

## The Royal Society of Western Australia Symposium on Evolutionary Biology, October 2009 – a summary

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Sitting here today, listening to such a variety of talks concerning evolution, I began to wonder what Charles Darwin would have thought about today's presentations. Would he have felt an inner glow of pride that his ideas had permeated so many areas of science? Or would he have thought that perhaps people had been taking things a bit too far? I think the former, for I'm sure he would have been as impressed by the wide range of topics covered today, as I have been.

We have heard about areas about which he knew nothing, particularly those in genetics: the talks by Ted Steele, Keith Oliver and Kemanthi Nandesena, which highlighted the importance of transposable elements in the genome. Darwin would, I think, have been delighted by Ted Steele showing that natural selection operates even at the molecular and cellular levels. But I believe that he would have been equally as fascinated by Lamarckian gene feedback loops and another potential mechanism driving evolution.

Darwin would likewise have been interested in Keith Oliver's courageous attempt to link genome transposable elements with the patterns seen in the fossil record, especially as a means of explaining the occurrence of 'punctuated equilibria' in the fossil record. And Kemanthi Nandesena's presentation opened up a whole new fascinating world of evolution in the prokaryotes.

Despite what many people think, there was a world of evolution before Darwin, which he himself would readily have acknowledged, expertly reviewed by Kevin Thiele, Stefan Rivets and Alan Tapper. While Darwin may not have drawn on ideas from the ancient Greeks, he was no doubt influenced by more contemporary workers. As Stefan Rivets has shown, Darwin's ideas have made us look back much more than we otherwise might have done to earlier philosophers' attempts to understand and interpret the world around them. It is hard not to believe that Darwin could have ignored ideas, such as those promulgated in the 18<sup>th</sup> century by Georges-Louis Leclerc, Comte de Buffon, given his influence on Charles Darwin's grandfather, Erasmus Darwin, and on Lamarck. Likewise, Darwin's writing in *On the Origin of Species* on development and evolution, was very much influenced by embryologists on the continent, such as Karl Ernst von Baer in Germany and Étienne Serres in France, despite Serres having many objections to Darwin's ideas on evolution.

Darwin would, I am sure, have been intrigued by Alan Tapper's thoughts on how philosophers have viewed

Darwinism, from the 100 years of indifference (a period of philosophical stasis, perhaps) to Popper's criticism in the 20<sup>th</sup> century, to the enthusiastic and expansive phase of philosophers' view on Darwinism in more recent times, and the philosophical realisation that the study of evolution may be scientific after all. As a botanist, Kevin Thiele, not surprisingly, is supportive of the Tree of Life metaphor for the evolution of life, enunciated by Darwin in *On the Origin of Species*. Its subsequent use by Haeckel and Hennig and its continued use today would, I'm sure, have made Darwin very pleased, even if the tree at times appears to be more of a hedge, or a shrub, or, to quote Kevin Thiele "a bloody mess!".

Darwin was very unsure about the fossil record. He felt that if there was one thing that could undermine his theory, that was it. "Geology", wrote Darwin (*The Origin of Species* 1878, 6th Edition p.265) "assuredly does not reveal any such finely-graduated organic chain; and this perhaps, is the most obvious objection which can be urged against this theory. The explanation lies...in the extreme imperfection of the fossil record." He was equally dismissive of collections held in the country's museums: "...our richest geological museums ...what a paltry display we behold!" (Darwin, *The Origin of Species* 1878, 6th Edition. p.270). But as Kate Trinajstic and my own presentation show, in fossil fishes and trilobites, respectively, Darwin can rest easy in the knowledge that not only does the fossil record support his ideas on evolution, but the museums now hold literally millions of specimens, each attesting to the veracity of evolution. My own presentation was about one of the areas much neglected by historians of Darwin, namely his ideas on the relationship between developmental change and evolution. Many ideas thought to have been developed in the 150 years since the publication of *On the Origin of Species*, were in fact discussed by Darwin. Kate Trinajstic also highlighted the recent use of new technology to unravel hidden secrets of fossils.

Lastly, Kate Bryant's talk on the education of evolution stressed the importance of pointing out to students that evolution is happening all around us, not just on the Galapagos Islands. She showed the significance of using local examples. Given Darwin's propensity for carrying out many experiments in his garden at Downe House, he would very much have appreciated this approach.

So had Charles Darwin been sitting in the audience with us today, I am sure he would have felt that publication of *On the Origin of Species* was well worth the many years of writing, and the long periods of anguish and self doubt that he experienced.