

Editorial

The cranes and skyhooks of Daniel C Dennett

Reading the new book by the American philosopher Daniel C Dennett (famed for *Consciousness Explained*) *Darwin's Dangerous Idea: Evolution and the Meanings of Life*—at the ECVF meeting in Tübingen—proved to be so seductive a distraction I missed far too many of the talks. The dangerous idea is that (page 83):

“Design can emerge from mere Order via an algorithmic process that makes no use of pre-existing Mind. Sceptics have hoped to show that at least somewhere in this process a helping hand (more accurately, a helping mind) must have been provided—a skyhook to do some of the lifting.”

The book's main concern is to show that this is false—that there are no 'skyhooks' in nature. Throughout there is this intriguing central metaphor of skyhooks and cranes: Darwinian evolution being building up from the ground with cranes—Divine design being skyhooks without earthly foundation. Dennett maintains that there are no skyhooks and that Natural Selection is a 'universal solvent' that melts all the basic problems of biology. This is a lengthy, deeply exciting discussion of evolution and mind, including comparisons with R&D in technology, presented with the extremely readable prose we have come to expect of its author: so exciting, I cannot hold back from introducing Dennett's cranes and skyhooks to readers of *Perception*.

The first use of *skyhook* noted by the OED is from 1915:

“an aeroplane pilot commanded to remain in place (aloft) for another hour, replies ‘the machine is not fitted with skyhooks’. The skyhook is a mechanically impossible meta-physical device for supporting or creating.”

In Dennett's context it implies mind-like or mind-driven intentional look-ahead for designing. By contrast *crane* means (page 76):

“a subprocess or special feature of a design process that can be demonstrated to permit the local speeding up of the basic slow process of natural selection, and that can be demonstrated to be itself the predictable (or retrospectively explicable) product of the basic process.”

Dennett's first example of an evolutionary crane is sex.

“As sexual reproduction carries a huge immediate cost ... the *long term* pay off of heightened efficiency, acuity, and speed of the redesign process—the features that make sex a magnificent crane—is nothing to the myopic, local competitions that must determine which organisms get favoured in the very next generation.”

And:

“What we learn from the example of sex is that a crane of great power may exist that was not created *in order to exploit* that power, but for other reasons, although its power as a crane may help explain why it has been maintained ever since”.

So there can be take-overs in evolution.⁽¹⁾

The second creative crane example is the Baldwin effect. James Mark Baldwin (1896) concluded that “organisms *by dint of their own clever activities in the world*,

⁽¹⁾ I had the trepidation to suggest that language structures may have arisen as take-over from pre-human perceptual classifications of objects and actions (Gregory 1971).

might hasten or guide the further evolution of their species". Baldwin (R J Richards 1978, page 480) was a 'spiritualistic metaphysician' who thought he had found a place for intelligent mind as a force in evolution. Darwin's theory would "leave Mind an insufficiently important and originating role in the (re)design of organisms". Dennett thinks that the Baldwin principle is important; but that behaviouristic recognition of a good trick is sufficient, so it does not give place for creative mind, or consciousness. Being no expert on this intriguing matter I merely pass this on; but perhaps it might be suggested that here is a *qualitative* issue not to be answered by philosophy alone.

How big can the Baldwin effect be? Is it ever big enough to give empirical support for the notion that creative mind (or even consciousness) is causal in evolution? It is important to note that this is alternative to Lamarckianism, which supposes that what is learned may be inherited. Thus this lacks empirical confirmation (not clear in Darwin's time) and so is rejected; but conceivably the Baldwin effect might reinstate mind as a similarly high crane. In Dennett's term it would not be a skyhook.

The crane-skyhook metaphor presumably gets its point from what *supports* these uplifts. The crane comes from and depends upon the ground: the skyhook has no earthly support. (An orbiting satellite is rejected as not being a practical skyhook.) The height of the hook presumably sets its range of effect into the future. One might add pushing up, directly from the ground—a jack. In the evolutionary context this would be pure and simple step-by-step trial-and-error, which Dennett does not accept as adequate for the job. So perhaps (because they can merely lift, and so cannot construct structures in a 'design space') there are no jacks in evolution.

For evolution of mind, the controversy rages over whether human mind has stepped out of biological evolutionary origins, to go it alone. Dennett disagrees with E O Wilson and 'the Standard Social Science Model' (page 490):

"Whereas animals are rigidly controlled by their biology, human behaviour is determined by culture, an autonomous system of symbols and values. Free from biological constraints, cultures can vary from one another arbitrarily and without limit ... Learning is a general-purpose process, used in all domains of knowledge."

For Dennett—"This, of course, is wrong, wrong, wrong." [!] He holds that:

"Whereas animals are rigidly controlled by their biology, human behaviour is *largely* determined by culture, a *largely* autonomous system of symbols and values, growing from a biological base, but growing indefinitely away from it. *Able to overpower or escape* biological constraints in most regards, cultures can vary from one another enough so that important portions of the variance are thereby explained ... Learning is *not* a general purpose process, but human beings have so many special purpose gadgets, and learn to harness them with such versatility, that learning *often* can be treated as it were an entirely medium-neutral and content-neutral gift of non-stupidity."

Dennett continues: "This is no defence of skyhooks; it simply acknowledges that we now have cranes of more general power than cranes of any other species". This (unusually) gives due regard to the power of technology and science in the human past, present, and future.

Dan Dennett (page 375) refers too generously to *Gregorian creatures*:

"a pair of scissors, as a well-designed artifact, is not just a result of intelligence, but an endower of intelligence [or, more exactly, what Gregory calls Potential Intelligence in the creation of Smart Moves ...], in a very straightforward and intuitive sense: when you give someone a pair of scissors, you enhance his potential to arrive more safely and swiftly at Smart Moves" (Gregory 1981, pages 311ff).

The same for words: language confers intelligence by (paradoxically) making problems easier to solve. So the inherited human brain is more powerful as it has extra technology-endowed Potential Intelligence to serve its limited Kinetic Intelligence.

(This must make IQ tests dodgy, as our Kinetic Intelligence is minute compared to our Potential Intelligence of knowledge—so maybe swamped.)

Cranes are human-designed 'Potential Intelligence', requiring human 'Kinetic Intelligence' to operate them. In evolution Natural Selection provides, or is, the Kinetic Intelligence. The human crane operator can look ahead with planned strategy and goals; perhaps to build a masterpiece, perhaps to build a city of beautiful nonsense. For Dennett evolution has no cognitive look-ahead of forward planning in this sense; but at least the Baldwin effect makes present design affect future design. Dennett's skyhooks have more than a hint of *deus ex machina*; but they are not controlled by, and they cannot bring, the gods to earth.

It is relevant to ask how far inventions and designs of technology are planned, or happen by essentially random trial and error. It is not hard to think of opposite cases. The atom bomb, in the last war, was planned and after several years of coordinated work by scientists and engineers the hoped for result was achieved. It worked first time. The Wright brothers, Orville and Wilbur, achieved the first heavier-than-air powered flight in 1903 following experiments suggested by the design of birds. Development over the next seven or eight decades, leading to such planes as the 707, did not start from any guess or hope or plan to achieve such a result. Though not a skyhook, the result was in the lap of the gods. It became possible from the build-up of knowledge from designing and flying, with more or less successful earlier aircraft, together with increasing theoretical knowledge of many kinds, from metallurgy to aerodynamics and suitable glass for the windscreen.

There are parallels here to notions of 'top-down' and 'bottom-up' in perception. It parallels the view that all top-down knowledge is earned, not given from heaven. This is accepted now by practically all theorists of perception (what the individual hasn't learned, having been inherited from knowledge gained by life-death experiences through ancestral Natural Selection). There remains, perhaps, a lingering doubt—mathematics. If Plato and some highly distinguished modern mathematicians such as Roger Penrose are right, isn't mathematics sometimes a skyhook? And is Darwinian philosophy broad enough in its application to exorcise all pre-design? Where did the Natural Laws of physics, and forces and matter, come from? Natural Selection, as we know it, only applies to the organic world of life.

The Wright brothers got their inspiration and initial designs from the *cranes* of birds flight; but what of engineers, scientists, or artists, who use and get inspiration from mathematics⁽²⁾ and nonbiological structures, such as *crystals*? How does this fit with Paley⁽³⁾ seeing the watch as designed by a watchmaker—for saying by analogy that the stone (with its crystals) is also created by a designing intelligence? Paley moves from mechanical cranes to justify heavenly skyhooks. Dan Dennett rejects skyhooks, saying there are only cranes. Design in the inorganic world bothered Darwin. Should it both Daniel Dennett? He would be the first to give a perceptive answer.

Richard L Gregory

References

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 Dawkins R, 1986 *The Blind Watchmaker* (London: Longman)

⁽²⁾ This would be Platonic mathematics—abstract nonsensory already existing *objects*—perceived by the mind.

⁽³⁾ Cf Dawkins 1986.

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