

Jones is to be thanked for opening the eyes of a wider public to matters in which we may have been blissfully yet culpably ignorant.

THE REV'D DR T. AMBROSE
March, Cambridgeshire

MOLECULAR ASPECTS OF EARLY DEVELOPMENT. Edited by George M. Malacinski and William B. Klein. Plenum Press, New York and London. 1984. Pp. viii + 324. Price: \$(US) 47.50

The last ten years has seen a revolution in the technology available to study problems in genetics and developmental biology. Where we could only dream in 1974 we can act in 1984. This book, the outcome of a meeting held in December 1982 by the American Society of Zoologists, illustrates both the benefits of this revolution and, to paraphrase Mr Heath (speaking in different circumstances), its unacceptable side.

Quite properly (given its subject matter) this book includes three papers on *Drosophila*. In one Dr Judith Lengyel (and eight colleagues) describes the isolation and characterisation of genes expressed in the early embryo. After a long theoretical justification a laborious screen results in two cDNA clones, one of a sequence more abundant in the blastoderm than oocytes and one more abundant in oocytes than in the blastoderm. The former turns out to be a cDNA of a transcript of a repetitive sequence. The other is analysed in very considerable detail, using the armoury of modern molecular biology, including DNA sequencing and chromosome walking. Possible functions of this "maternal" transcript are considered. But how extraordinary that this clone's *in situ* mapping to 67B did not alert these molecular biologists—it is the well known heat shock protein gene *hsp 26*! (as inspection of the sequence shows, given a single "frame shift mutation" in the authors' translation).

By way of contrast is the previous chapter - Kaufman and Abbot's review of the genetic and developmental analysis of the Antennapedia complex. What richness this analysis has uncovered! As I write I have before me this week's *Nature* (July 5, 1984) with Scott's molecular study of *fushi tarazu*, a member of this complex. A region of this gene, coding for some 60 amino acids, shows strong homology with other homoeotic loci in *Drosophila*. Moreover, this "homoeobox" sequence is found in segmented animals from worms to man.

It is, perhaps, a bit unfair to pick on these two contributions. But they do illustrate, I hope, both the power and the weakness of the molecular approach to developmental problems.

They also illustrate the weakness of publishing symposia volumes. Too often they serve only to bolster the egos of their editors and as vehicles to publish the ephemeral and/or best forgotten. Too rarely do they include substantive reviews such as Kaufman and Abbot's.

DR MICHAEL ASHBURNER
Department of Genetics, University of Cambridge

ISOZYMES IN PLANT GENETICS AND BREEDING. S. D. Tanksley and T. J. Orton. Elsevier Science Publishers, 1983. Part A, 516 Pp. Part B, 472 Pp. Price: \$105 per part

Some twenty-five years have elapsed since the word isozyme entered the language of plant genetics and thus it is an appropriate time to review the

advances made in this field. It is within this context that the editors of these two volumes have set out to provide a compendium of works bringing together the accumulated knowledge, its practical applications, and perspectives for the future.

The developments which have taken place in isozyme research have had considerable impact on plant genetics and related biochemistry and developmental studies. These fundamental aspects have been comprehensively covered in Part A, the advances have been such, however, that it has been necessary to divide this volume into five sections. The first introductory section presents an historical overview together with future prospects of the utility of isozymes. As far as history is concerned this is a most thorough survey. For the future of plant genetics however, it would appear from the review of Kleinhofs that isozymes have no role to play in that they are not mentioned at all within his article! In contrast, in the chapter of Moore and Collins their utility is brought to bear on the exciting developments which now challenge those architects and mechanics of plant heredity, the plant breeders; or should they be known nowadays as genetic engineers?

The second and third sections of this first part, dealing with isozymes in basic plant genetic research, and in plant breeding respectively, could each form monographs in their own right, such is the coverage of topics within them. The role of isozymes in studying gene regulation, their location within the cell, and their evolution are all to be found here together with their application to the characterisation of genetic variability in plant populations. It is within this latter sphere that isozymes have made their greatest contribution to the advancement of plant genetics in the past twenty-five years. They have provided the plant population geneticist with a most powerful tool in the form of easily identifiable genetic markers allowing precise measurements of genetic variability, the detection of natural selection, and the estimation of mating systems to be made. These topics are dealt with in the chapters by Brown and Weir, Clegg and Ritland, each providing a most useful review of the various methods and their applications.

It is in their use as genetic markers that isozymes have so far made their mark on plant breeding. These several applications which range from the identification of parasexual hybrids, as an aid to the introgression of genetic material, whether it be of quantitative trait loci or specific disease resistant genes, or in the more efficient conduct of contemporary breeding methods are reviewed by acknowledged experts. Whilst each chapter is noteworthy, the contributions by Holt and Tuleen on the introduction of alien genetic material, as exemplified by their researches on wheat, and Tanksley, on the introgression of genes from wild species, as shown by the work of Rick and his colleagues on tomatoes, are two chapters which should be compulsory reading for all students of plant breeding in that they so neatly apply modern technology to classical problems.

Allied with the work of the plant breeder the proprietary use of isozymes is covered in a short section describing their role in ascertaining the genetic purity of seed stocks and also as a means of measuring distinctiveness for the granting of plant breeders' rights. For this specific topic it would appear that the law-makers fail to appreciate that variety discrimination in outbreeding species is a population genetic problem, which may be answered by the techniques so concisely presented in the chapter on measuring genetic variability.

The final section of this first part deals with equipment and procedures, including also a comprehensive set of staining recipes. It brings together many methods and should prove to be a useful source of information on the multiplicity of enzyme staining systems now available.

The second volume of this series (Part B) is a summary of the state of knowledge of isozymes of twenty-one crops. Needless to say the information on some, such as maize, where seventeen enzymes controlled by thirty-seven loci have been examined, is a lot more than for example sunflowers, where only two enzymes with three genes involved have been surveyed. The majority of chapters review the various enzyme systems that have been examined within that crop, presenting where known, the genetic basis of any isozyme variation and in some instances the chromosomal location and linkage relationships of the controlling genes. These reviews should provide a most useful database for any future research worker wishing to ascertain the state of knowledge on specific enzymes over a range of plants. Whilst a standard nomenclature is available it has not been insisted upon by the editors, perhaps because authors were required to present paper in a photo-reproducible form. Apart from this minor criticism, the editors and their authors have produced two most useful volumes which will serve to be the basic reference works for any future student of isozymes in plant genetic research and breeding.

M. D. HAYWARD

Welsh Plant Breeding Station, Aberystwyth

ADVANCES IN HUMAN GENETICS VOLUME 13. Edited by H. Harris and K. Hirschhorn. Plenum Press, New York and London. 1983. Pp. xix + 312. Price: \$(US) 42.50

In this 13th volume the two medically qualified editors have done the profession proud for of the five topics selected four are of considerable clinical and practical importance. Furthermore, although the contributors have obviously been instructed to go into their subjects in depth yet they have also, I surmise, been told to begin at the beginning so that readers can gradually be led into the complexities which inevitably accompany rapidly developing subjects. For example, in "The Genetics of Blood Coagulation" (Graham *et al.*, Chapter 1) the end result must be a plug to stop the bleeding, but the steps involved in this are numerous—constriction of blood vessels, aggregation of platelets to damaged surfaces and finally the formation of fibrin clots. These are all regulated by enzymes which function as a cascade, each releasing an active factor from an inert precursor and all are under genetic control. Therefore at each step there may be abnormalities, and most of these mutants and variants have been recognised from a study of patients, haemophilia being the classical example (deficiency of clotting Factor VIII). But lack of "contact factors" may also inhibit coagulation, for example a defect in Factor XI which produces a bleeding disease found particularly in Ashkenazi Jews. Factor XIII, the last in the line, is responsible for the stabilisation of fibrin and its efficiency (controlled by an autosomal recessive gene) may lead to a faulty clot with the result that bleeding occurs from the umbilical stump a week or so after birth.

Fibrinolysis involves the activation of plasminogen to plasmin and mutants affecting the former may lead to thrombotic tendencies after trauma.