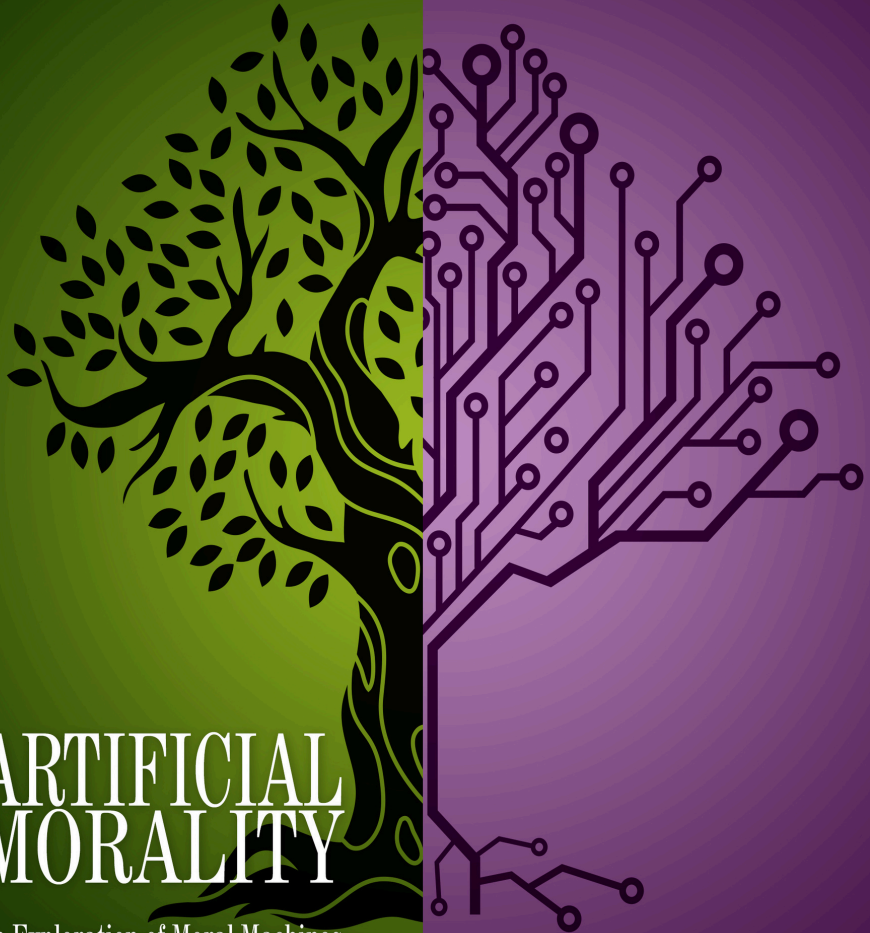


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ARTIFICIAL MORALITY

An Exploration of Moral Machines

ANDREI NUTAS



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Artificial Morality:
An Exploration of Moral Machines

Andrei Nutas

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Andrei Nutas

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*The measure of our maturity
is how the most vulnerable fare, not the mighty.*

*With conscience as our guide, technology can be midwife to a world
community that nurtures the flourishing of all conscious beings.*

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CHAPTER 1

Technogenesis

THE NATURE OF TECHNOLOGY

Despite its apparent pervasiveness, it is difficult to pin down what technology really is. At present, there has yet to be a clear agreement on what technology means and how it came into being. Disagreements often occur because people are unaware that the discussed terms are defined differently. Some consider that definitions are random and that it's not worth trying to choose between different definitions. Under this nominalist view, definitions are but arbitrary ways of carving up the world so we can refer to things within an act of communication. I do not want to completely negate this view, as authors and speakers have the right to define the terms as they wish. However, if used effectively, I think definitions cannot be wholly arbitrary but require a common thread, or as the continentalists would call it, an "essence"¹. Technology can be defined in a variety of ways, and looking at the various definitions can grant us insight into what can be included under the term "technology". From a philosophical perspective, agreement upon the definition of a term is far from being a fatal hindrance in dealing with the term. Given that investigating the definitions can help us understand the wide range of things that can fall under that category, multiple definitions can reveal the term's largest common denominator.

When most people think of technology, they often picture the latest gadgets, machines, and digital tools that have become ubiquitous in our modern world. These tangible examples of technology are most visible

¹ Essence is used metaphorically to aid the reader. As a naturalist, I do not support the idea of essences as they are unfounded with an ontology of becoming.

in the realms of commerce and industry, where they are used to achieve specific objectives and solve practical problems. This understanding of technology is reflected in common definitions found in popular media and everyday discourse. One widely accepted definition states that technology is the scientific method and material used to achieve a commercial or industrial objective. Newspapers and blogs often refer to technology as the application of scientific knowledge for practical purposes, particularly in the context of industry.

Scholars have also echoed this view, with Albastaki et al. (2020) defining technology as “the application of knowledge for practical ends” and “the practical application of science to commerce or industry.” They further describe technology as “the discipline dealing with the art or science of applying scientific knowledge to practical problems” (p. 153).

While these definitions paint technology as a tool for solving problems and achieving goals in the world of business and industry, this only scratch the surface of what technology truly encompasses. To gain a deeper understanding, we must explore the philosophical and historical roots of the concept.

For those with a more philosophical bent, particularly those steeped in the European tradition, the roots of technology can be traced back to the Greek concept of “*technē*,” which is often translated as “art” or “craft.” This etymological insight broadens our understanding of technology beyond mere tools and machines, inviting us to consider the principles, methods, and knowledge employed in the creation of something new. Cartelli and Palma (2008) explain, technology “can refer to material objects, such as machines, hardware, or utensils, but it can also encompass broader themes, such as systems, methods of organization, and techniques” (p. 83). This expansive view suggests that technology is not just a collection of artifacts but an ever-evolving body of knowledge that both shapes and is shaped by the societies in which it emerges.

Some have been tempted to view technology as a deterministic force, an autonomous agent driving social change. However, Cartelli and Palma argue that this reductionist approach should be discarded in favor of understanding technology as just one component of a complex, multi-faceted cultural matrix that includes social, political, historical, and economic factors working together to spur transformation.

This idea of technology as an interconnected system is echoed in the words of Jacob Bigelow, an early American scholar. In 1829, he described technology as consisting of “principles, processes, and nomenclature of the more conspicuous arts, particularly those which involve applications of science, and which may be considered useful, by promoting the benefit of society, together with the emolument of those who pursue them” (p. 9). Bigelow’s definition highlights the practical and beneficial aspects of technology while also acknowledging its scientific underpinnings and the rewards it offers to those who engage with it.

More recently, Carvalho et al. (2020) have defined technology as “the creation, usage, and knowledge of tools, techniques, crafts, systems, or organization methods, to solve a problem or serve some purpose or end” (p. 21). This concise yet comprehensive definition captures the essence of technology as a means of problem-solving and goal-achievement, emphasizing its practical applications and the knowledge required to develop and employ it effectively.

By examining these more nuanced definitions, we can appreciate the multifaceted nature of technology and its profound influence on the human experience. Far from being a simple set of tools or a deterministic force, technology emerges as a complex, interwoven system that both reflects and shapes the societies in which it is embedded.

If we venture one etymological step further and look into the Proto-Indo-European root “Teks” which means “to wave” and “to fabricate” an even more intricate perspective presents itself. The latter meaning of Teks makes us think of solely physical goods, but the former hints at a more profound idea of combining things together to generate something new. By utilizing “Teks” when reflecting upon technology, we can think more profoundly about what technology is and provide a broader and more accurate definition. “Teks” aligns very well with Arthur’s (2009) view of technology. Arthur sees technology as coming “into being as fresh combinations of what already exists” (Arthur, 2009, pp. 18 -19). The components that are woven together to create technology are often themselves technological and “consist of subparts that are also technologies, in a repeating (or recurring) pattern” (Arthur, 2009, p. 38).

Observing this heredity in technology, some, like Butler (1863) or Kelly (2010), proposed even the idea of a “mechanical kingdom” or the “seventh kingdom of life”. While Butler set out to position machines as a sort of totalitarian menace to humanity that will, in the end, enslave us

all, his statement, hyperbolic as it may be, still reveals the heredity inherent in technology: “there is nothing which our infatuated race would desire more than to see a fertile union between two steam engines; it is true that machinery is even at this present time employed in begetting machinery, in becoming the parent of machines often after its own kind, but the days of flirtation, courtship, and matrimony appear to be very remote, and indeed can hardly be realised by our feeble and imperfect imagination”(Butler, 1915, pp. 184). Unlike Butler, who is a clear technological pessimist within his essay, Kelly is a technological optimist. To help in his explanation Kelly proposes a new term “technium”. “The technium extends beyond shiny hardware to include culture, art, social institutions, and intellectual creations of all types. It includes intangibles like software, law, and philosophical concepts. And most important, it includes the generative impulses of our inventions to encourage more tool making, more technology invention, and more self-enhancing connections” (Kelly, 2010, pp. 11 – 12). For Kelly, the fundamental property of the technium is that it is a system of “self-reinforcing creation” (Kelly, 2010, pp. 12). While we have at least a modicum of control over the technium since we created it, the technium like any system has its inherent momentum. “Because the technium is an outgrowth of the human mind, it is also an outgrowth of life, and by extension, it is also an outgrowth of the physical and chemical self-organization that first led to life” (Kelly, 2010, pp. 27). Given all these spheres of influence, Kelly proposes that the human mind may, in the end, be just a small factor when it comes down to the factors that influence the development of the technium.

Downsizing the influence that humans have on the evolution of technology can make sense if we look at technology’s ability to reveal. “Technology comes to presence in the realm where revealing and unconcealment take place, where *alētheia*, truth, happens” (Heidegger, 1977, pp. 4). According to Heidegger, technology helps us to see things that are not yet here and that can be used in different ways. The person who designs or builds a house reveals what it will eventually become based on the four modes of occasioning². This revealing brings together

² Heidegger introduces the concept of “occasioning” or “bringing-forth” (in German, “*hervorbringen*”), which he believes is the essence of technology. He suggests four ways of occasioning: 1) *Physis*, the natural arising of things, or the blooming of the blossom, the emergence of something from out of itself; 2) *Technē*,

the materials and aspects of the object in advance so that it can be constructed in the desired way. Thus, by generating technology, we observe qualities that were hidden before engaging in the endeavor of creating something. I would further elaborate that technology does not only occasion the revealing of the properties of the entities and actions required to generate the technology at hand but that after the creation of said technology, we can apply it to reveal new facets of our reality. Observing that technology guides our epistemic process in such a way also helps us understand the view of technology as a somewhat independent kingdom of life.

Considering the meaning of “Teks” and Arthur’s perspective of technology, the best way to approach a definition of technology is by first thinking of some independent entities and actions that can obtain in the world and then looking and how waving them together has resulted into a new entity or action that was previously not present. With this in mind, let us imagine we are primitive hominids in the African savanna some 1.5 million years ago. We observe a fire, and given our experience with fire, we know that other animals are afraid of it and that it generates warmth. We also know that fire can kill us. Those more courageous between us choose to start experimenting, to see if they can use the fire. They start taking stuff and putting it on the fire to see what happens. At one point, they discover that dung can be put on the fire to make it burn longer. Thus, we can imagine that the technology of stretching fire emerged. Stretching fire waves together existing fire and dung in order to prolong the existing fire with the aim of providing warmth and shelter from other animals. This reveals a new facet of dung, namely that of fuel. Further, the ability to stretch fire reveals the night as a temporal space in which we can now be active under the security that the light generated by the stretched fire provides. At this point, what is revealed is also technology’s ability to extract us from the whims of the existing forces. Here we are countering the force of the night and day cycle by imbuing the night with light that would not otherwise be there.

the activities and skills of the craftsman, or the arts of the mind and the fine arts (techne belongs to bringing-forth, to poiesis; it is something poetic); 3) Episteme, knowing in the widest sense, it is akin to techne; 4) Aletheia, disclosedness, truth – in Greek philosophy, aletheia was used in the sense of “unconcealment”, the act of revealing or disclosing. Heidegger used this term to refer to the way things show themselves as they are.

Another exciting invention we can look at is speech. Communication is not something exclusive to humans, with animals generally communicating between members of the same species but also with members outside of their species. Sound cues are also widely used within the animal kingdom to convey warnings, attract mates, or defend their territories. We can imagine that as hominins grew more aware of the environment, we saw new possibilities before us. More complex ways of manipulating our environment became necessary to attain these new possibilities. We started to need a way to engage in more structured and hierarchical action plans that required manipulating various entities with distinct properties in particular ways. We can then categorize speech as a technology woven through the combination of sounds, the idea of identity, and the entities, properties, and actions manifest within our world. By associating sounds willfully to entities, properties, and actions that take place within the world, we became able to coordinate in ways that allowed us to follow through increasingly structured and hierarchical action plans which deliver us the attainment of complex ends. Speech has also revealed the capacity of sound as an identifying entity. Speech, as a technology, further broadened our horizons, enabling us to think of properties as independent elements and mix them to create entities with which we have never interacted. Thus, being with wings from outside this world, known as angels, came into being. Through the same process, Democritus could imagine atoms that were uniform, solid, hard, incompressible, and indestructible.

One more technology that we could contemplate is algorithms. Looking at how we do certain things, we can realize that specific steps, processes, or rules come together to generate an outcome. By ensuring that certain activities are done in a particular order given a certain predefined state, we can discover that the outcome will always be the same. This weaving of segmentation, planning, and perfect repeatability was used in 2500 B.C. in Sumer to help with division. According to Donald E. Knuth (1972), Sumerians “represented each formula by a set-by-step list of rules for its evaluation, i.e., by an algorithm for computing that formula. In effect, they worked with a ‘machine language’ representation of formulas instead of a symbolic language” (Knuth, 1972, pp. 672 - 673). The Sumerians used relatively complex algebra to process the world around them. While 2500 B.C. is the earliest solid proof of the existence of mathematical algorithms, we can be confident

that they had been in existence long before this date. Like the previous two technologies, algorithms also revealed new facets of the world. One of the things that algorithms reveal is objectivity, as within the controlled medium of mathematics, one can always be sure that beginning from the same start point and applying the same mathematical operations will always yield the same result.

From the vantage point of our mind pump, we can observe that technology comes about via an intelligence-driven evolutionary process whereby we wave various aspects of the world to attain valuable ends. In addition, technology is developed in a hereditary manner as older technologies are often woven together to generate new technology. And, of course, technology acts as a revealer by allowing us to see properties that we could not see before in already accessible entities and actions while making new entities, actions, and properties available.

While I do not aim to claim universal validity for the above definition of technology, it encompasses almost all elements of interest. For now, what is missing is that this makes technology look like it is always generated due to a targeted R&D process, which is invalid. For example, the microwave that most of us have in our kitchens was an accidental discovery that emerged while Percy Spencer was working on a radar-related research project. Thus, I would like to add to the above definition that while technology comes about via an intelligence-driven evolutionary process, this intelligence need not necessarily be aware or conscious of the fact that it is resolving a specific problem or willfully engage in the resolution of the problem to which the technology will, later on, be applied.

LANGUAGE AND HUMAN EXCEPTIONALISM

What we have been discussing till now hints at a symbiotic relationship between humans and technology. McLuhan's famous quote: "We become what we behold. We shape our tools, and then our tools shape us", echoes excellently the idea of human technology symbiosis. McLuhan's statement aligns with Heidegger's view of technology as revealing. Through its creation, technology reveals new possibilities within the world and concomitantly engenders new ways of being, which with time, become so ingrained in us that we cannot imagine our being-in-the-world without the possibilities engendered through these technological mediations.

The best example of this is language; we consider language to be something so significant that it has become a cornerstone of human exceptionalism. To better understand this, we must briefly detour into the defunct ideas of substance dualism. Dualism posits that there are two different kinds of substances. The idea of substance dualism, while not emergent in the ancient Greek tradition as a concept, nevertheless makes sense to approach by starting with Plato's theory of forms. Plato references his theory of forms throughout multiple works. In *Cratylus*, we have presented a practical version of the theory of forms. Here we are asked to contemplate a carpenter that is imagining the ideal shuttle to build a shuttle that can perform optimally given the ends to which it is to be used.

“SOCRATES: [...] Where does a carpenter look in making a shuttle? Isn't it to that sort of thing whose nature is to weave?

HERMOGENES: Certainly.

SOCRATES: Suppose the shuttle breaks while he's making it. Will he make another looking at the broken one? Or will he look to the very form to which he looked in making the one he broke?

HERMOGENES: In my view, he will look to the form.

SOCRATES: Then it would be absolutely right to call that what a shuttle itself is.

HERMOGENES: I suppose so.

SOCRATES: Hence whenever he has to make a shuttle for weaving garments of any sort, whether light or heavy, linen or woolen, mustn't it possess the form of a shuttle? And mustn't he put into it the nature that naturally best suits it to perform its own work?

HERMOGENES: Yes.

SOCRATES: And the same holds of all other tools. When a craftsman discovers the type of tool that is naturally suited for a given type of work, he must embody it in the material out of which he is making the tool. He mustn't make the tool in whatever way he happens to choose, but in the natural way. So it seems that a blacksmith must know how to embody in iron the type of drill naturally suited for each type of work.

HERMOGENES: Certainly."

(Plato, *Cratylus*, 389-390)

If we think about the theory of the forms only as the theory of the ideal reference of an object, it does not cause any serious issues. However, the theory of forms comes as a response to the problem of knowledge given an apparent ever-changing world. If we are to hope for knowledge by correspondence in a Heraclitan world, what is required is some constancy or stability amidst this change. Given that we can observe that we have some knowledge and that the phenomenological world in front of us is in a continuous process of becoming, some people posit another stable realm from which we can access this knowledge. Plato uses his theory of recollection to explain how we gain access to knowledge that exists in a different realm. By positing the soul's immortality and reincarnation, Plato presents us with a world where every soul has already experienced everything there is to know, so learning in this life is just a matter of remembering what we have forgotten.

"When the soul is immortal and has been born many times, and has seen the things here and the things in Hades—

everything, in fact—there is nothing that it has not learned, and so it's no surprise that it can recollect about virtue and other things that it knew before. And because all of nature is of the same kind and the soul has learned everything, nothing prevents a soul that has recollected just one thing—which people call learning—from rediscovering everything for itself, so long as it is brave and doesn't give up the search. For searching and learning are, as a whole, recollection.”

(Plato, *Meno*, 81 c-d)

While Plato offers no formal proof for his doctrine of recollection, he presents an illustration with a slave boy in *Meno* and an analogy with his allegory of the cave in the *Republic*. In *Meno*, Socrates meets with a young slave boy without education. Through a series of questions, Socrates leads the boy to discover geometric truths he could not have known otherwise. Socrates is asking “leading questions” to prove his point. Leading questions, as the name implies, contain information that suggests a particular answer. For example, “Have you stopped using drugs?” implies that the person has done so in the past, even if they have not. Leading questions can help get someone to provide information that they might not otherwise volunteer, but they can also be used to manipulate someone into providing a particular answer. In this case, Socrates manipulates the naïve slave boy into delivering his desired answer. He goes so far with the leading question that he even answers the form of a question.

“So: And we can fill in this space here in the corner?”

Slave: Of course.

So: So that there are precisely these four equal areas?

Slave: Yes”

(Plato, *Meno*, 84e)

Following the geometry lesson, Socrates partly restates the theory of reconciliation. He does not say that the slave has remembered some geometrical knowledge from what his mind had learned from experiences in previous lives. Instead, he says that the slave has discovered the relevant true beliefs in his mind, which he has comprehended while not in human shape. In other words, these true

beliefs were always there, and if we are brave, we can reach deep into our souls and find them.

“So: If he didn’t acquire them in this life, then, the following becomes immediately obvious, that he had and learned them at some other time.

M: Apparently.

So: And this is the time when he was not a human?

M: Yes.

So: If there are true beliefs within him during the time when he both is and is not a human being, which each become knowledge when stirred up by questioning, then won’t his soul be in a state of having learned throughout all time? Since it’s clear that throughout all time he was or was not a human?

M: Apparently

So: Then, If we always possess the truth about things in the soul, the soul would be immortal, so that the person who doesn’t happen to have knowledge now, that is, who hasn’t recollected, should be brave and try to search for it and recollect?

M: Your words seem good to me, Socrates, somehow or other.

So: And to me too, Meno. I wouldn’t strongly insist on the other aspects of the argument, but that we would become better men and braver and less lazy if we believe it is necessary to search for what one doesn’t know, rather than if we think that we can’t discover what we don’t know and should not look for it, for this I will fight strongly, if I am able, in both word and deed”

(Plato, Meno, 86 a - b)

Looking at the Seventh Book of the Republic, we face Plato’s allegory of the Cave. The Allegory is an extended metaphor for his doctrine of recollection. It is about a group of people who have been imprisoned in a cave since childhood. The only light in the cave comes from a fire burning at the cave’s entrance. The prisoners are chained so that they can only look straight ahead and cannot turn their heads. Behind the

prisoners is a raised walkway on which a parade of objects, animals, and people pass by. The prisoners can only see the shadows of the objects, animals, and people passing by on the walkway. They mistake the shadows for reality and have never seen real objects, animals, and people. Plato believes that we are like the prisoners in the cave. We mistake the shadows of reality for reality itself. However, there is a way to escape the cave and see the real world. This is through the process of recollection. In Plato's doctrine of recollection, the soul is like a prisoner in a cave, looking at the world through the firelight of sense-perception. The objects of sense perception are like shadows on the cave's walls. What we take to be reality is only an imperfect representation of the actual reality, which is the realm of the Forms. Rationality is essential in this process. Without reason, we would be unable to distinguish the shadows from the real objects and remain trapped in the cave. Reason allows us to see that the shadows are not reality, and by using our intellect, we can access the realm of Forms and come to know the true nature of reality.

In alignment with many philosophers throughout history, Plato seems to have sometimes believed that reason, which allows us access to the forms and truth, is the main differentiator between humans and non-human animals.

“The name ‘human’ signifies that the other animals do not investigate or reason about anything they see, nor do they observe anything closely. But a human being no sooner sees something than he observes it closely and reasons about it. Hence human beings alone among the animals are correctly named ‘anthropos’—one who observes closely what he has seen.” (Plato, *Cratylus*, 399 c)

Some authors would argue that Plato's statement regarding human exceptionalism in *Cratylus* isn't final since other writings suggest that animals have cognitive and moral abilities similar to humans³. Cloe

³ In *The Republic*, in the context of discussing the guardian class, Plato notes the virtues found in certain animals. For example, dogs are praised for their loyalty, courage, and ability to distinguish between friends and foes, a quality that requires some cognitive ability. In the *Phaedrus*, Plato suggests that the human soul resembles a charioteer with two horses, one noble and the other ignoble. Some argue that this implies a certain moral agency in animals since horses are used as

(1991) suggests that within Plato's text, there is a lot of material that puts under question the clear bifurcation presented above. "(1) Some passages seem to ascribe to non-human animals cognitive and moral capabilities which are human-like; (2) In discussing the transmigration of the soul, Plato seems ready to countenance human-to-animal and animal-to-human transits; and (3) Plato repeatedly states that certain human lives are beast-like or (worse still) are beast's lives (whatever this may mean)." Building on Cloe's second point it needs to be stated that Plato's idea of "transit" reincarnation requires that beasts and humans have similar souls. This then leads to a difference in degree only between humans and animals. While building on Cloe's third point, we can state that probably most people would not meet Plato's standard of 'Anthropos' as this would require them to have the purest form of logos (reasoning) that can only be found in those that live or strive to live a philosophic life.

While the answer that logos differentiates humans from beasts can still be placed under question by Plato, this ceases to be the case when we come to his disciple, Aristotle. First, let us discuss a key difference between Plato's and Aristotle's dualism. For the former, the body and the soul are two separate substances that interact. In Aristotle's case, there is no separation between body and soul; instead, one cannot be without the other. The role of the soul is to animate the body and to turn it from a simple matter into a living thing of a particular type. At first glance, we would be warranted to think that Aristotle was not a dualist but a material monist. Some modern Aristotelians defend Aristotle's theory of mind as a monist, anti-cartesian position. Considering Aristotle's denial of Plato's theory of forms in the substance dualist way – in which it was stated and his restating of the forms as natures and properties of things present within said things – I can see where this position comes from. However, Aristotle also posits that the intellect, part of the soul, does not have an organ that houses it. As such, the intellect and the soul are immaterial. With these considerations in mind, one must see that at least part of the soul, the intellect, is of a different substance than the body, which lands us again into the waters of substance dualism.

metaphorical stand-ins for parts of the human soul. In *Timaeus*, the transmigration of the souls (metempsychosis) is described - the idea that human souls may be reincarnated in animal bodies. This might suggest a belief in a shared moral and cognitive essence across different life forms.

“That part of the soul, then, called intellect (and I speak of as intellect that by which the soul thinks and supposes) is actually none of existing things before it thinks. Hence too, it is reasonable that it should not be mixed with the body; for in that case, it would come to be of a certain kind, either cold or hot, or it would even have an organ like the faculty of perception; but as things are it has none.”

(Aristotle, *De Anima*, Book III, 429 a 18)

Looking at Aristotle’s view on the relationship between human and non-human life and his position on human exceptionalism, the dualistic position makes a lot more sense. Under a naturalist or other type of monist ontology, the relationship between animals and humans, as described by Aristotle, could not be defended. For Aristotle, animals are best understood as belonging to a naturalistic schema in which they are situated between plants and human beings. He suggests that this is because nature makes nothing in vain, and given the ascending scale of the complexity of life, it is evident that “plants are for the sake of animals, and that the other animals are for the sake of human beings”. This hierarchy emerges due to the properties of the souls that animate each body; plants have life, animals have life and perception, and human beings have life, perception, and logos. Lacking logos, animals have no will of their own, allowing them to be subservient. To borrow some Kantian terminology, animals are not ends in themselves as they are not endowed with logos and instead are a means to an end.

At this point, we need to slowly venture around and connect to what has started this inquisition into human exceptionalism, namely my statement that the technology of language is strongly tied to our identity as humans and is used when arguing for human exceptionalism. To connect this statement with the discussion that we have had until now, we need to diversify the way we interpret and translate logos. Logos is a richer term and does not solely mean rationality. It refers to the capacity for discursive language, reason, and other similar traits. There are two main traits that Aristotle associates with humans. The first, as discussed, is our rationality, and the second is our politicalness. In his politics, Aristotle argues that speech is one of the main features that distinguishes human politicalness from animal politicalness: