

# Review of: "Femmes finales: natural selection, physiology, and the return of the repressed"

Jonathan Edwards<sup>1</sup>

<sup>1</sup> University College London, University of London

**Potential competing interests:** No potential competing interests to declare.

I agree with Andrew Brower, but I also think this from Olen Brown hits the nail: "Specific words are artfully used to link important concepts. I suggest that this may be a bit obscure.." If only for those with English not a first language it might be good to doublecheck clarity of broad linking and inferential sentences, hopefully without dampening the prose.

I would not suggest changes but have a comment in response to 'Have we reached the end?'

Paradoxically, funnelling into efficient cause mid C19th was followed, perhaps unnoticed, by replacement of efficient cause at the fundamental level by something much more like final, and also formal, cause. When a free electron annihilates, to be replaced by an occupied potassium atom 4s orbital mode, there is no apparent mechanism. The electron field in a spatiotemporal domain just 'has an appetite' for new mode. The end is entailed in, and inseparable from, the event of change, to the extent that the very nature of the change can depend on how it is finally 'measured'.

This is not quite purpose; Richard Arthur (in his Leibniz (2014)) is good on how Leibniz predicts the shift but maybe conflates here. But it seems a form of 'telicity' is OK. Darwin's lesson was perhaps that we should be wary of the telic (as in Lamarck) in cases where we already have a coarse-grained causal account that simply cannot make a telic route work – i.e. stretching your neck does not alter germ cell DNA.

A shift to telic, formal (pattern-based) causation comes in both thermo-dynamics and quantum theory. Field domains 'want' to shift patterns into energy wells. Ultimately, all human desires or purposes, if grounded in physics, arise from fundamental telic events. The catch, presumably, is that coarse-grained living 'systems' that bundle these events into classical sequences and aggregates will exploit telic events in indirect, pragmatic and likely Heath-Robinson, ways. So the 'end' for an electron is something different from the 'end' for a mother bison, within whom the electron resides, faced with a wolf. Nonetheless, if brain function involves critical events dependent on field pattern instabilities, as it may well do, then the two forms of 'telic' may not be totally dissociated.

None of this, I think, alters the valid points in the essay about the perceived waywardness of teleologists and the ironies around Darwin's position in the story. I guess that what most present day scientists learnt from Darwin is that you need to have a consistent pathway of events to explain something and all 'magic' needs to be at the fundamental level, where everything is magic - like every electron in the universe knowing exactly what it wants to do under every possible EM field circumstance. What is now interesting is the possibility of the fundamental level operating at a macro scale in biology, but there will be no shortage of femmes finales mirageuses to screw things up along the way.

