form of which most immunologists would like to settle for. Session two includes the hypothetical nonsecretable IgX that, if it exists, would bring recognition for cellular immunity in line with that for humoral responses; cell co-operation in thymus dependent populations and the role of non-thymus dependent lymphocytes and of macrophages are discussed. Session three has all the data on transfer factor that is below 10,000 molecular weight but seems to transfer specific cellular responsiveness between individuals. Is it some kind of immunogen or do we not yet have a pigeonhole to file a molecule like that? It can now be compared with the "factors" discussed in sessions four and five that are released from stimulated cells *in vitro*. There may be seven (migration inhibitory, lymphotoxic, skin-reactive, chemotactic, mitogenic, plus interferon and antibody), but we may hope that apparent differences may reflect the different test systems used and there may be fewer. Finally, session six considers the difficulty of having a foolproof surveillance system that would distinguish between an unwanted tumour cell and a self + X entity leading to self damage arising from delayed hypersensitivity.

The overall result is a sorting out of what evidence is conflicting, what are crucial points to establish, what alternative interpretations might be put on results that conflict with the most plausible hypotheses, and what weak points can be discerned in the defences where best to apply renewed experimental pressure.

D. A. L. DAVIES

ACTION OF ANALOGUES

Analogues of Nucleic Acid Components

Mechanisms of Action. By P. Roy-Burman. (Recent Results in Cancer Research, Vol. 25.) Pp. xi+111. (Springer-Verlag: Berlin and New York, 1970.) 28 DM; \$7.70.

DURING the past twenty years large numbers of analogues of purine and pyrimidine derivatives have been synthesized as compounds of potential therapeutic value and there has been a large volume of research effort devoted to elucidating the biological activity, metabolism and molecular modes of action of these substances. The results of these researches are scattered widely throughout the literature and this monograph is of value in that a large amount of information has been assembled and condensed by the author into a single slim volume.

The book includes brief, but well illustrated, summaries of the biosynthesis and degradation of purine and pyrimidine nucleotides. A representative selection of the more important purine and pyrimidine analogues is considered, and in each case the evidence relating to the metabolism of the compound, its effect upon enzyme systems and, where appropriate, the consequences of its incorporation into nucleic acids are reviewed briefly.

The author has managed to condense a great deal of information into a remarkably small amount of space. While the presentation is somewhat concentrated, it is fully documented and well supported with diagrams illustrating on the one hand the metabolism of the analogues and on the other the reactions with which they, or their metabolic derivatives, interfere. This compilation will be a useful source of information to many scientists in the field of cancer therapy and to those with more general interests in the area of nucleotide and nucleic acid biosynthesis and metabolism.

While the circulation of a highly specialized publication such as this will inevitably be small, it is unfortunate that it should have been so highly priced. At a more modest figure the book might have been attractive to many individual purchasers and would certainly have been much better value for money.

R. M. S. SMELLIE

ESSAYS ON BOTANY

Cellular Differentiation in Plants and other Essays

By C. W. Wardlaw. Pp. 160. (Manchester University Press: Manchester; Barnes and Noble: New York, March 1970.) 40s.

FOR fifty years Professor Wardlaw has been a keen student of plant morphology and morphogenesis. Readers of his previous books, such as *Phylogeny and Morphogenesis*, *Embryogenesis in Plants*, and more recently (1965) *Organization and Evolution in Plants*, will be familiar with his interests, as well as his predilection for the philosophical aspects of biologic organization. This new book is a collection of five essays, or "emeritus excogitations", in Wardlaw's phraseology, written in the past few years on subjects dear to his heart. In one of the essays Professor Wardlaw tells of the reception his *Organization and Evolution in Plants* received at the hands of the critics: "there was one sapient chap who indicated that I had explained very little and that all I had given my readers was words". I imagine that that same reviewer would have said something similar about this book. But yet, there are still challenging questions in plant morphogenesis that lie along "the dangerous, jungly pathways which I, in my still youthlike enthusiasm, feel impelled to tread", and we, the readers, should follow—at least a little way.

This book is not for the impatient reader after hard, clear facts; nor is it a propaedeutic book easily accessible for the interested beginner, as the dust-cover rubric states; rather, it is for one familiar, and preferably in empathy, with Wardlaw's earlier writings. The longest essay of the book, entitled "Aspects of Cellular Differentiation", is in two parts. The first gives us a historical perspective of the subject, reminding us that the current view relating a cell and its milieu to the developmental pathway it will take, was anticipated by the botanists of old (Grew, Vöchting, Driesch). The second part considers modern aspects of differentiation. Here Wardlaw relies largely on Bonner's book *The Molecular Biology of Development* for his attempt to see how far molecular biology can be profitably used to interpret morphogenesis and epigenesis.

If cell differentiation is "one of the most important, beguiling, provoking and difficult themes in botany" then what of epigenesis, the topic of the fourth essay? It is "just plain enigmatic". Enigmas arise out of ignorance: we need to think more deeply, more clearly, or in new directions if they are to be dispelled. But in which direction? For instance, if we seek the aid of the molecular biologist should he be concerned with the chemistry of atoms and electrons or with macro and megamolecules? Wardlaw recognizes the challenge but does not give any guidance or new ideas. Some may think that he deliberately invokes obscurity by introducing into his thesis the intangible Aristotelian concept of entelechy, and by speaking of "the deep inwardness of cells during their growth and development . . . that makes our understanding of them more and more remote", as well as by injecting a touch of unorthodoxy by mentioning that cells may transcend their genetic potentialities in creating neo-formations.

Perhaps the most successful essay is the third, "Reconciliations among Apex Lovers". Wardlaw attempts to resolve rival points of view about the structure and function of shoot apical meristems that still prevail. His criteria for reconciliation are nothing more than the call for scientific objectivity and it seems an unfortunate reflection on those working in this field that their conflict of views attracts an essay of this kind.

Professor Wardlaw's style of writing is unique. It is difficult to decide whether it is unforced literariness, or whether he writes with Robin Goodfellow at his elbow. If the former, the product is eccentric and the effect is irritating; if the latter, then the following passage