Book reviews

The Origins of Life: From the Birth of Life to the Origin of Language. John Maynard Smith and Eörs Szathmáry. Oxford University Press, Oxford. 1999. Pp. 180. Price £18.99, hard-back. ISBN 0 19 850493 4.

Or *Major Transitions* 3, if you prefer. This is the general-reader-friendly version of the 1995 *Nature* paper and its companion book. Although there is some updating to take into account new material (e.g. revised views on phylogeny since 1995), the main difference between *Origins* and its predecessors is the level. The earlier versions were for those within the field, while the new one is primarily for those outside it.

The number of claimed ‘major transitions’ remains unchanged at eight. These are the origins of protocells (= life?), DNA-to-protein systems, chromosomes, the eukaryotic cell, sex, multicellularity, coloniality and human society/language. No problems here: few would dispute the ‘major’ nature of all of these, and it is hard to imagine an addition to the list that would be of equal importance to the eight entries already there. (But perhaps the origins of bilaterality and cephalization come close.) So the subject matter is about as interesting as it could possibly be.

Have the authors succeeded in making this material accessible to the general reader? Unquestionably yes. The writing is clear, jargon-free and a pleasure to read. If ever a scientific book merited the hackneyed novel-descriptor ‘unputdownable’, this is it. Never before have I got a book review in so far before the editor’s deadline!

The book’s immensely broad coverage and its orientation towards the general reader have not been achieved at the expense of factual accuracy. This has been possible partly because the concentration of facts amidst the speculation is relatively low, as the authors freely admit, especially in such unknown areas as the ancient origins of macromolecules on the surface of the primitive pizza (sorry soup’s off). But partly it is also because the authors know their stuff. The only statement of ‘fact’ throughout that I really rebelled against was the claim that the homeobox sequence is always ‘at the start’ of a *Hox* gene. (New Zen koan: how near the ‘start’ are those homeoboxes that are split by introns?). Also, I think the authors should be awarded a prize for the worst-ever drawing (p. 121) of arthropod and vertebrate *Hox* complexes and their domains of expression. But these glitches aside, the level of factual accuracy is much higher than in many comparable books written for the general reader.

So, hot stuff, admirably clear and almost error-free. Are there no serious problems? Well, just one really. In my view, the structure of the book is suboptimal, and this detracts from its impact. To a large extent, this is a carry-over from the 1995

book, whose overall structure has served too much as a template for the structure of *Origins*. The problem is this. In chapter 2 (one of their best), they set the scene for the rest of the book in the following statement (p. 19): ‘One reason for discussing events as different as the origin of the genetic code, of sex, and of language in a single book is that we think that there are similarities between the different transitions, so that understanding one of them may shed light on the others.’ In the ensuing few pages they elaborate on several possible common themes. Then, from chapter 3 on, we go through the various major transitions, essentially chapter-by-chapter. I would like to have seen all this lead up to a final synthesizing chapter, where we would re-assess the extent to which the different transitions involved the same, or different, causes and consequences. But no such concluding chapter exists — rather, the end of the language chapter is also the end of the book. What a shame. And the inclusion, half way through, of two chapters (8 and 9) on genetic conflicts and symbiosis is no substitute. While these serve to discuss *some* common themes alluded to at the beginning of the book, they omit others. Also, their placing between major transition 5 (the origin of sex) and major transition 6 (the origin of multicellularity) breaks the overall flow of the book, which is otherwise very logical.

Of course, you should not let this structural oddity stop you buying the book. Why not instead, after reading it, write your own final chapter? That way, you could ask questions like whether genetic assimilation (see Waddington, 1953), which Maynard Smith & Szathmáry claim (p. 166) to be involved in the origin of language, was also involved in the other origins, and if so which. Generalizing from this, you could turn their list of transitions (p. 17) into a transitions × mechanisms matrix and think which boxes should have ticks, crosses or question-marks. Alternatively, we could all wait for the authors to do this themselves in *Major Transitions* 4.

References

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