levels of normal or mutant gene product. Some statements elsewhere show a horrifying lack of understanding of gene expression: 'It [CF] is transmitted in what appears to be an autosomal recessive mode of inheritance (ref). Because of the latter, it would be expected that the basic defect would express itself in all the cells of affected individuals.'

The molecular biological approaches to tracking down the CF gene are optimistically included in the 'basic defect' section. Most of this work is at a very preliminary stage. Bob Williamson's admittedly contagious enthusiasm for the molecular solution to genetic diseases is based on success stories where the gene defect was well characterized before the cloners were let loose on the problem, as in the thalassaemias. Linked probes perhaps capable of tracking *X*-linked Duchenne muscular dystrophy or autosomal dominant Huntington's chorea are not yet in regular use for prenatal diagnosis and in neither case has the mutant gene been pinpointed. The CF gene has not even been assigned to a chromosome, so looking for linkage by exclusion using chromosome-assigned DNA probes with restriction fragment length polymorphisms is an uphill job in a recessive disease with no reliable heterozygote detection. Partly because genetics was not the primary concern of this congress, there was no discussion of the problem of whether even closely linked (1–3 cM) probes would be reliable enough for prenatal diagnosis. The enormity of the task of walking 10^6 to 3×10^6 base pairs to find and identify the actual CF gene is so far in the future with this approach that it does not frighten the intrepid molecular biologist.

More than half the book consists of up to one-page poster abstracts. These vary from tantalizing through pedestrian to incomprehensible summaries of what we all know involves many man-years of painstaking labour in most cases. It is, however, impossible to assess data from these vignettes except occasionally by digging out quoted publications – not an easy task when references of the style 'Smith A. B. *et al.*, submitted' are allowed.

Precious library allocations should not go on conference reports of this type. The most zealous workers in the CF field may feel the need to widen their 'Horizons' by borrowing a copy from a colleague or at worst from inter-library loan.

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Genetics and Development. By JAMES H. SANG. Harlow: Longman. 398 pages. £13.95. ISBN 0 582 44681 3.

Many years ago, while I was studying the inheritance of quantitative characters in Drosophila, this organism seemed to me to present most unsuitable material for an attack on that fundamental biological problem, the genetic control of development: not only did Drosophila consist of a succession of two very different organisms, but the transformation from larva to imago took place rapidly inside a magic box, the pupal case, which allowed very limited experimental access to its contents. This opinion has happily turned out to be a very superficial one, largely because of the stubborn attitudes of far-sighted geneticists such as E. B. Lewis, who burrowed away at the impenetrable mysteries raised by homoeotic mutants such as bithorax and Antennapedia, or sought out mutations which might relate the segmental patterns of larva and imago. These studies have provided excellent material for the new techniques of molecular genetics, and have now placed Drosophila in the forefront of the attack on the genetic control of development.

Sang has written a textbook of developmental genetics for advanced undergraduate and post-graduate students of biology, but he has achieved much more than this by writing a critical survey of the subject which will be of great value to everyone interested in what is both the major outstanding general biological problem and also a research area of intense activity and rapid progress. The fact that something like two papers a day relevant to this field are being published makes his book all the more useful, since he

makes it easy for one to pick up any aspect of the subject as of two years ago, gives hints of what is to come, and enables one to go forward from there. I anticipate that this book will bring a number of new converts into this exciting field.

Drosophila certainly takes pride of place in the book – partly because of its current status for studies on development and partly because it is the author's main research interest. As an example of both progress and interest, we may take Sang's chapter 10 on the homoeotic mutations of Drosophila, which change the fate of organs developing from particular imaginal disks so that, for instance, the wing is replaced by a second haltere, or the haltere by a second wing, or arista by tarsus and so on, depending on the particular mutation involved. Continuing genetic analysis over the last 30 years has identified at least eight genes (or pseudo-alleles) in the bithorax gene complex, which appear to control development of the third thoracic through to the eighth abdominal segment. Deletion of the complete bithorax region of DNA causes all these segments to develop as thorax 2, and there is a remarkable relation between sequential gene activity and segment expression. Sang assembles the information on this system, including the recent discovery that most of the known mutations in the region are either inversions, deletions or insertions of transposable elements, or in one case a combination of deletion, inversion and transposition. Models to explain the behaviour of this system are evidently getting near to the truth but still run into difficulties over some gene interactions, as Sang makes clear. His chapter will certainly prove a valuable introduction for those who have been dazzled by the very recent talk of 'homoeo boxes' (*Nature*, 5–11 July 1984) or 'homeo boxes' (*Cell*, June 1984). One of these small and highly conserved segments is found near the 3′ end of at least three genes of the bithorax group and two of the Antennapedia group, and they all code for an even more highly conserved sequence of 60 amino acids which has DNA-binding properties – suggesting a role in gene regulation. This homoeo box DNA shows some homology with DNA in both vertebrates and invertebrates, but it forms a very small part of the Drosophila homoeotic gene complexes, both of which give a transcript of about 100 kb; so its role in gene regulation can hardly be very specific. Many more papers on these boxes are queueing up in *Nature*, we are told, so, having clarified our minds with Sang, we can confidently wait on the side-lines.

Sang describes the current status of work on a number of other developmental problems. For example, the chapter on 'The genetic analysis of genome organization' discusses the rosy locus in Drosophila and the equivalent *hxA* locus in Aspergillus, Aldox 1, dopa decarboxylase, rudimentary and ocelliless in Drosophila, *Amy* and *Amy* 1 in, respectively, Drosophila and the mouse, and *intA* which appears to be a positive regulatory gene in Aspergillus. Other sections deal with *Caenorhabditis elegans*, tissue determination and regeneration, sex determination, and include a final overview chapter on genetics and the control of development.

The book is well and clearly written, well illustrated, has a good bibliography and index, and is very good value at £13.95. It should obviously be in the library of every biology department, and, I think, in the hands of all those interested in differentiation and development.

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