, is a valuable and highly personal narrative, in which historical, anecdotal, and experimental information are skillfully blended with literary grace and skill.

Reading the book will give the advanced student and professional worker an appreciation not only of our present understanding of hormonal regulation in the higher plant, but also of stages in the evolution of our ideas. Thimann follows the plant from birth to death, starting with seed germination and proceeding chronologically through all developmental stages to maturity and the production of new seed. In the course of this intellectual journey, he gives detailed treatment to hormonal aspects of seed germination, cell enlargement, polarity, tropisms, differentiation, organogenesis, leaf and root growth, apical dominance, flowering, fruiting, senescence, and abscission. In addition, special chapters deal with the chemistry of plant hormones and concepts of their mode of action.

Thimann admits that "truly encyclopedic coverage was the last thing at which the lectures aimed"; accordingly he uses data from his own laboratory or the laboratories of his students wherever possible. He explains that "in many cases the data obtained by others could have about equally well been used, but our own materials were at hand." The result is that one does not expect or get a balanced coverage of the literature from the book; Thimann refers the reader instead to his extensively documented chapters in volume 6B of the treatise *Plant Physiology*, edited by F. C. Steward.

Into each personal synthesis, some error of fact, emphasis, or interpretation must inevitably creep, and this book is no exception. To take some trivial examples, Sievers, whose work on statoliths in *Chara* is discussed by Thimann, is not from Halle, East Germany, but rather from Bonn, West Germany; Kerns, not Carns, worked with Clark on auxin-induced flowering in pineapple; and my 1949 work on riboflavin-sensitized photoreactions was done not at Yale but at Caltech. Dealing with matters of scientific fact, Thimann states flatly on p. 33, as he has done elsewhere on the basis of experiments in his laboratory, that sucrose produces only very slight effects on the growth of excised etiolated pea epicotyl sections. But, as has been pointed out before, this ignores contrary work done elsewhere; Purves has clearly shown marked effects of sucrose on truly dark-grown pea tissue, and this has been independently confirmed elsewhere. Further, Bertsch and Hillman have shown that red light perceived by phytochrome specifically inhibits this extra growth induced by sucrose. Since the last finding might well explain the difference between Thimann's findings and those of others, one might have expected less dogmatic treatment of the issue. In view of what we now know about auxin-mediated proton extrusion, sucrose-proton cotransport into plant cells, and the effects of phytochrome on the latter process, this matter is not trivial. Similarly, not all will agree with Thimann's interpretation of his experiments on the role of starch statoliths in the geotropism of gibberellin-treated *Avena* coleoptiles and of the significance of "crystal bodies" in *Avena* and *Phycomyces* or with his treatment of the thorny issue of carotenoid as opposed to riboflavin as a photoreceptor in phototropism. Regarding the last issue, it would have been helpful to disentangle the question of the nature of the photoreceptor from the question of subsequent physiology; specifically, the possible role of riboflavin as a photoreceptor in phototropism is made neither less nor more probable by the fact that lateral auxin transport, rather than auxin photooxidation, occurs following light absorption, since either pigment could produce either effect. It would also have been helpful to cite at least one literature reference providing data on flavin photoreception.

No book produced in the last ten years has so successfully integrated the vast and complex literature of this field. The author and the University of Massachusetts deserve congratulations for the excellence of the product of their collaboration.

ARTHUR W. GALSTON
Department of Biology, Yale University, New Haven, Connecticut 06520

Books Received

Aerial Remote Sensing Techniques in Archeology. Papers from a symposium, Bal Harbour, Fla., May 1972. Thomas R. Lyons and Robert K. Hitchcock, Eds. Chaco Center (National Park Service and University of New Mexico), Albuquerque, 1977 (available from the Superintendent of Documents, Washington, D.C.). xiv, 202 pp., illus. Paper.

Annual Review of Astronomy and Astrophysics. Vol. 15. Geoffrey Burbidge, David Layzer, and John G. Phillips, Eds. Annual Reviews, Palo Alto, Calif., 1977. xii, 602 pp., illus. $17.

The Anthropological Imagination. Muriel Dimen-Schein. McGraw-Hill, New York, 1977. xviii, 294 pp. Cloth, $7.95; paper, $4.95.

Antibodies in Human Diagnosis and Therapy. Papers from a symposium. Edgar Haber and Richard M. Krause, Eds. Raven, New York, 1977. xviii, 414 pp., illus. $27.50.

The Application of Technology in Developing Countries. Papers from a seminar series, Aug.–Dec. 1976. Robert L. Bulfin, Jr., and J. Richard Greenwell, Eds. University of Ari-

(Continued on page 914)