*The Aquatic Ape: Fact or Fiction* is remarkably cheap at £20 for 369 pages and numerous tables and figures in hardback, and I think it should find its way into most biological libraries and onto the shelves of many biologists.

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*The Triumph of the Embryo*. By LEWIS WOLPERT. Oxford University Press. 1991. 211 pages. £14.95. ISBN 0 19 854243 7.

How each organism develops into an adult from the single-celled egg must be one of the most fascinating topics in Biology. However, it is often considered inaccessible to the layman. The complex movements to form cell layers and shapes are difficult to describe as the embryo is 3-dimensional and its complexity increases dramatically as it develops. This makes it hard to visualize what is happening and hold it in your mind. Once the descriptive aspects are grasped, trying to understand how this is achieved can seem even more daunting, as we need to know not just about cellular interactions but about the genetic programmes which switch on and off the expression of proteins to ultimately get the right cells to do the right things at the right time and in the right place. There are thousands of cells with hundreds of functions and yet they are carefully integrated to make a functional whole organism.

Professor Wolpert has tried to make this fascinating process accessible to the layman, and he has done a good job of explaining development with a minimal amount of terminology and unnecessary jargon. He makes things as easy as possible describing the early steps in embryonic development in terms such as the conversion from buns to doughnuts – so you immediately visualize what is happening. He also refers to the relationship between faults in developmental pathways and human diseases, thus emphasizing the importance of cellular decisions being executed correctly.

As might be expected much of the book is devoted to the spatial organization of cells, the way each species has its own individual shape and form, and he explains well how sometimes the fate of parts of embryos is fixed and at other times it can alter if normal development is perturbed. We all know that human embryos can be split to produce twins, but this is not true for all organisms, nor does this flexibility last for very long as development proceeds in those species which can regulate. He explains how developmental processes are dependent on decisions within cells, often due to influences from, and interactions with, other cells. He emphasizes the fact that the signals are simple and probably small in number and that the response of the cells receiving the signal is complex.

Generally, the topics selected for describing how eggs develop into embryos and obtain their form and pattern are good, though a few unquestioned dogmas have slipped in; for example, we are told mammalian eggs have no yolk because nutrients are supplied by the mother. Yet observation of mouse and rat embryos clearly shows the presence of yolk – we just do not know what it is for yet.

The book moves on to a molecular analysis of the control of development. This is important as it is the area in which progress is being rapidly made to unravel the mechanisms behind what we see when we watch an embryo develop or respond to experimental treatments. Whilst this approach is in part descriptive, as Wolpert says, I think it is also a very experimental approach and is unravelling fundamental developmental mechanisms. Many of the molecular experiments being performed interfere with development by expressing a gene in the wrong place or at the wrong time and use the resulting response of the embryo to give clues to underlying mechanisms rather than being only a description of which genes are expressed where and when, as he tends to imply.

The bare essentials of genetics, RNA and protein synthesis and the regulation of gene expression are covered in just 12 pages and really must make these topics, usually covered in much more depth, accessible to everyone. With this information one can readily follow the subsequent sections on the diversity of cells and how they each perform their specialized functions.

There is a chapter on the development of the *Drosophila* embryo. Discussing an insect egg developing may seem odd to the layman but it is an area which, because of the beauty of *Drosophila* genetics followed by the revolution in molecular biology, enables us to understand at the molecular level how a unicellular egg develops first polarity, a head and a tail and then divides it up in segments. Such segments are based on repeating units found throughout biology and not surprisingly some of the genes found in *Drosophila* are found in vertebrates too and are important in the development of their body axis.

The wiring of the brain is of interest to us all, and although it is a highly complex process it is covered in this book. Sex and cancer, two obviously relevant topics are also described though it is a shame that more emphasis was not placed on the rapid molecular advances in these subjects. We now understand quite a lot about the molecular basis of sex determination in a number of organisms and about numerous forms of cancer.

No book by Professor Wolpert would be complete without a section on regeneration, which his laboratory has devoted so much effort to studying. Evolution is also covered and here Professor Wolpert emphasises the concept that there are a few fundamental developmental mechanisms that have been

used time and time again to generate the diverse array of forms found on our planet today.

Hopefully the next phase of embryology will see a fusion of the more classical embryological and cellular techniques with the new power of molecular biology to unravel even more about how we develop.

Professor Wolpert's book should be fascinating reading for the non-specialist and a good introduction to problems of development for students perhaps going into medical studies. It may also stimulate the appetite for development of those who will study genetics and molecular biology.

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*Biochemical Protozoology*. Edited by G. H. COOMBS and M. J. NORTH. Taylor and Francis. 1991. 635 pages. Hardback £75; paper back £29.95. ISBN 0 7484 0000 1 and paperback 0 7484 0001 X p.

One of the joys of studying parasitic protozoa is the sheer amount of variety and diversity displayed by organisms which have adapted to highly specialised environments within their hosts. However, this diversity also makes it difficult to deliver a definitive text on the subject of biochemical protozoology. Indeed the last texts devoted wholly to this topic were written in the 1970s. Given the advances over the last decade this volume edited by Graham Coombs and Michael North is very timely and extremely valuable. In line with the increased depth and breadth of the subject, and the need for up-to-date information and referencing of a rapidly developing field, the book is not presented as a single text, but as a collection of 55 well-referenced mini-reviews. Each review forms a separate chapter and is written by a leading expert in his field.

The format works very well. Not only is the reader informed of the latest developments in areas of particular interest, but he is also presented with the viewpoints of individual researchers who themselves will determine the direction of research in the coming years. The result is a highly informative text which should be on the bookshelves of all practising and aspiring parasitologists.

In keeping with the history of biochemical protozoology, and the amount of funds available for research on different protozoa, the book concentrates on parasitic protozoa which pose a significant threat to human and animal health. The overriding aim behind most of the work described is either to define biochemical differences between the protozoa and their mammalian hosts which may be exploited by chemotherapy or to better understand the mechanism of action of important drugs. Much of the work described relates to *Plasmodium* species, responsible for malaria, and the trypanosomatids, responsible for sleeping sickness, Chagas' disease and leishmaniasis. A third grouping of significance is the anaerobic protists, which include the trichomonads, e.g. *T. vaginalis*, and other parasites such as *Giardia* and *Entamoeba*.

The layout of the book tries to group articles by their biochemical subject matter rather than by the organism being studied. The initial chapters concentrate on overviews of metabolism in different species, highlighting unique aspects of their biochemistry. The diversity observed is perhaps best illustrated by the novel organelles found in certain species; the hydrogenosomes of many anaerobic protists, the glycosomes of trypanosomatids and also the rather unusual mitochondria of erythrocytic stage plasmodia. The occurrence of dihydrofolate reductase and thymidylate synthase as distinct domains on a single bifunctional polypeptide, in all protozoa so far studied, points to the unique significance of folate metabolism in many parasites. Other systems whose study has provided promising 'leads' for new chemotherapies are the amino acid catabolism of anaerobic protists and the trypanothione metabolism of trypanosomatids.

Following on from the initial chapters specific enzyme drug targets and areas of metabolism are described in more depth. By far the largest single grouping of enzymes discussed are the proteinases (13 chapters). This may represent a degree of overkill, and to some extent this work is technology led. Scientists study what they can assay or measure. However there is no doubting the growing interest in this field and its potential value for developing new chemotherapies. In addition this work should also provide new insights into parasite biology. For example malarial proteinases involved in such fundamental processes as erythrocyte invasion and haemoglobin degradation are currently being characterised. The dream of a biochemical protozoologist is to (i) identify a novel pathway in an organism of interest (ii) identify a novel enzyme within this pathway and (iii) obtain structural information on this enzyme so that rational drug design can become a reality. In chapter 44 Alan Fairlamb describes the completion of the first two stages of this process in his study on trypanothione metabolism and trypanothione reductase in trypanosomatids. The successful crystallisation of trypanothione reductase from *C. fasciculata* has now put in process the third and final stage of what has been an invaluable contribution to our understanding of trypanosomatid infections.

It is worth noting that the end goal of such a process as that described above, namely the development of new drugs by rational drug design, depends not only on classical biochemistry techniques, but on the involvement of molecular biology and medicinal chemistry techniques. The editors state in their introduction to this book that they made a decision early on to 'deal solely with biochemistry