

Amplio, Ergo Sum

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Abstract: This article aims to explore the idea that enhancement technologies have been and will continue to be an essential element of what we might call the “human continuum,” and are indeed key to our existence and evolution into persons. Whereas conservative commentators argue that enhancement is likely to cause us to lose our humanity and become something other, it is argued here that the very opposite is true: that enhancement is the core of what and who we are. Using evidence from paleoanthropology to examine the nature of our predecessor species, and their proclivities for tool use, we can see that there is good reason to assume that the development of *Homo sapiens* is a direct result of the use of enhancement technologies. A case is also made for broad understandings of the scope of enhancement, based on the significant evolutionary results of acts that are usually dismissed as “unremarkable.” Furthermore, the use of enhancement by modern humans is no different than these prehistoric applications, and is likely to ultimately have similar results. There is no good reason to assume that whatever we may become will not also consider itself human.

Keywords: human enhancement; cognition; posthuman; evolution; personhood; human nature; moral value

Introduction

Since the earliest times, what we today refer to as “human enhancement technologies and methodologies” have had a greater and more fundamental influence on humanity than many would wish to accept. I present here an argument that enhancement, in its various forms, has been essential to the evolution of our species, and that its use today will only maintain the human continuum. If we can affirm this, there are great implications for our understanding of and the attitudes we should adopt toward the beings we may become, the so-called “posthumans.”¹ It is my contention that by looking to the past, we will hold the key to understanding the likely ways in which we will develop, and react to that development, in the future.

From *Sahelanthropus* to *Australopithecus afarensis*, into the genus *Homo*, the descent of humans is a constant thread. *Homo habilis* and *Homo gautengensis* gave rise to the intermediaries *Homo georgicus* and *Homo ergaster* before the well-known tool- and fire-user *Homo erectus* came to the fore as the premier member of the genus. *Homo antecessor* followed, broadening the group to include *Homo heidelbergensis*, *Homo rhodesiensis*, and the cousins *Homo neanderthalensis* and Denisovian hominin. During the existence of the latter species, we see the emergence of *Homo sapiens idaltu*, and ourselves, the wise humans: *Homo sapiens sapiens*. It is likely we would feel a kinship with these ancestors, stretching back into our first emergence from the trees, and we must acknowledge that one day we shall be seen by our descendants further along this thread just as we look back upon *H. erectus*. Here, I shall explore what it is that gives shape to this common thread, what made us who we are, and what shall undoubtedly shape our futures.

Ancient Apes and Modern Humans

Imagine that ancient *H. sapiens* walked among us. How would we treat them? Imagine that they were not Methuselah figures, but true ancestors to us all, the

first *sapiens* to walk the Earth. Imagine that they were new to our modern society, that they were, so to speak, “primitive.” They use fire, stone, and wooden tools. They clothe themselves and live as nomads in basic shelters. They are used to being prey for wild beasts, and to hunting and gathering for themselves. Agriculture is still far off for them, let alone our modern visions of biotechnology and enhancement.

They are 195,000 years old. They are known to us, today, as “*Omo humans*.”² Omo I and Omo II are the oldest known fossil examples of *H. sapiens*. Their exact subspecies is not entirely clear—they could be thought of as the point from which *H. sapiens sapiens* and *H. sapiens idaltu* diverged—but they are generally regarded as being, or being on the very cusp of, what anthropology refers to as “anatomically modern humans”³ (AMH).

When we think of “humans” and “humanity,” we do not tend to picture the beginnings of our species, beings from a different epoch. We perhaps tend to think of one of three major meanings⁴ of the term: the biological, effectively equaling species and usually limited to *H. sapiens sapiens*; the moral one, in which we refer to a community of beings of a particular moral status that we hold ourselves to possess; or the self-idealizing one, wherein we see a set of physical and behavioral traits and characteristics that we recognize both within ourselves and as something to which we ought to aspire.

All three are valid in different ways and are appropriate in different contexts, but if we consider them together, our instincts as to what counts as human might be challenged. The second and third senses are relatively straightforward: anything that shares the requisite traits, characteristics, or desires with us would probably count as human, as would anything that falls within our bracket of moral value; that is, persons. The issue here is introduced when the being that fulfills these requirements is *not* of the same species, as in the first common use of “human.” If the term is used as shorthand for *H. sapiens sapiens*, as it frequently is, then necessarily it precludes any other species (including other members of the same genus). As will be discussed later, this is likely to be a mistake.

It seems likely that the presence of such a visitor as *Omo* would cause a number of dilemmas, or perceived dilemmas. A primary concern would probably be the protection of such a being, and to what degree *Omo* would qualify for this. I have discussed elsewhere⁵ that it is the possession of personhood that we generally hold as a threshold for warranting the protections enshrined in law; protection of life, of body, of autonomy, and from discrimination to name but a few. However language, culture, and xenophobia (from both us and, potentially, from *Omo*) may make it difficult to recognize moral agency, self-consciousness, or narrative identity,⁶ which are the usual measures by which we tend to evaluate personhood, in our direct ancestor.⁷ The matter would be further complicated by the academic value of having a living early *H. sapiens* to study, which may contravene some of these protections (assuming that *Omo* lacked a grasp of evolutionary biology and modern research methods, or a particularly easygoing nature). We could undoubtedly learn much more about ourselves and about our ancestors than from fossils and inference of behavior, and it may be that some argue in favor of pursuing such a unique opportunity. Furthermore there is the need to protect *Omo* from the hazards of the modern environment that they may not comprehend.

Still, however, we would probably be reticent to treat such a being as an inferior—as a nonhuman animal, as an object—even if that being’s personhood

were in question. Some parallels might be drawn with beings we more commonly encounter: those who are either congenitally or through injury incapable of possessing or exercising the capacities necessary to qualify, philosophically, as persons. We generally abhor the notion of ostracizing the cognitively impaired, and instead treat them as we would persons. As I have discussed at length elsewhere, “human” is often used as a taxonomic descriptor and a collection of self-ideals to which we aspire, but is also a term describing a community of value.⁸ We would most likely describe a severely cognitively impaired *sapiens* as a human, as being a member of this community; and it seems reasonable that we would feel the same about any being that we know to be of our own specific species, ancient or not.

Would we react in the same way if our visitor was not our species? What if the visitor was an immediate ancestor in our genus, such as *H. erectus*? There would be no hard and fast dividing line⁹ between species where we might cleanly apply our divisions of personhood and humanity. If *H. erectus*, rather than a descendant of *H. erectus*, were to appear among us, it seems unlikely that our reactions would be any different than those we would experience when suddenly meeting *Omo*. Once again, we would be faced with someone highly similar to ourselves, although this time not someone “anatomically modern” or even an “archaic human,”¹⁰ which is an anthropological term for our immediate ancient peer species including *H. neanderthalensis*, *H. rhodesiensis*, and *H. heidelbergensis*, which is interesting to note in and of itself. We would see its heavy brow and different gait when compared to ourselves, even to *Omo*, and yet we would also see a range of behaviors that we would recognize as being meaningfully similar to our own. Our gut instinct would probably be to welcome a family member, not to cage an animal.¹¹ The further back we would go from which to draw our visitor, the harder it would be to predict our reaction, as we would know less and less for certain. Our ancestors would become steadily less “anatomically modern”—*H. habilis* had a smaller skull, a shorter stance, and more apelike features than us, but was still morphologically and behaviorally similar—and had a cranial capacity at least twice that of its predecessor.¹² More and more would rely on our determination of the ancestor’s moral status.

Our personhood is effectively unique, and it is probable that we are the only species to consider ourselves as such. Or, more properly, we are the only extant species—*H. sapiens idaltu*, *H. neanderthalensis*, *H. erectus*, and possibly older members of the genus are likely to have had the necessary intelligence and cranial capacity to qualify as persons—particularly if we consider the modern movements and legal proceedings¹³ to provide personhood to great apes and certain other non-*Homo* creatures. These animals are likely to be less intelligent or cognitively capable than our direct ancestors. Obviously, this cannot be proven, but we can extrapolate from the cranial capacities and paleontologically evidenced behaviors of the latter that they were probably close to modern humans in this regard. These behaviors include cooking in *H. erectus*, as well as complex social groupings with hunter-gatherer behavior and care provision for the infirm,¹⁴ even seafaring.¹⁵ *H. erectus* is also thought to have been capable of true vocalized language, possibly even articulate language in the same range as *H. sapiens*.¹⁶ We cannot know that this level of intelligence allowed for the generally accepted traits of personhood, which as discussed earlier in this article include moral agency, self-awareness, and narrative, but the nature of the behaviors would suggest that it did. It would require a moral agent to provide care for the infirm; and there are

few reasons to build rafts to cross lakes and seas from Asia to Europe¹⁷ without some capability to recognize a poor past and the potential for a better future beyond the waves. Self-awareness is harder to fathom given its internal nature, but evidence from nonhuman animals would suggest that it is entirely likely that they possessed it.¹⁸ If we take a Lockean perspective—that self-awareness is a repeated self-recognition allowing for moral responsibility;¹⁹ and the Nietzschean corollary of this that a self-aware being could be guilty and also cruel—“the psychology of conscience is not ‘the voice of God in man’; it is the instinct of cruelty”²⁰—then observations of chimpanzees would tend to bear this out. Chimpanzees have been found to have a sense of fairness; for example, choosing in a test to ensure that both parties received equal shares of food rather than trying to win more for themselves.²¹ They have also been found to punish wrongdoing (stealing food) against themselves,²² and have been seen to act in a cruel and brutal fashion in the famous “Gombe Chimpanzee War” as observed by Jane Goodall:

For several years I struggled to come to terms with this new knowledge. Often when I woke in the night, horrific pictures sprang unbidden to my mind—Satan [one of the apes], cupping his hand below Sniff’s chin to drink the blood that welled from a great wound on his face; old Rodolf, usually so benign, standing upright to hurl a four-pound rock at Godi’s prostrate body; Jomeo tearing a strip of skin from Dé’s thigh; Figan, charging and hitting, again and again, the stricken, quivering body of Goliath, one of his childhood heroes.²³

It bears noting, however, that it is not clear that the chimpanzees here were acting classically cruelly; that is, planning to cause pain, and imagining the suffering of the victim.²⁴

The evidence, then, would suggest that it is entirely possible for our predecessor species to have qualified as persons, at least as those within our own genus. If personhood is the main constituent of our community of value, then it is difficult to argue that any hominids that *were* persons might not also count as human. However, we are left with the question of what it is that makes this possible. To understand this chain of humanity, we must first examine what has forged it.

Essential Technology

The use of tools and the use of fire are possibly the primary drivers in the evolution of *H. sapiens*; and more pertinently, of the traits and characteristics that we like to think qualify us as “human.” Tools are defined as “[a]n object that has been modified to fit a purpose” or “[a]n inanimate object that one uses or modifies in some way to cause a change in the environment, thereby facilitating one’s achievement of a target goal”.²⁵ This is not, as we will discuss, too far from the general gist of enhancement technologies.

Bending physics to our will did not begin 5,500 years ago with the wheeled vehicle,²⁶ nor did it start at the use of Archimedean machines such as the lever and the inclined plane in prehistory. The oldest known deliberately designed tools are flint hand axes, applications of the machine principle of the wedge, dating from approximately 2,600,000 years ago:²⁷ tools that heralded the dawn of the Palaeolithic period.²⁸ There is evidence to suggest that the use of sharp stone

implements for food acquisition occurred even earlier, approximately 3,400,000 years ago, with “unambiguous stone-tool cut marks in ... [animal] bone.”²⁹

These, however, are not the first instances of tool use itself. Leaving aside so-called “social tool use” such as ants using their own bodies to form bridges,³⁰ there are many examples of tool use in nonhuman animals. Although deliberately manufactured tools are rare, there is widespread use of found objects, for want of a better term, across all *phylae* of the animal kingdom; from primates³¹ to cetaceans,³² birds,³³ cephalopods,³⁴ fish,³⁵ reptiles,³⁶ and insects.³⁷ Tool use is far from a trait unique to the *Homo* species. When we can directly observe the phenomenon in animals in the wild today, particularly in those animals that we know ourselves to be closely related to, it is safe to think that whatever common hominid ancestor we share with *Pan*, *Pongo*, or *Gorilla* is likely to have made use of them too.³⁸

Consequently, we may feel justified in concluding that tool use is nothing special. It does not set us apart from any other beings, past or present—it cannot be this faculty that makes us human—or at least, not this alone. As mentioned, tool use is undoubtedly the driving force behind our evolution into the morally valuable beings we consider ourselves to be, and, indeed, for our ancestors to have done the same, even if they did not consider it in as many words.

Through our ancestors’ use of tools to augment their capabilities, they provided themselves with the means to evolve in the manner in which they did; resulting, as it happens, in the primacy of highly developed cognitive function. We could consider this cognitive function something of a self-fulfilling prophecy, providing the means for our ancestors to enhance their own cognition further. As *Australopithecus* developed the duplicate *SRGAP2* gene,³⁹ engendering longer and more functional neurons, it sowed the seed for *Homo* to emerge.⁴⁰ *A. afarensis*, the species of the famed “Lucy” fossil,⁴¹ existed at the right time to have been behind the oldest stone tool cut marks already mentioned. Lucy’s probable descendant *H. habilis*—the “handy man”—began the widespread use of stone tools, moving beyond the “found object” tools previously discussed. The use of the upper limbs to manipulate tools regularly is thought to have contributed significantly to the move to true specialized bipedalism: less shoulder stability is needed, which frees the arms for greater ranges of motion to develop.⁴² Furthermore, the use of increasingly complex hand tools required increasingly sophisticated cognitive capacities to coordinate the requisite fine motions.⁴³ Sharp tools allowed for butchery and the skinning of animals,⁴⁴ primarily scavenged, which would usher in a critical evolutionary factor. *H. erectus* was the first ancestor in which we see incontrovertible evidence of the manipulation of fire and of cooking foods.⁴⁵

The controlled use of fire has one immediately obvious advantage; and it is the same reason that campers and outdoors enthusiasts carry fire-making equipment and we still build homes with hearths today (even if the advent of the radiator has mitigated this somewhat). The provision of warmth is one of the most critical survival necessities for any animal, and fire—the most direct means of doing so—significantly reduces the amount of time and effort that this takes to attain.⁴⁶ The ability to produce and control fire would also have contributed to the spread of ancient humans to cooler climates, and provided protection from night predators.⁴⁷

The cooking of food, however, is likely the most significant factor in the acceleration of cognitive capacity and brain size. Cooking acts as a form of pre-digestion in as much as less energy is required to break down tough fibers and proteins. Consequently, there is more to spare, and this is exacerbated by the increased

release of nutrients. For example, cooking would improve the digestive availability of complex carbohydrates, so for the same amount of food consumed, significantly more energy could be absorbed.⁴⁸ This contributed to the growth in brain size and capacity of *H. erectus*⁴⁹ in several ways. The first, much as with the provision of heat, allowed much less time—and therefore less energy—to be spent on feeding. An analysis of modern humans suggests that we spend only 4.7 percent of our time feeding, whereas our body mass and comparison with our close primate relatives would call for nearer 48 percent.⁵⁰ The second is this very provision of energy.

As I have discussed elsewhere,⁵¹ increased cognitive capacities and larger brains cause a proportionally increased drain on the body's energy budget. Being able to provide for this higher calorific need—through tool use and cooking⁵²—is the basis of an upward spiral or self-fulfilling prophecy. As cognitive function increases, it both requires and provides means for improved efficiency of energy intake. The increasing intake provides excess energy, which can be used to improve cognitive capacities. These then require a still greater input. There was, in a sense, an evolutionary pressure to improve technology, which, as I will show, in turn improved "us."⁵³

Technological Enhancement versus Natural Behavior

It is all very well to say that the actions described previously were important in the development of greater capacities in our predecessors; but it may be possible to write these off as animal behaviors with no deeper significance or meaning. One might suggest that their evolutionary ramifications are a mere byproduct, no different from that of any random beneficial genetic mutation taking hold, as seen in "traditional" sympatric speciation. If one imagines that an ancient primate group split into subgroups, one of which used stick tools and one of which did not, and the stick users had some advantage that led to isolation and speciation, this notion makes a certain degree of sense.

A similar concept is prevalent in a certain sector of the enhancement literature. Some thinkers would argue that some actions that bring us benefits and improve our capacities do not count as enhancement: the use of hand tools, as described in the previous section, being a major example. Patrick Lin and Fritz Allhoff give perhaps the neatest example of this argument, saying: "we understand that steroid use by baseball players is a case of human enhancement; we also understand that using a rock to crack open a clam is not."⁵⁴ This line serves to illustrate the key distinction for those who might agree; that there is a significance to artificial interventions that does not pertain to those that could be considered natural. Unfortunately (or fortunately depending on one's views) the reality of this distinction is not as clear-cut as some would like. In order to determine which interventions might be significant, we are forced to ask the following question: What, exactly, is the difference between the natural and the artificial in this context?

If we take Lin and Allhoff's steroids and rocks as they were intended, this means that steroids are the product of our highest modern chemical and biological artifice, and that rocks are the most basic, unaltered objects imaginable. The differences between the two items are myriad. Steroids take the application of all our learning to develop, and the application of our sophisticated technologies to produce. Anabolic steroids—performance-enhancing drugs—are made possible only by

our advanced capabilities, and could not feasibly have been manufactured or applied to augment sportspersons before the modern day. Rocks, on the other hand, are common objects which one can pick up almost anywhere on the planet, and are unchanged from those accessible to the Victorians, to the Romans, or to our most ancient primate ancestors. It requires no artifice and only a modicum of finesse or knowledge to utilize a rock to smash a clam.

The implication made is that the rock is natural, and the steroid is not. This may be true in a strict sense. One is found as is, and one requires artifice to produce. Consider, however, their effect. Injecting a baseball player with a course of the steroid may improve his strength, his speed, or his endurance. He is now capable of greater athletic feats than before taking the steroid: he can swing harder, round the bases faster, and work harder for longer (always useful in interminably long games of baseball). Palming a rock and swinging it has its own effect: clam fanciers can impact the bivalve with much greater force than with no rock in hand. They can open something that was previously inaccessible: they can perform a feat that previously they were incapable of performing. The rock and the steroid both impart a greater capacity to the user. They have, ultimately, the same effect.

There is no agreement across the spectrum of enhancement literature as to what might actually constitute an enhancement. Leaving aside the perennial enhancement-therapy debate, it remains (and is likely never to cease being) a matter of contention whether enhancement technologies must be so-called “technoscientific”⁵⁵ interventions—like the anabolic steroid—or whether the definition can be much broader.

Lin and Allhoff, who claim that “tools, diet, exercise and so on... [are] what we would intuitively call ‘natural enhancement’”⁵⁶ are in the former camp. This explains their feelings as to the rock. The European Parliament’s Internal Policies Department holds that an enhancement is “a modification aimed at improving individual human performance and brought about by [specifically] science-based or technology-based interventions in the human body,”⁵⁷ and further elaborates that: “Excluded... are improvements of human performance which are realised by the use of devices which are not implanted or not robustly fixed to the body.” Therefore, binoculars would not count, but implanted magnifying lenses would.

There is no explanation of this argument offered. Lin and Allhoff for their part rely on “intuition.” It seems, then, that the grounds for this viewpoint may be a little thin. The European Parliament document does try to rationalize by telling us that “one could argue [that non technoscientific interventions have] nothing to do with human enhancement at all, but only [amount] to a rather ordinary application of technology”;⁵⁸ but again it fails to actually deliver this argument. Nor does it explain why the application of science and/or technology to develop external aids is somehow different from similar applications within the body.

Lin and Allhoff do, however, use an interesting turn of phrase: “a rather ordinary application of technology.” This appears to be the key to the viewpoint being espoused; namely, the idea that some technology use is unremarkable. As explored at some length previously, we see basic technology (as in the Greek, *techne* “art, skill, or cunning of hand,” and *logia* “knowledge”⁵⁹) in a variety of animals. Technology, the use of artifice and the knowledge to apply it, exemplified as tool use in particular, is clearly a natural occurrence. Does this render it unremarkable? Perhaps it does, in and of itself, or perhaps it is more to the *effects* of this natural process that we should look to determine significance.

As discussed, in hominid evolution the use of natural tools no different from those that critics would dub “ordinary” proved a key factor; possibly even the most important. The (extremely long-term) effects of this “natural” technology would elevate us to the intellect and capacities we pride ourselves on possessing, uniquely among species. One might be justified in considering this significant.

Where a tool is “a device or implement...used to carry out a particular function... a thing used to help perform a job,”⁶⁰ we may struggle to think of any technology—advanced technoscience or an ape’s stick for collecting ants⁶¹—that does not fulfil this description. Performing a task requires capacity. Tools are, by definition, a means of providing this capacity: capacity that we do not possess without them. Whereas it is possible for us to break a stick with our bare hands, or to climb a wall, it is not possible for us to fell a tree, or to cut meat. These latter tasks require our capacities to be increased, through the use of a tool.

Although the particulars of what constitutes enhancement are up for debate, all agree that an enhancement would improve our capabilities or experience in some manner.⁶² This most basic requirement is telling. It seems difficult—even futile—to argue that the effect of a prosthesis, or a computer implant, or even an injection altering one’s biochemistry, would have a greater, or more lasting, impact than those we have discussed.

It is strange to consider technoscience as enhancement if these natural tool uses are not, and indeed Lin and Allhoff admit in a later article that “the natural-versus-artificial distinction... may prove most difficult to defend given the vagueness of the term ‘natural.’”⁶³ Arguably, we have gained far more from them than from the promised benefits of cognitive drugs, or cyborg implants. As I have endeavored to make clear, without these “natural” processes we would very likely still be much closer to our cousin the chimpanzee. It is probable that we would not possess many, even any, of the faculties and traits that we pride ourselves on, which we consider to be what make us human. If we, as we exist today, are the only beings worthy of personhood, then it is almost certain that without the enhancement provided by these basic tools—these “ordinary” behaviors—we would not be persons.

The technoscientific, radical intervention type of enhancement technologies that are (rightly) the focus of most debates promise us great things. All our capacities are potentially available to be augmented, from physical to cognitive; and it may well be that with the advent of genetic science, we will be able to give ourselves wholly novel abilities. It is increasingly likely that these changes could be made to the germline,⁶⁴ altering our offspring and, potentially, the future of our evolution as well. Some argue that it will go so far as to create new species, rivals for *H. sapiens*. Are they to be feared, or embraced as siblings? These changes have every chance of being hugely significant, changing who we are and how we live.

Compare, however, these changes against those we have already experienced. The potential augmentations we could see in the near future—or even that we have access to today—pale in comparison with the gulf between modern *H. sapiens* and that being’s ancient hominin predecessors. The very fact that we are in a position to even conceive of these ideas speaks volumes; one suspects that *H. habilis* had less lofty hopes for her or himself. It is these dreams, however, that are the key. Today, we imagine augmenting and enhancing ourselves to eradicate disease, to ensure a fairer world, and to enable ourselves to reach ever greater heights of cognition. Whichever side of the debate one falls on, it cannot be denied that we wish to better ourselves.

Ancient humans almost certainly had this same desire: less eloquently stated, perhaps, and even, if we go back far enough, probably subconscious. Regardless, the activities—particularly tool use—that we have discussed herein are means of improving the actor's lot. My life is improved if I can butcher meat with a stone hand-axe, or warm myself at a fire. My capacities are improved by these acts—over time—to the point that new, more advanced, and more able species arise. Had there been (conservative) bioethicists amongst the palaeolithic denizens, would they be espousing the same fears of their successors? The situations are not so different.

I Enhance Therefore I Am

So to what do these thoughts lead us? If we recognize the nature of our development up to—and probably beyond—*H. sapiens* as being a product of the use of enhancement, and hold that *H. sapiens* is a morally valuable being, then we have a glaring contradiction to explain away if we want to stick to the idea of enhancement as necessarily unnatural. Alternatively, we could simply embrace it. Our nature as moral beings, as persons, and as members of the human community of value all stem from the use of enhancement technologies: technoscientific, natural, and anthropological behaviors alike. I enhance, therefore I am. This holds true for the entire gamut of our existence, from ancient ancestor to potential beings who might succeed us. It follows that we must, therefore, exist on a continuum of sorts. As discussed earlier, ancient humans would, and should, probably be treated as our moral—if not cognitive—peers, and I have elsewhere argued for the same with regard to the types of novel persons we are likely to encounter in the future or indeed whom we might encounter from other sources, such as conscious AI.⁶⁵

This “human continuum” can be a means of placing ourselves in context, and perhaps more importantly a means of understanding what lies ahead by virtue of being able to recognize the path we have taken. Where we are likely to shape the future—and it is now increasingly recognized⁶⁶ that we have entered a new epoch, the Anthropocene, in which the world is shaped by humans rather than by nature—we must not forget that we are ourselves products of past beings. Their actions and technologies have engineered us just as we will (more deliberately) engineer our successors, whoever and whatever they may be. This remains the case on a smaller scale. Consider the aforementioned *Omo* person—an *H. sapiens sapiens* like us, and a person like us—and the gulf between our values and experiences. Consider, too, the Roman citizen, much closer to us temporally but still with many societal and moral differences, and yet so influential to who we are today, how we live our lives, and what we accept as part of the human experience. Both these persons (and their peers) could be thought to be primitive in different ways, but their uses of such technology as was available to them drove the development of what we recognize as human, and of what traits we see in ourselves as making us so. It is undoubtedly the case that in 2,000 years, whatever beings exist who consider themselves to be human will look back on us as limited beings, with technologies that are primitive compared with their own, but they too will be able to see the line from our development of genome editing, or implantable computing, or powerful exoprostheses to their own embodied existence and values.

“Human enhancement technologies” is a phrase perhaps born of convenience, describing the tools by which we augment our capacities, but it is also correct in

another sense. Not only do these technologies—broadly conceived—improve the abilities of humans, they also expand what is *to be* human. Contrast this idea with that of conservative commentators, who would hold that radical technology use will make us something other than we are, something other than human. I am a child of the Internet age, but even I possess abilities through technology today that were beyond my imagining as a younger person. That becomes exponentially more so if we consider older living generations. It is difficult to think of the changes in personally enhancing technology over the last 20 or 30 years—even the last decade—as being anything short of tremendous, and yet here we remain: ourselves. I still consider myself to be human, and no doubt I will do so until the day I die, whatever strange technologies I have incorporated into my life at that point. I will remain as morally valuable as the Roman citizen, I will remain within the same community not only as *Omo*, but even as *H. erectus* and perhaps *H. habilis*. The chain between these beings is technology and the use of that technology to improve our capacities. As these capacities have improved, the conception of exactly what it is to be “human” may have expanded—it is likely that we have a rather more subtle idea of our community of value than did *Omo*—but it remains the case that we, and our ancestors, would each consider ourselves human (or whatever protolinguistic term was once used for the same). It is natural to fear the new, but that does not make it right. The wisdom of repugnance would be cold comfort had our *Australopithecus* forebears managed to kill off their smarter mutant brethren. We would not be here to have these discussions if *H. habilis* had not improved their lot in life and, gradually, their capabilities.

These enhancing technologies, of whatever type (if one chooses to divide them), are the sole reason we have come to exist, and the key reason that we are persons. The questions we should be asking are not “what might go wrong” and “why would we want to stop being human,” but rather “where might we go” and “what else might be human.” Ancient hominids, modern humans, and the beings of tomorrow stand together in this as part of a human continuum wherein enhancement is essential for continued development. There is no reason to expect that to break.

Notes

1. I have explored (and opposed) this concept of “post” elsewhere: Lawrence D. The edge of human? The problem with the posthuman as the ‘beyond’. *Bioethics* 2017;31(3):171–9. It seems reasonable that any being we may become will also count itself, and should be counted by us today, as being simply “human.”
2. McDougall I, Brown F, Fleagle J. Stratigraphic placement and age of modern humans from Kibish, Ethiopia. *Nature* 2005;433(7027):733–736.
3. Nitecki M, Nitecki D. *Origins Of Anatomically Modern Humans*. New York: Plenum Press; 1994.
4. See note 1.
5. Lawrence D. More human than human. *Cambridge Quarterly of Healthcare Ethics* 2017;26(3):476–90
6. Taylor C. *The Concept Of A Person. Philosophical Papers, Volume 1*. Cambridge: Cambridge University Press; 1985, at 97.
7. For a more thorough exploration of this concept see See note 5 Lawrence 1985.
8. See note 1.
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Spoor F, Gunz P, Neubauer S, Stelzer S, Scott N, Kwekason A, et al. Reconstructed Homo habilis type OH 7 suggests deep-rooted species diversity in early Homo. *Nature* 2015;519(7541):83–6.
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