

evolution of deception in plants. In this scenario, the paradox alluded to by Schiestl et al. (that experimental addition of nectar leads to higher pollination success of unrewarding plants) is a logical consequence of combining two successful advertising strategies: high conspicuousness and high nutritional rewards. We therefore emphasise that the costs and benefits of alternative phenotypes of floral appearance can arise in distinct contexts, including signalling. As such, EPB and communication theory should be useful frameworks for understanding the evolution of deception.

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Book Review

A philosophical view of biology

Contemporary Debates in Philosophy and Biology edited by Francisco J. Ayala and Robert Arp. Wiley-Blackwell, 2010. £50.00 hbk; US \$89.95 (440 pages) ISBN 978 1 405 15998 2.

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“There is a grandeur in this view of life”, wrote Darwin in the concluding sentence of his masterpiece [1]. And a view indeed it was: the view that the complexity and beauty of life, of the vertebrate eye for example, could be better explained by the theory of natural selection than any recourse to a designer. The purpose and methodology of biological science were, to Darwin, incorrect and a new approach in

both science and Western thought, bolstered by his “one long argument”, was the result [2]. Like Darwin, many today appreciate inquiries into the nature and purpose of biology as a discipline and think about its history, foundations and current methods. That is, there is an appreciation among biologists of a philosophy of biology. The benefits of knowing the historic boundaries of one's discipline and how they came about are obvious, especially in the current era when boundaries are fast disappearing and the enormous strides of inter-disciplinarity impress us all. Since formal teaching of a philosophy of biology in undergraduate or graduate courses (in biology) is rare, biologists interested in the philosophy of our subject likely acquire knowledge through a literary osmosis from multiple sources. Now, with the recent publication of *Contemporary Debates in Philosophy of Biology* by Francisco J. Ayala and Robert Arp, there is an excellent resource at hand for

further understanding the topic of philosophy, as well as communicating the benefits of a broad view to students.

The senior editor, Francisco Ayala, is a renowned evolutionary biologist who has a parallel interest in philosophy, science teaching and constructive dialogues between science and religion. The second editor, Robert Arp, is a young scholar who straddles academia as a philosopher and industry as an analyst. Together Ayala and Arp have accumulated a wealth of talent to debate ten foundational questions: is biology reducible to physics and chemistry; what was the past adaptiveness of traits; is the gene the level of selection; distinctions between the processes of micro- vs. macroevolutionary change; evo-devo's challenge to the modern synthesis; the Pleistocene mind of humans; memes and cultural evolution; the biology of ethics; and intelligent design.

The book is beautifully laid out and is clearly intended to be a teaching tool both for students and researchers across disciplines. The ten topics each have a general introduction by the editors that is very helpful and balanced in its discussion of the topic and the broader background of the question posed. Two chapters from the contributors then follow this introduction, one arguing for the case and another arguing against. What is really nice is that the chapters each have a counterpoint allowing responses. The debates are made so much more dynamic because of this simple addition. Helping us along the way are notes and references with the authors providing extra notes and the editors providing further reading to get us up to speed on the topic at hand. This book is intelligently designed.

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However, *Contemporary Debates in Philosophy of Biology* is not a text book or reference source. The authors are arguing their case on topics of major importance such as the question of where selection acts, or the distinction between behavioral ecology and evolutionary psychology, and many more besides. No doubt many evolutionary biologists might have very strong reactions to these things. Either they feel such theorizing is a waste of time and what is needed are formal approaches (tests and models) or they counter with their own argument. What I feel after reading this book is that its authors have placed great care and attention into their arguments and biologists, if so minded, could have an important role in future developments.

Since most of the contributing authors are philosophers, the biological examples discussed in the book are lacking (this myopia is reciprocal and biologists writing about philosophy can, of course, be limited in their reading). In some cases the biological examples used are old and retained because previous philosophers of biology discussed them. Therefore there is a real potential for biologists to assist. We have learned in recent years from the flood of molecular biology data that much happens to produce new phenotypes besides the mutation- novel phenotype-selection model. Likewise, our view of the organism as central in ecology has shifted and we can now speak of robustness of populations and an interdependence of diverse genetic entities within ecosystems. The changing perspectives offered by the news tools of cell biology [3] provides an opportunity to examine the conceptual founda-

tions of biology, such as the role of the hypothesis in the post-genomic era [4]; the nature of the gene [5]; how the aligned desiderata of multiple genetic entities (such as that comprising the microbiome/host unit) call for a re-definition of an organism [6] and what exactly a phenotype is anyway [7,8].

It is an exciting time in biology. For those who want to understand some of the ways we have arrived at our current view, *Contemporary Debates in Philosophy of Biology* is a welcome resource.

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Music Review

The hip-hop Richard Dawkins?

The Rap Guide to Evolution by Baba Brinkman. Lit Fuse Records 2009. www.babasword.com.

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Trends in Ecology and Evolution, Elsevier Ltd., 32 Jamestown Road, London, NW1 7BY, UK



Evolutionary biology and poetry might not seem remotely suited to each other but nonetheless, some have experimented with bringing them together. Erasmus Darwin, grandfather of the more famous Charles, famously wrote his work on the transmutation of species in the form of verse [1] and much more recently, in the days before impact factors gathered enough tyrannical power to put a damper

on anything the least bit quirky, this very journal re-published some of the evolution-inspired poems written by friends and colleagues of J.B.S. Haldane to mark his 60th birthday [2]. Suffice it say, both works are of more note for their intrinsic interest than their literary merits.

Perhaps this just shows that evolutionary biologists are not much good at poetry and poets don't see anything in

evolution to inspire them. The first of those sentiments might well be true but the second has now been comprehensively disproved. Canadian rapper Baba Brinkman's *The Rap Guide to Evolution* is an intelligent, lyrical, witty collection of performance poetry that also manages to be an accurate, popular-science discussion of modern evolutionary theory and its wider implications. Those of you with an aversion to rap music bear with me; this is not rap as you might know it. This is rap with an intelligent twinkle in its eye. It is rap with warmth and humanity, far removed from the stereotype of the style as aggressive, violent and divisive. It is also rap that doesn't simply use its subject matter of evolution as an amusing gimmick but rather draws on modern Darwinism with accuracy and insight. The accuracy is ensured by instigator of the project Mark Pallen, Professor of Microbial Genomics at the University of Birmingham, author of *The Rough Guide to Evolution* [3] making this the first rap album ever to be peer reviewed (as Brinkman is justly fond of telling his audiences).

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