

physically organised pathway, when recent research is revealing the existence of multi-enzyme complexes containing many or most enzyme activities associated with specific biochemical pathways.

Generally, however, the book is highly recommendable to any undergraduate (or graduate) biology student who has received a basic biochemistry course. It can only serve to increase the student's interest in the mechanisms of biological regulation.

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## Immune Responsiveness

*Genetic Control of Immune Responsiveness: Relationship to Disease Susceptibility.* Edited by Hugh O. McDevitt and Maurice Landy. (Proceedings of an International Conference held at Brook Lodge, Augusta, Michigan, May 8–10, 1972.) Pp. xviii+469. (Academic: New York and London, April 1973.) \$19.50.

THIS handy book presents the well planned, three-day discussion on the genetic control of immune responsiveness which took place at Brook Lodge in May 1972. It is well designed, and excellently edited by H. O. McDevitt and M. Landy. The book does more than document the symposium; it gives a systematic and comprehensive survey of the genetics of immune responses, different aspects of which are treated precisely by scientists, eminently competent in their respective fields, whose names are often synonyms for their work. The discussions themselves do not simply paraphrase the material presented, but elaborate new views. The book avoids the common tedium of conference reports, and can serve as a text and reference book, both of which are lacking in this area. In this context, however, references to original papers would be desirable.

The six chapters (followed by an extensive commentary by M. Cohn) deal with histocompatibility-linked Ir genes, the H-2 region, Ir genes linked to allotypes, T and B cell receptors, control of disease susceptibility and HL-A type and disease. This classification is practical and also delineates principal aspects of genetic control of immune responsiveness as we see them today.

Immune response (Ir) genes are distinguished genetically and functionally as histocompatibility and as immunoglobulin-heavy chain allotype-linked genes. Several models of genetic control cannot, however, yet be classified (Sela, Biozzi). The histocompatibility-linked Ir genes are interpreted as dealing with the specific recognition of antigens by T cells or even determining the T cell receptor itself (Benacerraf, McDevitt). This concept, of course, leads to an extensive discussion of the nature of the

T cell receptor: immunoglobulin *pro* and *con* (Unanue, Uhr, Warner). The question remained open.

The major histocompatibility systems of mouse (H-2) and man (HL-A) are introduced by Shreffler and Ceppellini, respectively. As illustrated by F. Bach and van Rood, serologically defined H antigens are distinct from other functions of these gene regions; that is, MLC (mixed lymphocyte culture) stimulation, graft rejection, genetic control of immune response. Some examples of allotype linked control presumably reflect presence or absence of the respective structural genes (*v* genes) for receptors on B lymphocytes (Cohn, Nisonoff). But other types might represent still unknown mechanisms (for example, monoclonal antibodies, Krause).

The concept of Ir genes has important theoretical and medical implications. It might be the key to a new analytical approach to studying susceptibility to infectious, autoimmune and neoplastic diseases, at least as far as immune reactions are involved. Lilly gives an example of how multigenic control already can be analysed (Friend virus disease). It is further shown that genetically controlled immune responses can either prevent or cause virus disease (Oldstone). In man, only studies on the population level of associations between HL-A system and disease are reported (Bodmer). Family studies, such as Levine's on pollen allergy, are not yet included in this book.

Bodmer presents a stimulating genetic model for major histocompatibility systems: that is, large clusters of related genes, which presumably arose by evolutionary gene duplications and which control functions such as graft rejection, MLC stimulation, disease susceptibility, antigen recognition and serologically detectable H antigens. Associations at the population level then reflect linkage disequilibria between closely linked genes.

M. Cohn systematically summarises the theoretical implications of genetic control of immune responsiveness and their bearing on generation of diversity and self-tolerance in terms of his theory of associative recognition. This is literally a purgatorium of all facts and ideas presented before. Cohn makes explicit (and the book implicit) that facts must be separated from contaminating tacit assumptions and also that they become meaningful only within a conceptual framework, which prevents them from becoming misleading.

The reader, overwhelmed by data and interpretations, may be consoled by a sentence (easily generalised) from F. Bach: "Who isn't confused about MLC isn't thinking clearly" (he might even become proud of it).

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## Electrochemistry

*Electrochemical Systems.* By John S. Newman. Pp. xiv+432. (Prentice-Hall: Englewood Cliffs, New Jersey, January 1973.) \$18.95.

READING this book emphasises the range of the study of electrochemistry and the possibility of creating interest by the nature of the attitude adopted to create coherence in the subject.

The approach is predominantly that of the chemical engineer; illuminating at times but rather insensitive in those areas where the chemistry of the materials could be involved as a major interest, and with an indifference to techniques of experimentation. The result is an interesting and in some ways quite a valuable book; a good companion to more conventional texts and certainly, and of course deliberately, more comprehensive in coverage than is customary. Thermodynamics, electrode kinetics, electrokinetics, ionic transport processes, current distribution and mass transfer are treated.

The author is happiest in his exposition of phenomena which may be described and satisfactorily handled by a formal treatment; essentially areas, as defined by the author on page 1 of the book, where electrochemistry may be regarded as macroscopic science in the absence of a need for correlation with microscopic or molecular concepts. This is strongly to be contrasted with the approach to electrochemistry as followed by some more chemically oriented authors, in which the interest is essentially atomistic and preoccupied by adsorption and electron transfer; these are difficult electrochemical problems, germane to a full understanding of the interfacial processes but, no matter how complex the treatment, not yet yielding to a theoretical approach.

Many practising electrochemists will read the contents of this book relating to the handling of the macroscopic aspects of the subject with interest and benefit; the chemical engineer, diverting his thoughts to electrochemistry, in particular should become happier in certain aspects of the application of his professional skills. It would be kind, however, to omit comment on the chapter on electrode kinetics, a section most necessary to such a continued education.

A feature of the book and one according to the American pattern is the rather extensive lists of examples at the end of each major section. I regard them with mixed feelings. It is a respected pedagogic procedure to provide students with such exercises but the value is purely much diminished in the omission of answers and even some guidance to the solution of some of the questions. Some, too, refer to unrealistic experimental situations which,