



Observations of the Owl (16)

No Plans in the Pipeline

I confess I'm unable to resist the tempting topics of evolution in this celebratory Darwin Year of 2009. So, my dear friends, I am afraid you will have steel yourself against Owl columns laced with various aspects of evolution throughout the year.

Sorry about that if you are disinterested in evolutionary biology (on the other hand, how could you not be interested when you profess to be a *life scientist*?). But it's simply too much fun, not least due to the many misconceptions flying around; not only amongst the general public but also among life scientists themselves.

Even some of the most prominent ones are regrettably being sucked into that swamp. Take, for example, Francis Collins, one of the 'heroes' of the Human Genome Project. Recently, when referring to the untranscribed genome regions, he apparently announced, "I've stopped using the term 'junk'. Think about it the way you think about stuff you keep in your basement. Stuff you might need some time. Go down, rummage around, pull it out if you might need it." And, on another occasion, "It is not the sort of clutter that you get rid of with-out consequences because you might need it. Evolution may need it."

Ouch, Mr. Collins! Evolution doesn't have any plans for the future hidden in the pipeline. Of course, there are *causes* why things evolve, just as there are *effects* that can be identified. However, nothing evolves following a predetermined path in order to achieve a pre-designed goal.

Evolution doesn't envision any scenarios about hypothetical new challenges ahead and, therefore, doesn't actively prepare organisms 'underground' to sufficiently meet as many of those scenarios as possible. No, no, dear fellows! Evolution exclusively takes into account the here and now.

Thus, concerning the wide regions of non-coding DNA in certain genomes, we can only note that they evolved randomly and have since not been eliminated by natural selection. That means that *right from the start* they at least haven't conferred any selectional disadvantage to the organism, given the enormous metabolic effort to maintain them during each cell division.

Sorry Mr. Collins, your two quotes were obviously utter nonsense.

To illustrate this widespread misconception of how evolution really works, Canadian biologist T. Ryan Gregory in his blog, 'Genomicron', distinguishes between 'because' and 'so that': things evolve 'because', they do not evolve 'so that'. He gives the following example: "Why are some strains of bacteria resistant to antibiotics? *Because* a mutation occurred that happened to be beneficial under the conditions of antibiotic treatment and that, subsequently, became common in the population over the course of several generations. Bacteria do not experience mutations *so that* they will become resistant to antibiotic agents."

At this point, however, I have to admit that, fortunately, there are many of you human scientists around that do not allow your-

selves to be lured into any such 'so that'-pitfalls – even if it is particularly tempting. And I am especially pleased to provide you with an excellent example, not involving one of those boring 'Drosi-Coli'-model organisms, but rather – owls!

I bet many of you don't know that the American continent is home to a close but rather strange and smelly relative of mine: the burrowing owl (*Athene cunicularia*, as your taxonomy specialists prefer). 'Strange' because they are day-active and live in dry, open areas with low vegetation where they nest in burrows. 'Smelly' because they are partial to the dung of other animals; even their underground nests and surrounding areas are carpeted with the stinky stuff (yuk, that makes my feathers quiver).

What's the effect? Well, it serves as bait for the owls' favourite grub, dung beetles. According to a study led by Douglas Levey from Gainesville, Florida, owls with dung bait ate ten times more dung beetles than owls whose 'decorative-dung' was removed from their burrows by inquisitive scientists (*Nature* vol. 431: 39).

You can probably already guess what's about to come, right? It is soooo tempting at this point to claim that my relatives evolved this special kind of 'tool usage' *so that* they could reach their long-cherished aim of attracting and catching as many

beetles as possible, with relatively low effort.

Hah, but steadfast Levey didn't succumb! "Even though people think owls are wise, there's no reason to assume they make a conscious choice

to go get the dung they bring back because they know beetles will then appear out of nowhere," he said in an interview with *National Geographic*. According to Levey, this dung beetle baiting behaviour is more likely a trait that evolved via natural selection: owls that bring back more dung are more likely to get more dung beetles and thus are more likely to be successful in reproduction, passing on the trait until it is fixed in the whole population. "The owls are using a rather simple method to catch beetles with readily available material, so the raw material – owls, dung, and dung beetles – if you like, was just waiting for evolution to come up with tool use."

That's it. Well done, Doug. Rest assured, I shall propose you for this year's *True Understander of Owls Award*. (Although there is still room for discussion over your initial phrase on owls and wisdom.)

Despite a lot of positive examples like this one, however, all too often terrible things continue to be written and even appear in high profile peer-reviewed journals. Here's another one: the abstract of a new paper by Ville Mustonen and Michael Lässig in *Trends in Genetics* (vol. 25: 111-19) starts: "Evolution is a quest for innovation. Organisms adapt to changing natural selection by evolving new phenotypes." Aaargh! There go my feathers again, quivering up and down the length of my spine. I promise to contain myself this time. But it's now over to you. What exactly is wrong about this statement? Think about it and write to owl@lab-times.org.



"Selection only takes into account the here and now."