

## Book Reviews

*The Human Genome.* By TOM STRACHAN. BIOS Scientific Publishers. 1992. Pp. 160. £13.95/US \$28.00. ISBN 1 872748 80 5.

The idea of obtaining the complete DNA sequence of all  $3 \times 10^9$  base pairs of the human genome first surfaced at a meeting in Santa Cruz in 1985. It was and still is an audacious concept, and it is not surprising that it has fuelled much controversy. Proponents of the Human Genome Project, such as James Watson, view the genetic messages encoded within DNA as providing the ultimate answers to the chemical underpinnings of human existence. Opponents see it as mega-science, and likely to divert scarce resources away from more immediate problems in cell biology. They ask why we should sequence the entire genome when more than 95% of it has no apparent function. Ethicists are concerned at the possible abuse of detailed knowledge of human genetic structure. Recently national and commercial rivalries have emerged over the question of the ownership and patentability of specific DNA sequences.

Despite these problems it has become clear that the Human Genome Project is already proceeding at a formidable pace, and that the issue is no longer whether it will happen but rather how and when. Should genetic mapping precede physical mapping, or should the two go hand in hand? Should there be tight regulation of genome projects or loose coordination? Can anyone play, or is mega-science only for mega-scientists? Who is going to coordinate the biggest project ever attempted in the biological sciences?

The answers to these questions must involve discussions amongst groups other than molecular geneticists. Ideally they should include the lay public whose taxes will pay for the project. However, it is a depressing fact that the average well-educated but non-scientific person has only the faintest idea of what a genome is, and would be baffled by the techniques of mapping and sequencing. He or she has probably mastered the concept of a gene and the basic principles of simple inheritance. But the astonishing varieties of gene structure and the technical complexities of DNA analysis would be too much. This is especially true in Britain, where membership of the chattering and opinion-forming classes usually requires profound ignorance of and indifference to all things scientific.

Tom Strachan's book aims 'to provide non-

specialist and specialist alike with a concise description of our current knowledge of the human genome'. By non-specialist he means (or should mean) someone who is not a molecular biologist, but who still has an honours degree in chemistry or the biological sciences. This is emphatically not a book for the lay person and should be kept well away from any paid-up member of the chattering classes. It would simply confirm their latent opinion that most scientists are overpaid technicians whose ability to communicate with 'normal' people has largely disappeared.

*The Human Genome* is written in a style close to shorthand. It is probably as dense and tightly packed a piece of writing as will be found outside a dictionary. Although line drawings, tables and the odd photograph break up the text, there is no interrupting the relentless flow of fact that must be absorbed, digested and made sense of before the next section is tackled. If this sounds critical, it is not meant to be. The command of the factual material is excellent; the descriptions of techniques and the types of data they generate cannot be faulted; there are arrays of helpful tables and a well-constructed index. It is a book that can be browsed in with pleasure.

But for whom is it intended? One of the few services that a reviewer can perform for his limited group of readers is to spare them the trouble of acquiring and assessing irrelevant books. I have already suggested that the non-scientist might let this one pass. But any other biologist with a few pounds to spare could do worse than buy *The Human Genome*. It is not something to read in one go, but it is a book to keep on a handy shelf for occasional perusal. In the hope that today's medical undergraduates will be tomorrow's opinion makers, I intend to recommend it to my students.

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### In search of the holy engrailed

*The Making of a Fly.* By P. A. LAWRENCE. Blackwell Scientific Publications Ltd. 1992. Pp. 228. £16.95. ISBN 0 632 030 488.

I received my review copy of Peter Lawrence's book as I was about to set off to a meeting in Japan and facing the prospect of having to give six lectures on

*Drosophila* developmental biology upon my return. Would the book make good airport reading, and how would undergraduates like it as a text?

In his preface, Peter Lawrence describes the book as a narrative that should be read from beginning to end. To achieve this he has inserted descriptions of the methodology that underpins modern research in developmental biology into boxes set apart from the body of the text. Indeed this is helpful, especially having set the book down, and when trying to pick up the story line again in a different time zone. He has created a highly readable text that is by and large free from jargon, and which presents the salient features of *Drosophila* development using carefully chosen examples from the vast literature to illustrate his points. The primary literature is not cited, and this helps in maintaining the flow of the text. The result is a book that will give a highly readable overview of *Drosophila* development to those non-specialists who have been intimidated by the sheer quantity of scientific reports and the strange language of the *Drosophilist*.

The examples chosen by the author to illustrate his points are by and large the most appropriate. There are obvious idiosyncrasies, but these bring the book to life and serve to remind us who is telling the story. The theme of the first chapter, the intimate inter-relationship between mother and egg, is elaborated in chapter two, which describes how maternally active genes establish the body axes of the embryo. The natural course of events is followed by a description in chapter three of the zygotically expressed genes active in the embryo in response to these maternal cues. These chapters are very successful, and comprise broad overviews of developmental pathways with carefully selected examples of specific gene interactions that illustrate basic principles without getting bogged down by the increasing complexity of the system as development proceeds. Chapter four is about cell lineage, an area in which it is difficult to separate the technical approach from the message. This chapter, which allows the author to address subjects dear to his heart, defines the **parasegment** and leads in to the topic of the next chapter, the homeotic genes. To my mind the story line of the book seemed to break up somewhat from this point, although it could be that jet-lag was now at its worst. The emphasis of the next chapter seems an over-indulgence. It describes a large number of cuticle-grafting experiments from a variety of insects that indicate the importance of positional gradients in generating polarity. These are important considerations, but they seem to be given too much weight. The penultimate chapter describes the role of cell-cell interactions in establishing spacing patterns, and the final chapter describes eye development. My feeling is that it will be difficult for the non-specialist to put these final chapters into the context of 'making a fly'. Many of the future problems that face those studying *Drosophila* development relate to what

happens downstream of the homeotic genes; what controls the development of the nervous system; and how imaginal tissues develop into adult structures. Whilst the final chapters touch with insight on these questions, it would have been helpful to put later development into a broader context, perhaps by first having a chapter simply describing what goes on, and what are the unsolved problems. Having said this, the book is a good read and I can highly recommend it.

How does it serve as a teaching aid? In this context, it could be a disadvantage to split the technical approaches from the story line. This depends upon the background of the students. I was teaching a class of biochemists who had never before come across any of the techniques involved. Thus the experimental approaches had to be taught in parallel. This meant that the students had to dip into sections of the text, not an approach that Peter Lawrence recommends. Nevertheless, I think they liked it. All, that is, but one unshaven youth, who spent the first minutes of every lecture still plugged into his Walkman. He later confessed that he didn't understand what I was talking about, and I had several private attempts to try and instil the basics of the gap, pair-rule, segment polarity, gene hierarchy...to no avail. Peter Lawrence's book? Well he didn't understand that either. Ah well.

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*DNA Science: A First Course in Recombinant DNA Technology.* By DAVID A. MICKLOS and GREG A. FREYER. Cold Spring Harbor Laboratory/Carolina Biological Supply Company. 1990. Pp. 477. Paperback, £19.95. ISBN 0 89278 411 3.

Having been involved for several years in introducing students to recombinant DNA technology, I have become only too aware of the lack of an introductory laboratory text: a text which is written not for advanced undergraduate or research students, but rather one that is specifically designed for those at an early stage in their careers in the biological sciences, both for those intending to pursue molecular biology as a specialism and those who are taking such a course as a subsidiary. *DNA Science: A First Course in Recombinant DNA Technology* is a very readable amalgam of the history, theory, application, development and practice of modern molecular genetics. Although straightforward language has been used, this has not resulted in any loss of scientific rigour, and the authors should be warmly congratulated for this achievement.

The book is divided into two main sections: text, and laboratory schedules. Chapters 1 and 2 adopt an historical approach: they introduce the underlying