Book reviews

How to get a PhD, Estelle Phillips and D. S. Pugh. Open University Press, Milton Keynes. 1991. Pp. 161. Price £30.00 Hardback. ISBN 0 335 15537 5, £9.99 Paperback. ISBN 0 335 15536 7.

In a clear, refreshingly simplistic manner, this book provides a comprehensive guide to obtaining a PhD. The authors identify practical and common factors involved in this achievement offering assistance to those undertaking the 'quest' whether the chosen field of research is in the Arts or Sciences. These factors range from fulfilling the administrative requirements of individual universities to practical advice on how to maintain a convivial relationship between students and supervisors. It also provides help and direction for the student should this relationship be strained. The authors are obviously well aware of student types. The prospective candidate may have entered the arena bright-eyed and bushy tailed, eager to create paradigm shifts, or has taken on the PhD simply to remain in close proximity to a boy/girl friend. Regardless of their reason, however, all candidates will have very similar obstacles to overcome and it is, and I quote, 'crucial' for students wanting a PhD that they understand fully the objectives and nature of the processes involved. Moreover, it is also important they be aware that for most students the PhD process is an intensely emotional experience.

From the outset the authors emphasize, and continue to do so throughout the book, that this process is ultimately under ones own management. Whilst it is the responsibility of the supervisor(s) to teach the crafts of research, it is for the student to discuss how to apply that craft to his/her specialized area. This craft involves, of course, identifying problems, meeting deadlines and finding or being given opportunities to write papers, reports or critiques; all helping ease the task of the final write-up.

The authors are aware of the difficulties faced by even the most well intentioned helpful supervisor. How to instill that determination and application, rather than brilliance, are the keys needed to complete the process? How to inculcate the need for 'bread and butter' before dessert; you can leave the paradigm shifts for after your PhD. The authors are sympathetic to the academic and social worker role the supervisor is expected to play once accepting a student. They offer sound advice on how to identify and develop the skills required. In the present academic climate it pays, and no doubt will increasingly continue to do so, to be a conscientious supervisor. However, whether or not the supervisor has played this role to the fullest, at the end of the day the outcome (success or failure) must rest with the student. *How to get a PhD* is an aid towards a successful outcome. I would suggest it should be compulsory reading

for all prospective students and their mentors in the PhD experience.

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Practical Genetics, R. N. Jones and G. K. Rickards. Open University Press, Milton Keynes. 1991 Pp. 228. Price £35.00 Hardback. ISBN 0 35 09218 7. Price £14.99 Paperback. ISBN 0 335 09217 9.

The authors describe this publication as 'a book about practical genetics', and identify their target audience as at the school/college/university/polytechnic interface level. The experiments contained in the book range across the whole spectrum of classical and microbial genetics, starting with mitosis and meiosis, in plants and insects respectively, and continuing with *Drosophila* crosses; mutant isolation, recombination and linkage analysis in yeast, *Sordaria* and *Aspergillus nidulans*; polymorphism in clover populations; plant genetics (crosses with seedlings and maize ears); genetics with humans (common traits, blood groups and chromosome preparations); and simple bacterial crosses.

Much of the book has a very familiar ring. Having taught an elementary genetics course for 15 years at university level, these experiments are all old friends. Some of them (a small minority) are still included in our present courses, but they are almost all now very long in the tooth and we, and I suspect most university departments, have long since moved on to a more modern approach. The authors do point out that the schedules and exercises are known to work repeatedly and well, and this is certainly true. These experiments have been in use for so long now that almost all of the faults have been ironed out. The *Drosophila* experiments, for example, are based to a considerable extent on those described in Strickberger's book *Experiments in Genetics with Drosophila*, published in 1962, while the bacterial experiments are based on the classic book by Clowes and Hayes, published in 1968.

None of which is to say that these experiments are not still very valuable and useful as teaching exercises, particularly if they can be developed for school/college purposes to introduce the basic principles of the subject. My feeling about the experiments described in the book, however, is that they have not been so developed. They seem little

changed from the practical classes we used to run, and as a consequence I suspect that they will be too complex to mount at the school level, and too out-dated to be of much use at university level.

Surely, what needs to be done at the school/university interface, is to provide a set of practicals which are completely reliable, but which provide a feel for some of the excitement of the subject and relate the work to some of the amazing developments that have taken place in Genetics in the last 10 years. This I feel is one of the major failings of the book. It is written in a rather dry and, to me, old-fashioned style, which I cannot really see will induce any excitement in sixth-form students. Much could have been learnt from looking at what has undoubtedly been the most successful laboratory manual produced in recent years, namely Maniatis' *Molecular Cloning Techniques*. Using a spiral bound format, providing a good clear outline of experiments with clear diagrams, and backing this up with an almost recipe-like approach, has created an exceptionally useful book with a modern feel to it. Exactly the same approach could, with considerable benefit, be adopted for school use, with the experiments being designed specifically for the school context. Why should sixth-formers have to make do with experiments developed for university use 20 years ago?

Despite these criticisms, this book will be useful at the intended level, particularly if it is in the hands of a teacher who already has a good feel for the subject. By being selective and developing particular parts of the experiments, the book could provide the basis for a very comprehensive course. It would not, however, be suitable for people approaching the subject for the first time.

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Evolutionary Biology, Volume 25. M. K. Hecht, B. Wallace, and R. J. MacIntyre (eds). Plenum Publishing Corporation, New York. 1991. Pp. 475. Hardback, Price not yet available. ISBN 0 306 43644 2.

Writing a book review is usually a very simple task. You say a few words to set the scene, then apply an appropriate ratio of praise and criticism, and end up saying that on balance *x* is a generally good (or bad) piece of work. As I have learned the hard way (by reading reviews of my own books) many reviewers seem to feel remarkably unconstrained by the need to read the book concerned before offering their humble opinion of it. It sometimes seems, therefore, that a quick flick through and a cursory scribble will suffice.

Fortunately (or otherwise, depending on your point of view), it is impossible to follow this minimalist approach in relation to the current volume of *Evolutionary Biology*, consisting as it does of nine 'chapters' (some of them virtually books in their own right), ranging in length from 17 to 125 pages. The subjects covered span from history to molecular

biology, from mole rats to ammonites and from evolutionary changes in the Pre-Cambrian to those occurring right now. Given this state of affairs, the book cannot be reviewed as a coherent whole, rather each chapter requires separate consideration. Inevitably, then, the individual 'mini-reviews' that follow will be too short to do justice to the relevant author(s), while the overall review will be intolerably long: a classic 'no win' situation. But then again, if you do not like it, you do not have to read it: you can try instead to blast through the 475 pages of 'Volume 25' without any prior sampling of its flavour. No? Then read on.

Chapter 1 — on adaptation and speciation in mole rats, by Nevo — is a mine of information on that particular group of creatures. It is detracted from, however, by being dressed up as a consideration of the validity of the modern synthesis. In this respect, it seems rather misguided. Many doubts about the synthesis focus not on its ability to explain adaptation and speciation within a very restricted group (a 'superspecies', in this case), but rather on difficulties in extrapolating it to explain 'big' evolutionary phenomena such as the origin of body plans in the Cambrian explosion (see comments on Chapter 5 below). On page 108, Nevo asks 'Is a new evolutionary synthesis necessary to explain adaptation and speciation in evolving mole rats?' While I am quite happy to accept his answer that it is not, I just do not think that it is a terribly interesting question.

Chapter 2 is by Dickinson and deals with the evolution of regulatory genes in *Drosophila*. Three main topics are examined here: variation in regulatory patterns within and between species; behaviour of genes transformed between species; and nucleotide sequences in regulatory regions. I found the sections on these topics interesting but rather heavy going. The 'heaviness' is no fault of Dickinson's, though. It is an inevitable consequence of the current state of knowledge in this field, with lots of bits and pieces of information, but little in the way of general principles to tie them all together. Having said that, Dickinson does allow himself some interesting speculations. In particular, he suggests on page 128 that Gould & Lewontin's (1979) ideas of constraints, and sub-optimal solutions to evolutionary problems may be just as applicable to the molecular details of genetic regulation as they are to the phenotype. Related to this, on page 158, he applies a theory of the evolution of phenotype complexity (the 'maintenance of functions' theory: see Arthur 1984, Chapter 13) to the evolution of complexity at the molecular level. These are intriguing, although of course unproven, suggestions, which I hope will stimulate further debate.

The third chapter is by Ehrman *et al.*, and is called 'A long-term study involving *Drosophila melanogaster* and toxic media'. This yawn-inspiring title turns out to be a devious plot to reduce the readership of what is really an article about a very interesting experiment on speciation. What the authors did was to select separately for tolerance to sodium chloride and copper sulphate in separate ('allopatric') populations, and then to make the selected populations sympatric and to look for reproductive isolation. Unfortunately, they did not find any, and so we come full circle: from boring title to interesting experimental design to boring result. Would other populations with different genetic architectures have