A 'metaphysing' dung beetle

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You may have seen the film *Microcosmos*, produced in 1996 by the French biologists Claude Nuridsany and Marie Perrenou. It does not star humans, but much smaller creatures, mostly insects. The filmmakers' magnifying camera transposes the viewer into the world of these organisms. For me, *Microcosmos* is not an ordinary naturalist documentary; it is an exercise in metaphysics.

One sequence in the film shows a dung beetle—with the 'philosophical' generic name *Sisyphus*—rolling a ball of horse manure twice its size that becomes stuck on a twig. As the creature struggles to free the dung, it gives the impression that it is both worried and obstinate. As we humans know, the ball represents a most valuable treasure for the beetle: it will lay its eggs into the manure that will later feed its offspring. The behaviour of the beetle is biologically meaningful; it serves its Darwinian fitness.

Yet, the dung beetle knows nothing of the function of manure, nor of the horse that dropped the excrement, nor of the human who owned the horse. *Sisyphus* lives in a world that is circumscribed by its somatic sensors—a species-specific world that the German biologist and philosopher Jakob von Uexküll would have called the dung beetle's '*Umwelt*'. The horse, too, has its own *Umwelt*, as does the human. Yet, the world of the horse, just like the world of the man, does not exist for the beetle.

If a 'scholar' among dung beetles attempted to visualize the world 'out there', what would be the dung-beetles' metaphysics—their image of a part of the world about which they have no data furnished by their sensors? What would be their religions, their truths, or the Truth—revealed, and thus indisputable?

Beetles are most successful animals; one animal in every four is a beetle, leading the biologist J.B.S. Haldane to quip that the Creator must have "had an inordinate

fondness for beetles". Are we humans so different from dung beetles? By birth we are similar: *inter faeces et urinas nascimur*—we are born between faeces and urine—as Aurelius Augustine remarked 1,600 years ago. Humans also have a species-specific *Umwelt* that has been shaped by biological evolution. A richer one than is the *Umwelt* of beetles, as we have more sensors than have they. Relative to the body size, we also possess a much larger brain and with it the capacity to make versatile movements with our hands and to finely manipulate with our fingers.

This manual dexterity has enabled humans to fabricate artefacts that are, in a sense, extensions and refinements of the human hand. The simplest one, a coarse-chipped stone, represents the evolutionary origins of artefacts. Step-by-step, by a ratchet-like process, artefacts have become ever more complicated: as an example, a Boeing 777 is assembled from more than three million parts. At each step, humans have just added a tiny improvement to the previously achieved state. Over time, the evolution of artefacts has become less dependent on human intention and may soon result in artefacts with the capacity for self-improvement and self-reproduction. In fact, it is by artefacts that humans transcend their biology; artefacts make humans different from beetles. Here is the essence of the difference: humans roll their artefactual balls, no less worried and obstinate than beetles, but, in contrast to the latter, humans often do it even if the action is biologically meaningless, at the expense of their Darwinian fitness. Humans are biologically less rational than are beetles.

Artefacts have immensely enriched the human *Umwelt*. From among them, scientific instruments should be singled out, as they function as novel, extrasomatic sensors of the human species. They have substantially fine-grained human knowledge of the

Umwelt. But they are also reaching out—both to a distance and at a rate that is exponentially increasing—behind the boundary of the human *Umwelt*, behind its conceptual confines that we call Kant's barriers. Into the world that has long been a subject of human 'dung-beetle-like' metaphysics. Nevertheless, our theories about this world could now be substantiated by data coming from the extrasomatic sensors. These instruments, fumbling in the unknown, supply reliable and reproducible data such that their messages must be true. They supersede our arbitrary guesses and fancies, but their truth seems to be out of our conceptual grasp. Conceptually, our mind confines us to our species-specific *Umwelt*.

We continue to share the common fate of our fellow dung beetles: There is undeniably a world outside the confinements of our species-specific *Umwelt*, but if the world of humans is too complex for the neural ganglia of beetles, the world beyond Kant's barriers may similarly exceed the capacity of the human brain. The physicist Richard Feynman (1965) stated, perhaps resignedly, "I can safely say that nobody today understands quantum mechanics." Frank Gannon (2007) likewise commented that biological research, similarly to research in quantum mechanics, might be approaching a state "too complex to comprehend". New models of the human brain itself may turn out to be "true and effective—and beyond comprehension" (Kováč, 2009).

The advances of science notwithstanding, the knowledge of the universe that we have gained on the planet Earth might yet be in its infancy. However, in contrast to the limited capacity of humans, the continuing evolution of artefacts may mean that they face no limits in their explorative potential. They might soon dispense with our conceptual assistance exploring the realms that will remain closed to the human mind forever.

REFERENCES

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EMBO reports (2010) 11, 410. doi:10.1038/embo.2010.72