Out of Africa: From *Homo naledi* to *'Homo cyborg'*

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No tools were unearthed, only traces of tool-using capabilities. No death record was chronicled, only sweeping estimations of several thousands or millions of years. No enhanced cognitive functioning was alleged, only insinuations of a primitive brain the size of an orange. As scientists hunted for fragments of our earliest life forms in underground cave systems, they may also have uncovered traces of our not-so-human futures.

The earth-shattering discovery of a new species of hominin by palaeontologists operating in South Africa's underground cave system enhances our understanding of our human origins. After six 'underground astronauts' treaded through chambers of dripping stalactites and cracks of limestone to uncover *Homo naledi*, the piecing of 1500 preserved bones from at least 15 individuals confirms once again that our early roots are in Africa.

Other early roots were further explored only a few months after the discovery of *Homo naledi*, with the stunning find of 47 human teeth deep inside a cave system in Daoxian, China. Dated between 80 000 to 120 000 years old, the discovery of the teeth leads us to question only one migration out of Africa – could there have been multiple waves of movement off the continent?

The uncovering of these ancient fossils undoubtedly represents a victory for palaeoanthropology. It also symbolises a technological triumph. In South Africa, petite cavers – all women – were recruited via social media, and their journeys were scrutinised through blogs and video diaries, complemented with Twitter and Facebook updates. Electrical cords dangled through caves, cameras above ground enabled real-time viewing below, and the recovery of fossils required 3D scanning equipment. Technology was also used to convene more than 50 experienced scientists and early-career researchers to categorise and report on the skeletal material. In China, sophisticated technologies were used to determine that the teeth contained no radioactive carbon, which led to the identification of their age using calcite deposits. Technological advancements thread through this tale.

Despite the technological prowess used for the discoveries, the certainty of our *Homo* origins disintegrates with time: Is *Homo naledi* 20 000 or 2 million years old? Are the teeth 80 000 or 120 000 years old? Were the bodies disposed of deliberately or caught in a death trap scenario? Scientists suggest it may be decades before convincing responses emerge for either scenario.

Within our lifetime, *Homo naledi* and its descendants – us – could plausibly evolve into '*Homo cyborg'*. Techniques for human enhancement already exist to augment our mental and physical capabilities. Our bodies are restored to their original states through artificial medical remedies: pacemakers are routinely embedded in us to preserve, restore, or replace heart beating functions; and paralysed individuals move robotic limbs by channelling thoughts through electronic implants. The manifestation of *Homo cyborg* advances medicine to enhance and reshape the natural body and its human functions.

The convergence of computing and neuroscience will further propel the notion of *Homo cyborg*. The technology futurist Ray Kurzweil predicts that our neocortex will connect to the cloud by 2030 – a mere 15 years away. As our cognition fades with time, machines will assume lost functions. The human brain will die, but our minds will live on, perhaps even in a machine. We will be able to remedy biological demise through the life of our mind using technology. Humans risk losing control of their evolution. Artificial bodies could prevail.

Norbert Wiener, the US mathematician and founder of cybernetics, cautioned that technological advancement could result in the dehumanisation of humans. We employed cutting-edge technology to assist us in uncovering our ancestors. For our future tomorrow, we must balance our human touch with technological sophistication. We may not entirely understand our past out of Africa, but we certainly hold the tools to our future.