

## The weasel returns

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In the article, 'Dawkins' weasel revisited',<sup>1</sup> Royal Truman describes a program which he claims to be like that used by Dawkins in his book, *The Blind Watchmaker*.<sup>2</sup> The objective of Dawkins' program was to illustrate cumulative selection by generating the 28 letter string, 'ME THINKS IT IS LIKE A WEASEL' by means of cumulative 'mutation' and selection amongst strings of letters, commencing with a random string. Clearly Truman's program is unable to illustrate this process, as it has no selection procedure. Instead, it generates new strings of letters from previous generations by randomly varying **only those letters in a string which do not match the target letter for their location**. Truman correctly claims that such a program does not demonstrate Dawkins' point (though he incorrectly describes Dawkins' true point). Unfortunately the program used by Dawkins is not at all like Truman's program.

Bart Read has previously pointed this out in his letter.<sup>3</sup> He suggested that '... Dawkins forces every generation to have one mutation in it although it is possible that he gives every single letter a 1/28 chance of mutation and simply breeds progeny on this basis'.<sup>4</sup> Actually, Dawkins is likely to have selected between a 1/30 and a 1/40 chance for each letter to ensure that each generation contains progeny with no mutations, but Read's suggestion is essentially correct.

The existence of progeny exactly resembling their parents is necessary to conserve accrued matches. Without them, the appearance of new matches or the disappearance of existing matches are equally probable in what is essentially a random procedure. Truman, of course, introduces a deterministic mechanism (matched sites aren't 'mutated') to achieve the same effect. The difference in approach is relevant, indeed essential to Truman's critique of Dawkins.

Admittedly, Truman's mechanism could reasonably be thought to be the mechanism used by Dawkins as a first approximation. If, however, Truman had compared his mechanism with the results Dawkins published, he could have determined that his mechanism was not the one used by Dawkins. A simple check would have shown that where his program generated 23 mutations in the first generation, Dawkins' generated only 1. This difference in mutation rates would be sufficient to show him he was not using Dawkins' method.

Truman might also have thought to check the two methods suggested by Read. There are 8 mutations in the 9 generations between generation 1 and generation 10 in Dawkins' original example. Clearly, therefore, Dawkins' program can generate two (or more) mutations in one generation though it typically does not. As a forced mutation

procedure can only produce one mutation per generation, Dawkins must have used Read's second method (each letter having a small discrete chance of a mutation). Finally, reducing Dawkins' program to one progeny per generation does not merely extend the time taken to achieve the target string as Truman claims. Rather, it turns the mechanism into a random walk generator.

### Addendum

In rechecking the facts relating to Truman's article, 'Dawkins' weasel revisited', I noticed an error I made in counting mutations. Specifically, where I have counted 10 mutations between generations 1 and 10, there are only 8. This means I am unable to distinguish, by direct inference, between Read's forced mutation procedure and the discrete mutation chance per letter that I prefer. I apologize for this error. The error does not, however, affect the essential points of my criticism of Truman's article, specifically that Dawkins did not use a procedure analogous to that described in Truman's article; that Truman could easily have determined the inappropriateness of his program by comparing its results with Dawkins; and that Truman's criticism of Dawkins' argument depends essentially on his assumption that Dawkins used a program like his own.

### References

1. Truman, R., Disappointing delusion, Book Review of *Unweaving the Rainbow*, *CEN. Tech. J.* **13**(1):33–36, 1999.
2. Dawkins, R., *The Blind Watchmaker*, Penguin, UK, 1991.
3. Read, B., Dawkins' weasel revisited, *CEN Tech. J.* **13**(2):73–74, 1999.
4. Read, Ref. 3, p. 74.