Book Reviews

Immunological Phenomena

Cold Spring Harbor Symposia on Quantitative Biology. Vol. 41, Origins of Lymphocyte Diversity. Papers from a symposium, Cold Spring Harbor, N.Y. Cold Spring Harbor Laboratory, Cold Spring Harbor, N.Y., 1977. In two parts. xxxviii, 902 pp., illus. + indexes. $60.

Anyone interested in immunology will want to read this major collection of papers, which marks the state of immunological understanding in 1976. The whole package is bound by an introduction by N. K. Jerne and a summary by G. M. Edelman, each of whom offers the reader a characteristic brand of history, philosophy, and futurology.

"Lymphocytes are a diverse group of cells," says the first line of the opening paper. By p. 902 the persistent reader will also be aware of the diversity of immunologists and of their views. Almost 20 years after Burnet's hypothesis concerning clonal selection, immunology is showing the characteristics of a mature discipline without having lost any of its youthful enthusiasm. This volume describes at least as many new phenomena as were described in the 1967 volume, but the confidence with which the phenomena are explained has grown. One might even speak of overconfidence, since there is an air that almost any explanation is possible for novel findings.

The volume largely reflects the extensive growth of cellular immunology. From the novelty of the division of lymphocytes into two classes, T and B cells, immunologists have progressed to the classification of many subsets of T and B cells. There has been a concomitant realization that many immunological phenomena can be understood as results of interaction between lymphocytes. Simple ideas of direct interaction by cell-cell contact or interaction mediated by an antibody molecule appear to have been drowned in a sea of factors. The diversity of factors is most strikingly illustrated by the table in which J. Klein compares the properties of the B cell activation factors reported to date.

In striking contrast, the wealth of detailed information about antibody molecules clearly points to the only sure way forward for immunology. A firm foundation for the subject must rely on detailed molecular studies. Even the advanced studies of antibody molecules are by no means complete, however, and for many other immunologically important molecules this volume documents merely the first steps in their detailed study. Perhaps the discovery of the structures of the products of the major histocompatibility locus will, in the next few years, yield as much insight into immunological phenomena as has information on the structure of antibodies. There is certainly no shortage of questions to answer. One of the most intriguing concerns the linked recognition of the products of the major histocompatibility complex and other surface antigens in killing that is mediated by cytotoxic T cells. Despite various plausible explanations, one is left wondering whether some vital new piece of information is needed before an obvious solution will emerge.

The extent to which antibody diversity is generated on an evolutionary time scale and the extent to which it is generated on a somatic time scale is not yet clear, but in this volume proponents of the two sides of the argument express their views stridently. "Network" emerges as the fashionable word for the discussion of antibody or lymphocyte diversity. The idea that antibodies form a closed self-regulatory system of idiotype–anti-idiotype interactions is intriguing and experimentally productive. Whether networks will provide the ultimate description of immune phenomena or merely prove to be a laboratory curiosity may be clear by the time of the next Cold Spring Harbor Symposium.

The last section of the volume relates some of the exciting advances in the molecular genetics of the antibody system, including reports of direct studies, at the nucleic acid level, of the number and arrangement of antibody genes. It is fitting that these studies, which mark the beginning of a more satisfying understanding of the immune system, conclude a volume that, overall, describes a few more steps toward such an understanding.

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Brain Biochemistry

Cyclic Nucleotides in the Nervous System. JOHN DALY. Plenum, New York, 1977. xiv, 402 pp., illus. $32.50.

Cyclic AMP (adenosine 3′,5′ cyclic monophosphate) has provided a unifying mechanism for the study of the actions of a variety of hormones. This single molecule initiates the tissue-specific response to hormones of many different types of cells. Sutherland, Rall, and co-workers have shown that the mammalian brain contains large quantities of cyclic AMP as well as the enzymes catalyzing both the hormone-sensitive synthesis and the degradation of cyclic nucleotides, and Rall and his co-workers have identified compounds that cause accumulations of cyclic nucleotides in preparations of intact brain tissue. Although these experimental approaches continue to be used, the complexity of the nervous system has hindered efforts to elucidate the functional role played by cyclic nucleotides therein. In peripheral tissues, cyclic nucleotides are usually implicated in only one or two well-characterized tissue-specific responses to hormones. Brain, however, is a tissue of diverse physiology and biochemistry, and it is thus not surprising that cyclic nucleotides have been implicated, with varying degrees of certainty, in a number of biochemical or physiological aspects of brain function.

John Daly has provided an extensive overview of the physiology, biochemistry, and pharmacology of cyclic nucleotides in the nervous system. The monograph has three main parts. First, the enzymology of the cyclic nucleotides and cyclic-nucleotide-dependent protein phosphorylation are discussed. This section is concise, and it introduces all the concepts that have attracted experimental interest in the past 15 years. The second section is concerned with the numerous factors that cause the accumulation of cyclic nucleotides in preparations of intact neural tissue. This is the aspect of cyclic nucleotide metabolism that Daly and his co-workers have studied. Since considerable interspecies variability exists, the discussion is organized on the basis of species, brain region, and finally test compounds. A considerable quantity of data are presented in this section, but few general principles emerge; rather, the differences between species and brain regions are highlighted. Nonetheless, a compilation of this information in a single, indexed volume is useful. The third section describes the numerous physiological phenomena in which a reg-

ulatory role for cyclic nucleotides has been demonstrated. Like the two preceding sections, this one is encyclopedic in scope. The coverage ranges from the sophisticated studies of tyrosine hydroxylase kinetics to the less precise studies of postdecapitation rise in cyclic AMP.

The monograph is by far the most extensive and complete summary of this topic currently available, and it will be of use to anyone interested in cyclic nucleotides in the central nervous system. The nonspecialist, however, may be overwhelmed by single sentences that are almost one page long and contain more than 100 citations (for example, pp. 55 and 56). Although its form and content will preclude extensive reading at any one time, the book remains an extremely useful reference tool, providing a guide to the "state of the art" for cyclic nucleotides in the nervous system.

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Hypnosis Research

Methodologies of Hypnosis. A Critical Appraisal of Contemporary Paradigms of Hypnosis. PETER W. SHEEHAN and CAMPBELL W. PERRY. Erlbaum, Hillsdale, N.J., 1976 (distributor, Halsted [Wiley], New York). xvi, 330 pp. $18.

The goal of this book is to evaluate different approaches to the study of hypnosis, a psychological phenomenon that has been difficult to define operationally and behaviorally. The central methodological problem in hypnosis research is to separate responses due to hypnosis from those due to "artifact"—systematic error that occurs because experimental subjects are influenced by expectations and subtle cues emanating from both the experimental procedure and the experimenter. Artifact is not limited to hypnosis research, and because of the generality of the methodological problems this excellent discussion can be read profitably by all scientists who conduct research in which subjective experience and verbal report provide much of the data base.

Controversy has always surrounded hypnosis, focused mainly on the issue of whether hypnosis is best conceived of as an altered state of awareness, an enduring trait or capacity of a person, a product of the situation in which the person finds himself or herself, or a spurious phenomenon. Attempts to understand hypnosis have sometimes reflected, sometimes anticipated developments in behavioral research in general.

Theories of hypnosis are traced in a provocative review covering a two-hundred-year span and providing some fascinating and previously unpublished insights into the historical antecedents of the main methodological paradigms of hypnosis. The authors then examine six paradigms of hypnosis developed by seven outstanding behavioral scientists. Each paradigm is evaluated with regard to the explicit or implicit theory of hypnosis underlying it, the methodological innovations associated with it, the evidence supporting it, and some problems associated with it vis à vis the other positions discussed. Special emphasis is placed on the issue of the validity of the inferences associated with the paradigms and the success with which they take experimental artifacts into account. Careful recognition is given both to subtle conceptual changes in the positions adopted by the investigators over the years and to the extent to which their findings can be handled by other paradigms. This approach reveals the subtleties of the issues and provides insight into the alternative ways of conceptualizing common issues, but it has the disadvantage of emphasizing disagreement rather than agreement.

Hilgard's contemporary functionalism, which stresses the role of individual differences, is presented first. To some extent Hilgard's position is done an injustice by being the first one discussed, for several digressions are necessary to discuss methodological issues that have implications for all the paradigms.

Barber's orientation is thoroughly behaviorist and operational. He has searched for the functional relations that exist between specifiable antecedent factors (for example, the wording and tone of suggestions) and the responses they bring about. The problems with Barber's unselected independent-group design and the control procedures involving task motivation instructions are thoroughly treated. Unlike other investigators, Barber views the term "hypnosis" as expendable, often placing it in quotation marks. The authors argue that the inferences Barber draws from his data are necessarily limited.

Sarbin has developed the only comprehensive theory of hypnosis, but, as the authors point out, his theory of hypnosis as role-enactment has generated little empirical work other than a few limited correlational studies. Unfortunately, the authors do not point out that this theory cannot be disconfirmed, as all behavior can be explained by the subject's definition of the role or skill in enacting it.

In attempting to distinguish between artifact and hypnotic response, Orne has devised quasi-control experimental designs. Only his real-simulating design is discussed extensively by the authors. In experiments using this design, subjects who are unresponsive to hypnosis are instructed to pretend to be hypnotized by the experimenter, who is not told which of the subjects are hypnotizable and which are faking. By being "blind," the experimenter is prevented from treating hypnotized (real) and quasi-control (simulating) subjects differently. The authors point out that this design has been widely misunderstood. It tests only the validity of operational definitions in the experiment. Differences in behavior between hypnotized and simulating subjects show only that cues in the situation (what Orne calls demand characteristics) are not sufficient to account for the behavior of hypnotized individuals.

Sutcliffe distinguishes "credulous" and "skeptical" approaches to evaluating hypnosis research. He views imagery and delusion as important components of the phenomenon. His methodology is derived from traditional multivariate design, and he advocates a systematic approach that has features similar to those of Barber's univariate system. Sutcliffe's main contribution was to plead for appropriate methodological control when interest in hypnosis was being rekindled in the early 1960's. He has not done research on hypnosis for over a decade, although the research of two of his students (the authors of this book) has extended beyond his paradigm.

The paradigm of London and Fuhrer attempts to evaluate the motivational artifacts of the hypnotic setting by comparing susceptible and insusceptible subjects. The authors point out that this paradigm has not yet been fully explored.

By way of integration the six paradigms are compared in detail. The authors cogently argue the need for investigations involving convergent validation. Their plea for research that uses multiple paradigms for delimiting validity, thereby cross-checking alternative explanations to establish the correctness of inferences, is laudable, but the implication that multiparadigmatic approaches have been ignored in the study of hypnosis must be questioned. The authors' person-oriented rather than problem-oriented approach to hypnosis research leads, paradoxically, to a limited account of