



Was
Darwin
Wrong?



An ignored critic and the Origin of Species

A review by Gert Korthof. 27 Dec 2001. (updated 12 Jan 2002)

Two important themes of FORSDYKE'S *The Origin of Species Revisited* are the insights and criticism of a Darwin contemporary (George Romanes, 1848-1894) and the presence of two levels of information in DNA (primary and secondary information). Romanes pointed out that Darwin's main work *The Origin of species* did not solve the mechanism behind the origin of species, although it solved the origin of adaptations. According to Forsdyke the mechanism behind the origin of species should not be sought in the primary information in DNA, the genes, but in the secondary information in DNA, which initiates the splitting up of one population into two non-interbreeding populations.

Paradox of survival of fittest and the Origin of Species

Darwin introduced the idea of common descent of life. Common Descent is best illustrated as a tree. And there is no tree without branches. A branch in the tree of life means splitting of 1 species into 2 species. There is no permanent separation if the two groups interbreed. So if they are real species they must be reproductively isolated. Reproductive isolation is in the modern definition of species: a group of interbreeding individuals who are reproductively isolated from other such groups. Let's call it concept 1.

Darwin also introduced the most important concept of natural selection, later called 'survival of the fittest'. Let's call it concept 2. Some individuals leave more descendants than others. Individuals who don't reproduce will not be represented in the next generation. The paradox arises when combining (1) and (2): If species are reproductively isolated groups, then can natural selection produce two reproductively isolated groups out of one interbreeding group? The first and only reproductively isolated individual in a population will have no descendants, unless that individual finds a similar partner. The origin of reproductive isolation seems to be an anti-Darwinian anti-natural selection! In Forsdyke's words: "How can natural selection contribute to reproductive isolation when natural selection is, after all, about selection of *individuals* for reproductive *success*, not for reproductive *failure*?" (p32).

This paradox is of fundamental importance to understand the development of Darwinism from Darwin to today ([10](#)). It determined the research agenda of evolutionary biologists. The paradox was transformed into a battle between people believing that geographic isolation was necessary contra a minority believing that it was not (sympatric speciation). Forsdyke pointed out this paradox ([9](#)). I did not realise that the paradox was so old. Modern critics of evolution don't know about the paradox. It doesn't look spectacular to outsiders,

but it is crucial for Darwinism to solve it.

Artificial and Natural Selection

Forsdyke pointed out that Huxley(1863) already noted there was a troublesome dissimilarity between Artificial and Natural Selection. Whereas crosses between artificially selected 'species' (e.g. dogs) are usually fertile, crosses between members of true species (e.g. horse and ass) are usually sterile. This is troublesome because Darwin used the analogy between Artificial and Natural Selection as an argument pro evolution. It means that one cannot extrapolate from Artificial to Natural Selection. It's nice to see how the great defender of Darwin, Huxley, was also a critic. Although some creationists use this criticism, they did not invent it. To solve the paradox evolutionary biologists after Darwin tried to create reproductive isolation in the laboratory. Forsdyke's historical discoveries about the dissimilarity of artificial and natural selection are very useful because not every scientist publishing in *Nature* is aware of the ambiguous nature of artificial selection as evidence for evolution by natural selection: "the effectiveness of artificial selection was a major contribution to Darwin's theory of evolution by natural selection." (1).

Forsdyke's solution to the species problem

Crucial for Forsdyke's solution is the distinction '**primary**' and '**secondary**' information in DNA. The primary information in DNA is the sequence of the bases A,T,C,G in DNA which is translated into a sequence of amino acids in proteins. This is the standard meaning of information in DNA. Forsdyke defines 'secondary' information as the relative amount of CG pairs to the total amount of CG + AT base pairs. This is called the (C+G)%. Whereas the proportion of A:T and C:G is always 1:1, the (C+G)% varies.

(C+G)% and stemloops

How could (C+G)%, a statistical property of DNA, be a barrier between species? Forsdyke states: "If differences in CG% could prevent recombination, then reproductive isolation would be achieved" (p112). *However do they really prevent recombination and meiosis?* Forsdyke brings in the DNA stemloop, with clear illustrations. I found the stemloop story fascinating on its own, but it is not clear to me what the connection of stemloops with (C+G)% is. In short Forsdyke claims that stemloops of single-stranded DNA are crucial in meiosis, (this is supported by evidence) and that similar (C+G)% between the homologous chromosomes are necessary for stemloop formation (supported by 1 publication sofar, p125). Forsdyke routinely talks about stemloop *potential*, but what about *actual* stemloops? Are there photographs? I suppose stemloops need fixed positions on chromosomes to be able to do their work. And a percentage is not the same as a spatial pattern. If many different stemloop-sequences are possible, then thousands of stemloops are expected along

chromosomes by sheer chance. How many stemloops are there actually on human chromosomes? And how many do we need? Since the draft sequence of the human genome is now known, it should be straightforward to produce the number and locations of stemloops. Is there indeed a correlation between actual stemloop formation and (C+G)%? Could the formation of stemloops be experimentally prevented and result in failure of meiosis? Could chimp gametes fertilise human gametes in vitro? could their chromosomes pair? Forsdyke is aware that "further definition of the role of CG% is needed".

It has been known even before the discovery of the structure of DNA in 1953, that (C+G)% differs in different species. For example the (C+G)% ranges from 34% to 58% in virus species. Forsdyke suggests that (C+G)% has something to do with the making of a species and with keeping species apart. The (C+G)% is a barrier between species. If CG% does not match, the result is sterility (hybrid sterility). Hybridisation does not occur between species with different (C+G)% according to Forsdyke. Forsdyke's hypothesis is that (C+G)% is a dominant evolutionary force. Since evolution is the Origin of Species, (C+G)% could be the cause of speciation. (C+G)% is the primary cause of speciation. It is non-adaptive, neutral, internal, non-morphological, invisible from the outside. This is opposed to orthodox Darwinism with its primacy of natural selection and genes establishing reproductive isolation. The idea of 'secondary' information in DNA is a new paradigm in molecular evolution. It is an alternative to the selectionist protein-centred view of sequence conservation and evolution, and the neutralist view of Kimura. It could also give an alternative explanation for introns.

What other sources say

Clearly Forsdyke has sympathy for Romanes, especially because Romanes was undeservedly attacked by Huxley and Wallace and ignored by later Darwinists. What do other sources say about Romanes? Peter Bowler (2) devotes only a few lines to Romanes. Interestingly he reports Romanes' criticism that Darwin did explain the origin of adaptations, but *not* the Origin of Species. He does not mention the paradox discussed above.

Ernst Mayr (3) stated: "It is not nearly so widely recognised that Darwin failed to solve the problem indicated in the title of his work." This is ironic considering the fact that Romanes was ignored by the leading Darwinists, and that this failure of Darwin was not really mentioned in the textbooks of evolution. No wonder: Darwinists did not advertise it! In stead they dogmatically defended the solution (allopatric speciation) following Mayr. Too much attention for the problem would have looked as if Darwin's main work was a total failure! Mayr (4) mentions Romanes shortly together with Gulick, and claims that he himself rediscovered and included the distinction 'transformation of species/ splitting of species' in the evolutionary synthesis in 1942. However Mayr did not mention the above-discussed paradox.

Romanes is absent from Tom McIver's *Anti-Evolution*, which contains more than 1800 works from 1859 to 1988 and he is not one of 16 critics in David Hull's *Darwin and his Critics*, according to information in Lovtrup's book.

Forsdyke has much in common with Lovtrup (8). Both authors (a) accept the fact of evolution, but (b) try to restore an unbalanced history of Darwinism and (c) try to restore an unbalanced theory of evolution. Both base this on (d) their own discoveries about what is missing in evolutionary theory. And (e) both

discoveries are triggered by the circumstance that they are working outside the evolutionary biology discipline.

Obviously the (C+G)% is an important element in Forsdyke's story. What is known in the literature? Are there explanations for it? In the publication of the draft sequence of the Human Genome Project (5) attention is given to the CG content of our genome. Stemloops are not discussed. It appears that the human genome contains GC-rich and CG-poor regions and that differences in (C+G)% measured at different levels are inhomogeneously distributed over our chromosomes. Different explanations are referred to such as a relation with gene density, composition of repeat sequences, correspondence with cytogenetic bands and recombination rate. The last point could support Forsdyke's hypothesis.



Forsdyke's book has a dual nature: historical (a lot quotes from historical sources) and molecular genetics. This combination of historical research and modern molecular genetics is rare. For molecular geneticists history starts in 1953 (discovery of the structure of DNA) and it is unusual that a molecular biologist looks further back in time. Forsdyke is interested in Romanes as a critic of Darwinism. At the same time biochemist Forsdyke is a critic of Darwinism himself and has new approaches to old problems in evolutionary biology. For example: (C+G)%, stemloop hypothesis, fine-tuning of RNAs as a new evolutionary selection factor in addition to natural selection for protein sequences. Forsdyke is in the position to have an independent, critical and unorthodox opinion about mechanisms of evolution, because he is not part of the evolutionary biology community. A consequence is that we don't find a balanced orthodox overview of the species problem. Ecology and behavior are absent in his account of the origin of new species. Readers who need an up-to-date review of field and laboratory research of the species problem should read Menno Schilthuizen (6). Forsdyke is orthodox in the sense that there is no creationism, panspermia, Lamarckism (7), etc in his book and he has published numerous articles in mainstream scientific journals.

Based upon his website, I expected to find more about chromosomal evolution in his book, but Forsdyke is not interested in karyotype evolution, but in the molecular mechanisms behind it. A glossary would be helpful (allotetraploids, divalent pairing, etc.). There are frequent references by chapter number to other chapters of the book, but the page headers do not contain chapter numbers. A warning for the internet surfer: there exists a book with the title *The Origin of Species Revisited: The Theories of Evolution and Abrupt Appearance* by creationist Wendell Bird.

I learned from the book that every theory, no matter how successful, fails in some respects and that this should trigger improvements. Maybe if Darwinists had listened to Romanes and other critics, the shortcomings of Darwinism would be included in the evolution textbooks as a list of unsolved problems. Unsolved problems are the future research agenda of the next generation of Darwinists, not facts to be ashamed of. I think a possible explanation for this situation is the circumstance that Darwinism was attacked right after the publication of *The Origin of Species* by creationists and other critics. This has hardened Darwinism and Darwinists. And in turn this has polarised both sides. Unnecessarily.



"The Origin of Species Revisited. A Victorian Who Anticipated

Modern Developments in Darwin's Theory."

by Donald Forsdyke

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A review copy of this book was kindly provided by the publisher McGill-Queen's University Press.

1. William Hill(2001) *What if Mendel had studied sheep? Nature*, **414**, 586. 6 Dec 2001.
2. Peter Bowler(1989) *Evolution. The History of an Idea*, p249.
3. Ernst Mayr(1971) *Populations, Species, and Evolution*, p10.
4. Ernst Mayr(1982) *The Growth of Biological Thought*, p401.
5. Carina Dennis and Richard Gallagher(2001) (editors) *The Human Genome*, Nature Publishing Group, p88-90.
6. Menno Schilthuizen(2001) *Frogs, Flies and Dandelions: The making of Species*.
7. One exception: Forsdyke accepts that "HIV-like viruses have transferred somatically-acquired information to the germcells" (p140,143) which is of course a form of neo-Lamarckism because the Weismann barrier is crossed. See [Lamarck's Signature](#) on this site.

8. Søren Løvtrup(1987) *Darwinism: The Refutation of a Myth*. ([review](#))
9. I later found in S.J.Gould(2002): *The Structure of Evolutionary Theory*, p130, that Darwin knew and solved the problem of hybrid sterility in the chapter "Hybridism" in his "Origin of species". [8 June 2002]
10. This paradox can be described in a non-paradoxical way (as I found out reading Jerry A. Coyne and H. Allen Orr (2004) *Speciation*): Reproductive isolation is not a fitness paradox, it is a fitness *difference*. As soon as there are two fitness optimums (that is two different adaptations), a fitness minimum arises between the two as a side effect. Natural selection does not create a fitness minimum (which is indeed a paradox), but creates two different fitness maximums. All individuals falling between the two optimum adaptations are selected against.

Further Reading

- [Evolution SELECTED PAPERS AND COMMENTARY](#) is Forsdyke's homepage at Queens University, full colour, even living sperm! Further there are two of his own publications full-text on his site, which is quite an achievement considering the fact that they were published in commercial scientific journals.
- Jerry A. Coyne and H. Allen Orr (2004) *Speciation*. Up-to-date overview of speciation literature by two experts.
- [short review](#) of the book by Stephen Lewis in the Biologist.

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