

## What's In a Word? On Reading – And Misreading – Alfred Russel Wallace

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A few years back I received an email message from a biology professor who had been working up some materials on the early writings of Alfred Russel Wallace. He had noticed a passage in my *Alfred Russel Wallace Page* website transcription of the “Sarawak law” paper, ‘On the Law Which Has Regulated the Introduction of New Species’ (Wallace, 1855), that read: “The present inquiry, which seeks to eliminate from known facts a law which has determined, to a certain degree, what species could and did appear at a given epoch...”. and wondered whether the word “eliminate” represented some kind of mistake in the original typesetting. At first I thought he might have a point, as on checking I determined Wallace had used the word “eliminate” on only a couple of other occasions in his early papers, whereas elsewhere he had used the seemingly better-fitting “elucidate” several times. I also looked at several examples of Wallace’s handwriting, however, and it hardly seemed that the clear way he scrolled his “d’s” could have led to such an error.

On then consulting the second edition of the *OED*, I found something interesting: the sixth definition for the word “eliminate” given there is: “Incorrectly used for: To disengage, isolate, extract (particular elements) from a compound; to disentangle (a fact, a principle) from a mass of confused details; hence, to elicit, deduce”. Further, the several examples the *OED* gives of in-print usage of this variation are from a limited period starting with the 1840s and 1850s, and include sources Wallace might well have read. It is therefore very likely that Wallace’s words did express what he meant, even if the usage was colloquial and a product of its time only.

Since this episode took place, I have become more and more intrigued with the way Wallace used language, and especially how that usage might provide clues about the evolution of his thought. One thing is clear: Wallace was a very effective wordsmith. The philosopher Charles Peirce once said of him that he “never wrote a dull line in his life, and couldn’t if he tried, his very tables and diagrams being as entertaining as they are valuably instructive” (Peirce, 1906, p. 160). Certainly, Wallace was in high demand as a reviewer and commentator, as he published over one hundred book reviews after 1867 and was frequently called upon to serve up one or another kind of occasion-specific remark. And only this year I revealed (Smith, 2008a) that he was even engaged for a time as an “eyes-in-the-field” journalist, during the first years of his travels in the Far East.

Beyond merely being readable, moreover, Wallace was by all evidence effective at expressing just what he wanted to say. His vocabulary was extensive and his use of it mindful of purpose, and indeed a fair number of his shorter works directly addressed various aspects of word usage itself. Thus, at one time or another he concerned himself with vocabulary collection, encyclopedia entry organization, terminology definitions, rules of systematic nomenclature and revision, the use of neologisms, linguistic diasporas, poetic expression, and even some relationships of biogeography to folklore and myth.

His interest in words and language extended all the way to analyses of the origins of verbal communication itself, including his support for and development of what was termed the “mouth gesture” theory of the evolution of speech (Wallace, 1881, 1895). The nineteenth century philologist Hyde Clarke was particularly taken with this latter work, referring to it as “the Wallace formula” (Clarke, 1882).

All of which argues that perhaps we should be paying a little more attention than we have to Wallace’s choice of words over his career – especially to critical terms whose introduction into his vocabulary at particular stages of his life might shed some light on the evolution of his thought process. This is what I hope to do in the remainder of this essay. Actually, some fair notice has already been taken of a few of Wallace’s applications of language; two in particular that come to mind are his suggestion to Darwin that he adopt Herbert Spencer’s phrase “survival of the fittest” in speaking of the process of natural selection, and the exact meaning he gave to the terms “varieties” and “variation” in his writings of the 1850s. The latter subject deserves a larger review than can be given now and will be spoken of no further here; in a moment, however, an attempt will be made to better contextualize Wallace’s promotion of the Spencer term to Darwin in 1866.

On reading Wallace one quickly becomes aware of some grammatical and structural idiosyncrasies in his writing that are probably related, as Peirce (1906, p. 160) explains, to his lack of formal schooling combined with an over-emphasis on the inculcation of Latin during it. Still, Peirce also finds reason to point to his “remarkably lucid, easy, and harmonious style of writing; remarkable, we mean, in comparison with that of others who, like him, have never received any instruction in rhetoric”. For modern readers, there is actually still relatively little to pointedly criticize, apart from his typically Victorian tendency to write long sentences, and occasional period-related complications of the “eliminate” variety noted above.

Attention to the matter shows that there really are certain key terms that Wallace uses again and again (and/or at particular times during his career) which seem quite instructive in context. One of the most revealing of these usages concerns the word “accumulate” (and its variants “accumulation,” etc.), employed by Wallace in over one hundred of his writings spanning the whole of his career. In most of those instances he applies it in a straightforward and conventional fashion – *e.g.*, to “accumulations of belongings” or “accumulated facts” – but of more particular interest is the wonderfully descriptive way he often connects natural selection to character variation through its use, as in “natural selection accumulates variations”. If one reads “accumulate” to imply, roughly, “addition through haphazard or irregular collection”, Wallace’s understanding of how natural selection is connected to evolution is at once made clear: certain variations, however emerging initially, are identified through the contingencies of environmental engagement as having survival value at a particular time, and on this basis are “accumulated” within the population through differential survivorship.

Wallace’s first use of the term in this exact sense came in the essay ‘Remarks on the Rev. S. Haughton’s Paper on the Bee’s Cell’ (Wallace, 1863a), where he states: “...simultaneous favourable variations in structure and habits, accumulated by natural selection, may act and react on each other, and thus ultimately lead to such a modification of the insect as may better adapt it for constructing the most advantageous form of

cell” (p. 304), and “Natural selection, acting through advantage in the struggle for existence, *accumulates* favourable variations, but in no sense *causes* them” (p. 308; Wallace’s italics). A few months later, in another article (Wallace, 1864a), he notes “those slight modifications which tend to bring a species into more exact harmony with surrounding conditions can be accumulated and rendered constant by ‘natural selection’ in an island where intercrossing with the forms of other districts is impossible” (p. 110), and a few months later again, in the famous ‘Origin of Human Races’ paper (Wallace, 1864b), “...every slight variation in his mental and moral nature which should enable him better to guard against adverse circumstances, and combine for mutual comfort and protection, would be preserved and accumulated” (p. clxiv), and “...by no other means can it be shewn that individual variations can ever become accumulated and rendered permanent so as to form well-marked races” (pp. clxviii-clxix). Further examples are scattered throughout the rest of his oeuvre. One might argue that Wallace picked up this usage from the *Origin*, where plenty of similar examples can be found, yet these post-1858/9 constructions are presaged by ten years by analogous thoughts related to physical nature appearing in his 1853 book *A Narrative of Travels on the Amazon and Rio Negro*: “When these rivulets meet together and accumulate into a river...” (p. 409), and “...during which time the stream will work for itself a wider and deeper bed, capable of containing its accumulated flood” (p. 427). Two subtexts in these earlier passages are worthy of note. First, Wallace’s writing conveys an image of process in which the initial events – rain falling and collecting into rivulets – randomly enact, but then give way to increasing order. Second, there is a sense of guiding control by outside forces: gravity, and the pre-existing and confining stream bed. The “accumulated flood” thus initiates as a vast array of largely unordered events, but even once organized into a consequential flow remains an influence that is both controlled, and controlling.

This leads to an important point that is often glossed over, as it usually was by Darwin, and even occasionally by Wallace himself: the “accumulation of variations”, which we may term “evolution” as a simple description of historical fact, is not quite the same thing as natural selection itself. Indeed, Malthusian pressures are such as to frame no more than a stalemate between continually procreating populations and their resource base – that is, just enough individuals are removed to bring the system back into equilibrium. This is the “extinction”, “extermination”, “weeding out”, or “elimination”, of the *unfit* – all of which terms Wallace used over the last several decades of his career, especially after C. Lloyd Morgan suggested the phrase “natural elimination” in 1888 to describe what Wallace was trying to get at.

One surmises that Wallace knew full well right from the beginning – for him, the mid-1840s – that in one fashion or another variations were being “accumulated”, and that this was “evolution”. But exactly how the adaptations that gave form to these “variations” developed over time was a puzzle he did not solve until it occurred to him in 1858 that there must be differential *removal* of individuals; that is, that the more poorly equipped individuals tended to die off faster than the better equipped ones did, with resulting generational implications. It was this removal of the unfit that actually constituted “natural selection” for Wallace; in the 1858 Ternate essay he likens this to the action of a governor on a steam engine.

As mentioned above, Wallace continued to use the allegorical term “accumulate” throughout the rest of his life to describe how the adaptive variations that emerged were retained, if not truly randomly, at least without preordainment. In this respect, no real revision of his thinking across the 1858 boundary was necessary, as before that time he apparently recognized no necessary utility to the role of adaptations, preferring to think their refinement was in some fashion shaped directly by the greater forces of environment (Smith, 2003, 2005). Once it occurred to him that utility was the key, he merely embraced the view that evolution enlisted *whatever* opportunities for productive environmental engagement variation made possible.

Still, this model left him with a new, and even more difficult, conceptual challenge. While, as stated above, “those slight modifications which tend to bring a species into more exact harmony with surrounding conditions can be accumulated and rendered constant by ‘natural selection’,” this governor-like function did nothing to guarantee any kind of progressive change, just a return to “harmony.” Wallace had rejected Lamarckism from the beginning, and thus the only conclusion he could draw was that the selecting forces within the environment (as defined broadly to include *all* supra-organism involvements, including those with other organisms) had themselves to be changing over time, continually providing new and more challenging contingencies for engagement. Surely his consideration of the analogy provided by domestication processes helped him to understand this; there, humankind’s immediate objectives propelled evermore intricate selection strategies, and increasingly refined results. But in the case of *natural* selection, the more “recondite” (a favourite Wallace word) forces of environment were behind the selection, as he first makes clear in a passage from ‘The Origin of Human Races’:

From those infinitely remote ages, when the first rudiments of organic life appeared upon the earth, every plant, and every animal has been subject to one great law of physical change. As the earth has gone through its grand cycles of geological, climatal and organic progress, every form of life has been subject to its irresistible action, and has been continually, but imperceptibly moulded into such new shapes as would preserve their harmony with the ever changing universe (Wallace, 1864b, p. clxvii).

In 1972 the anthropologist Gregory Bateson concluded:

Wallace, in fact, proposed the first cybernetic model...Basically these systems are always conservative...in such systems changes occur to conserve the truth of some descriptive statement, some component of the status quo. Wallace saw the matter correctly, and natural selection acts primarily to keep the species unvarying...” (Bateson, 1972, p. 435).

Seven years later he added:

...If it had been Wallace instead of Darwin [who started the trend], we would have had a very different theory of evolution today. The whole cybernetic movement might have occurred one hundred years earlier as a result of Wallace’s comparison between the steam engine with a governor and the process of natural selection” (Bateson, 1979, p. 43).

The implication is that Wallace’s natural selection – the elimination of the unfit – describes the negative feedback loop component only, a simple return toward equilibrium, within

the evolutionary process. The adaptive structures selected enter into a form of stabilizing engagement with a population's surroundings that is somehow implicitly positive feedback-serving. Otherwise put, there is something about engagement with the environment, whether in terms of behaviour, migration, or dispersal, which *itself* produces a net "accumulation" of information. This in turn is genetically recapitulated through the individually surviving actors on the stage.<sup>1</sup>

Now no one is suggesting that Wallace had systematically thought out the matter of negative and positive feedback controls, but he apparently *was* aware that two contrasting components of the overall process of evolution were operating (sometimes referred to in systems terms as a "push-pull" coupling – see Maruyama, 1963), and needed to be kept separate to make sense of it all. To understand how this was reflected in his post-1858 thinking, we must now consider some other terms he was struggling with at the time.

"Natural selection" was a new term as applied by Darwin, so not surprisingly it does not appear in Wallace's writings until 1860, when he uses it in 'The Ornithology of Northern Celebes', published in April of that year. (Interestingly, according to the date he placed on the finished work he apparently completed it in October 1859. Thus, he actually first referred to the term – at least in manuscript – before the *Origin* itself appeared in print, a month later.) Somewhat more surprisingly, however, it does not turn up in any of his next twenty publications, finally resurfacing in the 1863 essay 'Who Are the Humming Bird's Relations?' From that point on, it appears regularly in his writings.

Pretty much the same thing is true of the word "evolution", which was not in common usage to convey the notion of "general organic change" at the time *Origin* was first published (though Herbert Spencer had begun to apply the word in the 1850s). Usually the term "transmutation" was seen instead, or "the development hypothesis". Wallace does use the word "evolution" a couple of times in the 1850s, but to a now archaic end referring to the irregular motions of butterflies or birds in flight. By the late 1860s he was beginning to use "evolution" in the currently familiar sense fairly regularly, and it is interesting to focus in on how this took place.

We should note first that Wallace apparently had some trouble coming to a decision as to how the noun "evolution," designating, in effect, a *summation* of process, should be connected to a word implying its own coming about. Amazing as it may seem, I have been unable to come up with even a single example of Wallace using any of the words "evolve", "evolves", "evolving", or "evolutionary" anywhere in his voluminous writings (and even as early as the 1860s other writers were). One can only conclude from this that his appreciation of the process of organic change did not extend to abstractions reducing it to a passive, "internal", coming about. Instead, it was, in the first instance, a *responsive* phenomenon. This impression is fortified by the fact that although he did employ the word "evolved" on a couple of dozen occasions (but only after the mid 1860s), on just one occasion was it used in the passive voice (this one exception referring to a non-biological aspect of evolution): in all the others, it appears as part of the active voice constructions "was evolved in/from", or, in the vast majority of cases, "has been evolved".

This is particularly interesting in view of more current usage, through which the notion that a plant or animal “evolves” conjures up images, not of complex patterns and cycles of environmental engagement, but instead of genetic continuities and phylogenetic trees. This latter appreciation of evolution, “tree thinking”, has taken over our thoughts to such an extent that the very notion of what constitutes being “natural” has been equated with what is *actually* an abstraction: historical lineages – which exist only in the mind, and not as functional elements of planetary energetics.

In his 1858 essay Wallace took the first giant step toward ridding himself of this baggage. Nevertheless, as of 1864, and his ‘Origin of Human Races’ paper, he was still struggling with how it all fits together. How could the environment, as broadly defined, go “through its grand cycles”, subjecting “every form of life... to its irresistible action”, and moulding “such new shapes as would preserve... harmony with the ever changing universe”, in a manner that accounted both for the observed biological outcomes, and the place of supra-biological attributes such as human morality, artistic talent, and mathematical skills? – the latter seemed to be attuned to more subtle influences. In late 1864 and early 1865 he released a series of commentaries designed to explore how the higher attributes might develop; more specifically, how culturally/ethically/morally less advanced individuals and societies might rise above the treadmill of mere survival and actually better themselves (Wallace, 1865a, 1865b, 1865c). While still pursuing this train of thought, he was introduced to and began to explore the literature and physical “manifestations” of spiritualism. Wallace soon came to the conclusion that the “realm of spirit” constituted a real – and thus causal (if nonphysical) – part of nature. His experiences at seances undoubtedly helped sell him on this model, but it is also likely that he adopted it *primarily* because spiritualistic philosophy suggested theretofore missing connections in the absence of which his understanding of evolution as a universal process would have remained, at least for him, uncomfortably incomplete (Smith, 2008b).

This is most evident from his 1866 study ‘The Scientific Aspect of the Supernatural’ (Wallace, 1866a), first published in instalments in a secular magazine around the middle of the year, then reissued in pamphlet form a couple of months later. This monograph-scale essay reviews the literature, philosophy and history of spiritualism, largely in the form of a plea for taking its investigation seriously. Apart from the extraordinary departure it represented in general, it is also remarkable for an entirely different reason: it was here, in of all places his treatise on disembodied spirits, that Wallace expanded his active vocabulary with his first use of the four terms “evolution”, “evolved”, “fittest”, and “survival of the fittest”. The first appears as:

Is it possible, if these ‘spiritual’ communications are but the evolutions of the minds of weak superstitious or deluded human beings, that they should so completely contradict one of the strongest and most cherished beliefs of the superstitious and the religious... (p. 55);

the second in the “has been evolved” form mentioned earlier; the last two in the same thought as:

Now here again we have a striking supplement to the doctrines of modern science. The organic world has been carried on to a high state of development, and has been ever kept in harmony with the forces of external nature, by the grand law of ‘survival

of the fittest' acting upon ever varying organisations. In the spiritual world, the law of the 'progression of the fittest' takes its place, and carries on in unbroken continuity that development of the human mind which has been commenced here (pp. 49-50).

The use of "evolutions" above, despite its closer synonymic approach in meaning to "creation" than to "transmutation" (and indeed when in 1875 the essay was included in Wallace's collection *On Miracles and Modern Spiritualism*, it was replaced with the word "workings"), nevertheless initiates a new direction in his use of the word.

More importantly, it was right at this time that Wallace decided to endorse Spencer's term "survival of the fittest" – and even use the word "fittest" – for the first time. Interestingly, the essay appears to have been submitted to the magazine around mid-July 1866 (a note printed in its 21 July issue reports they had received the manuscript and were ready to proceed with its preparation for publication); this postdates by no more than a week or two Wallace's famous letter to Darwin (dated 2 July 1866) suggesting the latter take up Spencer's phrase. Ironically, Wallace first suggests that Darwin make use of it to combat the impression many received that natural selection implies, in analogy with artificial selection, that a guiding hand must be at work to do the selecting. But then he moves on to what I believe is his real complaint:

I find you use the term Natural Selection in two senses – (1) for the simple preservation of favourable and rejection of unfavourable variations, in which case it is equivalent to 'survival of the fittest'; (2) for the *effect or change* produced by this preservation, as when you say, 'To sum up the circumstances favourable or unfavourable to natural selection,' and, again, 'Isolation, also, is an important element in the process of natural selection': here it is not merely 'survival of the fittest,' but *change* produced by survival of the fittest, that is meant" (Marchant, 1975, p. 142; Wallace's italics).

Here we have Wallace stating in the clearest possible words his differentiation between what he sometimes referred to as the "law" of natural selection, and the larger reality, evolution. Given his train of thought over the preceding two years and the absence of any earlier efforts on his part to distinguish between the two ideas, it is difficult to believe that his dealings with spiritualism to that point had not helped to clarify his thought process in this regard. When he identified the notion of the "progression of the fittest" (and its attendant implications: progressive change at the level of conscious awareness), the way to contrast between adaptation-the-process and adaptation-the-structure became clearer, and the need to keep the two concepts separate, even more apparent. In parallel with "elimination of the unfit" at the biological level, spiritualistic "fitness" was defined in terms of the individual's rejection of immoral and unethical behaviours. Achieving such a goal depended on more than the individual simply willing it so, however; instead, spiritualists understood the "spirit realm" environment to be capable of "feeding back" instructive lessons through the medium of dreams, subliminal suggestion, and even on occasion more sensationally through what we would now term "paranormal" interventions (seance manifestations, etc.). To be sure, many or most such contacts would have no effect or be interpreted inappropriately (leading to fanaticisms, etc.), but on the whole a programme of ethical/moral elevation would ensue. Thus, Wallace's exclusive use of the "was evolved from" and "has been evolved" constructions: in both the physical and psychical instances an environment was serving as an external stimulus to change. After all, not all variations within biological structures

led to sustainable engagements with the physical world either.

Wallace's first use of the word "evolution" in a sense entirely familiar to us today came in a letter to the Editor of the *Athenaeum* referring to his recommenced studies on mimicry; it was dated 26 November 1866, and appeared in the 1 December 1866 issue (Wallace, 1866b). (Here too there is a spiritualism connection, as the pamphlet version of *The Scientific Aspect of the Supernatural* had been issued no more than two weeks earlier, and it was just at this time he began to witness convincing seance manifestations in his own quarters.) Specific contrastings between natural selection and evolution were not long in coming. In my *Alfred R. Wallace: Evolution of an Evolutionist* (Smith, 2003, Chapter 5) I comment:

By 1869 and his Lyell review [*i.e.*, Wallace, 1869], however, he is more obviously contrasting natural selection with evolution, as at one point he states: "Neither natural selection nor the more general theory of evolution can give any account whatever of the origin of sensational or conscious life." His changing thoughts over this period are also mirrored in a small alteration made when he incorporated the essay "A Theory of Birds' Nests," first presented as a paper in 1867 but only appearing in total in print in 1868 [Wallace, 1868], into his collection *Contributions to the Theory of Natural Selection* in 1870: in the 1867/1868 version, the text reads "...on the theory of evolution, as worked out in detail by Mr Darwin, a wide range...", whereas in 1870 this had been changed to read "on the theory of evolution and natural selection, a wide range...". One thus gathers that his views on the hierarchy of causation involved were in flux over this period.

This separation is further reflected in Wallace's varying usage of the words "adapt", "adaptation", and other variants thereof. Before 1864 the word "adapt" appears only once in his writings, and "adapts" or "adapting" not at all. "Adaptation" turns up only twice over the same period (in the form "adaptation to"), but "adapted" is used over thirty times, invariably as "adapted to" or "adapted for". Thus he is restricting his usage of the concept to depict a state of interaction between organism and environment, and neither to the historical process of its generation, nor to specific adaptive structures. That Wallace was already predisposed toward accepting a complex interaction state view of evolution, and societal evolution in particular, even before all of this, is evidenced by words from a paper he first presented on 1 September 1863 (exactly six months *before* he read his 'The Origin of Human Races', and right around the time of his response to Prof. Haughton on natural selection as related to bees' cells):

...the absence of civilisation does not necessarily imply the want of capacity to receive it. An external impulse is in every case required; for I believe no instance can be shown of a homogeneous race having made much or any progress when uninfluenced by the contact of other races. Civilisation has ever accompanied emigration and conquest -- the conflict of opinion, of religion, or of race. In proportion to the diversity of these mingling streams, have nations progressed in literature, in arts, and in science; while, on the other hand, when a people have been long isolated from surrounding races, and prevented from acquiring those new ideas which contact with them would induce, all progress has been arrested, and generation has succeeded generation with almost the same uniformity of habits and monotony of ideas as obtains in the animal world... (Wallace, 1865d, on p. 206).

Two or three years later Wallace would conclude, finally, that the spark that had



infused humankind and moved us beyond a “uniformity of habits and monotony of ideas” had come from a hitherto unrecognised realm, a form of “environment” that transcended time and space (as, he no doubt felt, those habits and ideas themselves did).

There are those who would argue that Wallace’s decision to pressure Darwin into adopting the term “survival of the fittest” was a bad one, because it made the notion of natural selection vulnerable to accusations of tautology. To the extent that the role in the equation of *heritable* variations does tend to get lost as a result, this is a fair criticism. Yet it is a criticism that misses the point, at least with respect to *Wallace’s* goals. Considering his initial likening of natural selection to the action of a governor device, it is doubtful that he ever intended the concept to signify more than an elimination of the unfit. “Survival of the fittest”, therefore, is by default nothing more than the immediate implication of removal of the unfit. It is still an unavoidable and implicit element in the unfolding of evolution – but, as I believe Wallace wanted us to understand by his choice of words, it is also only *one* element of that unfolding.

### Note

1. It should be understood here that in making this observation I am not ignoring the point that it is the *heritable* characters in differential reproductive success that lead to change interpreted as evolution. Instead, my objection lies in the idea that it is not necessarily so that the resulting change need represent an increase in *organisation* – whether that increase be in the form of ever-more numerous and specialized insects, or organisms sporting growing levels of self-awareness. Thus, what is it about environmental engagement that promotes, not just a biolayer consisting of *different* assemblages of microorganisms at different times, but one characterised by *increasing* levels of temporary diversion of incoming extraplanetary energy sources over time?

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