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Do Medieval and Renaissance Androids Presage the Posthuman?

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Abstract: In his article "Do Medieval and Renaissance Androids Presage the Posthuman?" Kevin LaGrandeur analyzes the relationships between literary images of artificial humans associated with medieval alchemists and alchemy, their modified reemergence in the Renaissance, and how such androids may forecast the idea of a posthuman subjectivity that is connected with their present-day descendents. For example, the talking brass heads in Robert Greene's two Renaissance plays, *The Honorable History of Friar Bacon and Friar Bungay* and *Alphonsus, Prince of Aragon* have their roots in Arabic sources, and the former derives specifically from legends concerning the thirteenth-century alchemist and philosopher Roger Bacon. These early instances of the artificial anthropoid also anticipate, in a broad sense, the kinds of philosophical issues regarding subjectivity that cyborgs bring up for our "posthuman" society. The literature of the earlier era also represents a fear that humans will be diminished-all of the creators in the fictional literature examined are in danger of losing control of their creations, and thus of having their agency called into dispute.

Kevin LAGRANDEUR

Do Medieval and Renaissance Androids Presage the Posthuman?

The factual and fictional literature of the Renaissance contains references to the creation of artificial humanoids-somewhat remarkable for an era that predates not only the era of cloning and robotics, but also the era of industry. These figures range from images in fictional literature of talking brass heads to discussions of the homunculus by Renaissance natural philosophers and to Jewish legends of the golem. What all of these figures have in common is an association with medieval alchemy. The brass heads in Robert Greene's two plays, *The Honorable History of Friar Bacon and Friar Bungay* and *Alphonsus, Prince of Aragon* have their roots in Arabic sources, and the former derives specifically from legends concerning the thirteenth-century alchemist and philosopher Roger Bacon. Also, both the homunculus and golem appear to be extreme, mystical adaptations of medieval alchemy. For example, these creations are both depicted as being conceived in an alchemical vessel-the glass retort. This article is an attempt to trace the associations between literary images of artificial humans associated with medieval alchemists and alchemy, their modified reemergence in the Renaissance, and implications such images of androids may have for the idea of a posthuman subjectivity.

The Elizabethan writer Robert Greene wrote two plays in which talking brass heads figure fairly prominently. As I have discussed elsewhere, these two robot-like heads have important symbolic value and important ancient roots ("The Talking Brass Head"). In the first play, *Alphonsus, Prince of Aragon*, a brass head of unknown origin, which can spit fire and utter oracular proclamations, sits in a palace where its owner can consult with it about the future. In a later play, *The Honorable History of Friar Bacon and Friar Bungay*, there is another talking brass head whose origin, unlike that of the first, is clear. It has been assembled by the medieval alchemist Roger Bacon with some help from enslaved daemons, who lend their services as smiths to "hammer out" the shape of the piece. The brass head, once animated, will, Bacon hopes, make him a renowned figure in both scholarly and popular circles. Like a modern computer, the automaton will enable the scholar to do his work faster and to do work that would be impossible for the unaided human. The head is to explain difficult intellectual questions, give philosophical lectures, and it will enable Bacon to build a defensive brass wall around all of England (Greene, ii, 25-30). The conceptual roots of these contraptions lie in the Middle Ages. Bacon's presence as a central character in Greene's play and his creation of a talking brass automaton are not accidental: By the early 1500s this Friar had become an icon for alchemy's dangerous social effects, and had come to be seen as a wizard more than a natural philosopher. This was due to a combination of his prodigious and advanced scientific writings — especially in the field optics, for example — his mention of wondrous mechanical automata in his writings, and his censure by the Catholic Church — a censure which has been attributed, at least in part, to the unorthodoxy of his scientific views. It has been long thought (although not without controversy) that Bacon's opinion that mathematics and experiment were much more valuable to science than accepted textual authority was a chief source of his troubles with the Franciscan hierarchy, troubles which culminated with the declaration of his work as heretical in 1278. In fact, many of the opinions that he based on his own research, especially in optics, had no equivalent in traditional sources. Rather, he relied on brilliant but simple experiments of his own, such as using prisms and water vapor to show how rainbows are formed. He was also fascinated with mechanical marvels, and discussed them in at least one of his books, *De nullitate magiae* (translated as *Roger Bacon's Letter Concerning the Marvellous Power of Art and of Nature and Concerning the Nullity of Magic*). In chapters 4 and 5 of that work, Bacon writes of some amazing devices that he is familiar with, including a flying machine, and chariots and ships that are able to move without the normal means of propulsion.

Bacon was not alone among medieval scientists in his mention of or fascination with the idea of producing automata. Indeed, there are at least four other medieval European natural philosophers and alchemists who are associated in popular legend with the construction of automata—especially artificial humanoids: Gerbert of Aurillac (who later became Pope Sylvester II), Albertus Magnus, William of Auvergne, and Robert Grosseteste. William of Malmesbury maintains that Gerbert built not only a mechanical clock and a church organ powered by steam, but also an intelligent, talking brass head (175). John Gower, in his *Confessio Amantis,* mentions Grosseteste's struggle to create a similar device.

There are also legends about Albertus Magnus's fashioning of a complete automaton that could answer questions, and of his pupil Aquinas's destruction of it when he, accidentally discovering it in his teacher's laboratory, assumes it to be a demon. Perhaps it is not surprising, then, that we find tales in the Renaissance about the creation of artificial, oracular heads, and that they center on medieval natural philosophers like Bacon and his contemporaries.

It is also not surprising that these tales were mainly negative in tone, despite a Renaissance fascination with automata. The science that these men practiced was unorthodox for its time—a time that put a premium on orthodoxy. In particular, men like Bacon, and Gerbert often preferred the results of their own experiment and observation over the authority of ancient, written sources (Bacon's writings on optics are a good example of this). This, as well as the fact that they were early adopters of novel ideas — Albertus championed the controversial use of Aristotle's rediscovered texts in the universities, for example — and adopters of ideas from the Arabs (who were the blood enemies of the Western European establishment), sometimes put their ideas under suspicion. Indeed, many of the philosophers mentioned above had close contact with knowledge of the occult sciences adapted from Arabic sources and from classical sources recovered through the Arabs. Gerbert had evidently studied in Arabic Spain, and the rest of these philosophers, in their work, gave credence to at least some occult ideas derived from the Arabs. The popular legends that these philosophers possessed wondrous automata may also be influenced by common connections between magic and science in the Middle Ages and the Early Modern era. In this light, we can posit that the tales of these scientists' creation of artificial humans are symbolic of their transgressive scientific methods and ideas. The roots of such automata in alchemy are clear. In addition to the sources already mentioned, these robotic figures also have their precedents in other ancient literature known by medieval alchemists. There are, for instance, the automata mentioned by Hero of Alexandria in his writings. There is also the *Asclepius*, a second-century work on the occult sciences, which informs us that the Egyptians were able to "animate the statues of their gods" (Yates 257). Indeed, anecdotes of one such Egyptian statue were widespread even before the *Asclepius* was written. Philostratus, Pliny, Juvenal, Strabo, and Tacitus all mention a statue of Amenophis (the Greeks later renamed the statue Memnon) west of the Nile, at Thebes, that made music when the first light of dawn struck it (Cohen 16). Aristotle and Callistratus both discuss a statue of Diana that moved on its own (Callistratus described the source of its movement as mechanical, whereas Aristotle maintains it was animated by quicksilver) (Cohen 16-17).

I now turn to another common image of the Renaissance that can be shown to have connections to medieval alchemy: the organic artificial man. During the same period in which Greene was writing his plays containing metallic automata, there were also discussions of artificial humanoids that were flesh and blood. Paracelsus and Cornelius Agrippa, two alchemists of the time, claimed to know how to create a *homunculus* — a miniature, living man. Moreover, their *homunculus* bore a close resemblance another creature, the *golem*, supposedly made by contemporary rabbis, such as Judah ben Loew of Prague and Elijah of Helm in Poland. This association is important not only because of the geographic and temporal proximity of all these men, but also because of connections dating from the Middle Ages between alchemy and the Jewish Cabala, a portion of which contains details about creating a *golem*. Paracelsus mentions the *homunculus* in at least two of his works and describes in detail how this creature is made, in his *De Natura Rerum (Concerning the Nature of Things),* from the forty-day fermentation of semen, horse manure, and blood in a sealed retort (124). This same type of *homunculus* is also mentioned early in book 2 of *De Vita Longa (A Book Concerning Long Life)*, where he states: "The necromancers call it the Abreo; the philosophers name such creatures naturals, and they are commonly called Mandragorae. Still, error prevails on this subject through the chaos in which certain persons have involved the true use of the homunculus. Its origin is in the sperm. By means of complete digestion, which takes place in a venter equinus, a homunculus is generated like in all respects, in body, blood, principal and inferior members, to him from whom it issued" (2 334). Clearly, Paracelsus is discussing what we would call asexual reproduction. Misogynistic as the focus on the sperm as a unilateral source of life may seem, it is important to point out that the elimination of woman from the reproductive process is not really the central idea here. One may see from Paracelsus's focus on the putrefaction of substances (or on their "digestion," as he calls it in the second passage), that the real focus for him is control of the process of spontaneous generation. This process, also called *abiogene-*

sis, was the process by which, in Paracelsus's time, many lower creatures, such as insects, were thought to originate spontaneously from rotting organic matter.

Around the same time and in the same context, Cornelius Agrippa also mentions the making of a homunculus in book 1, chapter 36 of his *De Occulta Philosophia Libri Tres (Three Books of Occult Philosophy)*. In that work, Agrippa discusses how the spontaneous generation of living things is made possible by using the proper mixing of natural elements under the proper astrological influence. Among other creatures produced in this way, Agrippa mentions the *homunculus*: "there is an art wherewith by a hen sitting upon eggs may be generated a form like to a man, which I have seen and know how to make, which magicians say hath in it wonderful virtues, and this they call the true mandrake" (108). Although Agrippa's methods of creation are different, and though he is much vaguer about his methods than is Paracelsus, it is clear that both men are referring to the production of an artificially made human — or, more precisely, an organic entity with a human form. The basic ideas behind the artificial generation are similar. Paracelsus's use of a retort as an incubator and horse dung as a heat source is an imitation of the hen's egg and hen, respectively. Also, Paracelsus's and Agrippa's use of the term *mandragorae* or *mandrake* to describe these creatures is a prime indicator of the similarity of their ideas of artificial generation: according to Donald Tyson's footnote to the passage from *De Occulta* above, as well as to several other scholarly sources on the mandrake (see Randolph; Thompson), in the Renaissance, human qualities were attributed to this plant because its forked root resembled the human form; it was even said to shriek like a human when pulled from the ground, and it was thought to be transformable to a human, with the proper rituals.

Another important connection between the two men's descriptions is their similar use of a key term: they both call animate, humanoid things not born of human parents "naturals." Paracelsus states of the homunculus that "philosophers name such creatures [as the homunculus] naturals." Agrippa, too, discusses "naturals" in book 2, chapter 1 of *De Occulta Philosophia*. In this section, writing of mathematics and "the many wonderful works which are done by mathematical arts only," he asserts: "of mathematical doctrines only works like to naturals can be produced, as Plato saith, a thing not partaking of truth or divinity, but certain images kin to them, as bodies going, or speaking, which yet want the animal faculty, such as were those which amongst the ancients were called Dedalus his images, and automata, of which Aristotle makes mention" (1253b.24-1254a.16). This passage makes several things clear: first, Agrippa considers naturals "kin to" automata; second, because the context in "which Aristotle makes mention," in his *Politics* (1253b.24-1254a.16), of Daedalus's images and automata is in contemplating the idea of a more convenient slave, it is implicit that Agrippa thinks of homunculi, other naturals, and automata in this context as well. Yet this comparison of Agrippa's also is an implicit indication of the paradoxically great power of artificial creations. This power is inherent in the fact that the automata he mentions in the chapter from which I quote above were built as servants by gods or by men with godlike powers.

The association of the sixteenth-century *homunculus* with divine power is even more evident in its likely ancestor, the *golem*, an artificial human made from clay by Jewish adepts. This creation is described in the Jewish Cabala, which dates back to the early Middle Ages, was newly translated in Paracelsus's and Agrippa's time, and was known by both of these men. The golem first appears in late twelfth-century Jewish commentary on the *Sefer Yetzirah (Book of Life)*, a Cabalistic text, though the roots of the idea that a human could create living things by ritualistic magic may go back much further. Gershom Scholem, the most authoritative source on the history of the golem in Jewish thought, notes: "The idea that [God's] act of creation might be repeated by magic or other arts" has its origin in "the legends recorded in the Talmud concerning certain famous rabbis of the third and fourth centuries" (184). He also notes that the *Sefer Yetzirah* itself may be older than the Middle Ages (165 see also Sherwin and Idel on this topic). This idea of the ritualistic creation of the golem became especially widespread in the medieval period among the French and German Hasidim, and by the end of the twelfth century there were "four main sources of instructions for golem-making" (184). The most "precise" of these, according to Scholem, are the instructions written by Eleazar of Worms, and it is these that make their appearance in the literature of Christian philosophers of the sixteenth century. That Paracelsus's and Agrippa's ideas of the *homunculus* share an affinity with the idea of the *golem* is asserted by a number of experts, including both Scholem (197), the preeminent expert on the *golem*, and Walter Pagel, who wrote a seminal work on Paracelsus. Scholem points, as early evidence of an

elision between the ideas of a Cabalistically-created golem and Paracelsus's alchemically-wrought homunculus, to the fact that a medieval Jewish scholar says, in reference to the golem, that its creation "must take place in a vessel" (197). This vessel, he continues, "should be taken as a retort. This would be extremely interesting, for it would mean that long before Paracelsus the Jews associated the retort, indispensable to the alchemist makers of homunculi, with their golem" (197).

Moshe Idel also notes that it is the "current view" among Jewish scholars that "the Jewish concept of the Golem contributed to the emergence of the Paracelsian view of the homunculus," although he disagrees with this view (185). Although Idel objects to this idea of Scholem's, arguing that the process of creation for the golem and homunculus have different bases (word-magic, versus alchemy), he allows that their overall processes of creation are parallel and, more importantly, that the ideas of the golem and the homunculus become mingled toward the sixteenth century. He presents, as evidence of this convergence, two Cabalists of the era, Yohanan Alemanno and Abraham Yagel, who appear to see relationships between the golem and other non-Jewish artificial humanoids. Alemanno, writing at the end of the fifteenth century, has a syncretistic view of the creation process. "We may," says Idel, "describe Alemanno as proposing, implicitly, a combination of the classical Ashkenazi [Jewish] technique with the hermetical type of magic using astral concepts" (171). And, at another point, Alemanno seems to see a second type of connection, one between the alchemical recipes of Paracelsian creation and the word-based, mystical techniques of the Jews. As Idel notes, Alemanno, in an unpublished manuscript, observes: "it is possible to the wise investigator to comprehend the quality of the material combination and the measures of the elements which enter this mixture and are blended in such a manner that it was possible to take from the four elements, parts which are measure in such a way that are on the degree of human semen. And he will provide for it a measured heat, similar to the heat provided by the womb of a woman so that it was possible to give birth to a man without [the need of] the male semen and the blood of the female, and without the [intervention of] masculinity and femininity" (171).

The similarities between Alemanno's formulation and Paracelsus's recipe are apparent in this passage, from the use of semen, to the provision of a constant external heat (provided by horse dung in Paracelsus' procedure), to the reference to the asexuality of the process. Moreover, Alemanno wrote his manuscript a few decades before Paracelsus did his work and during a time of cross-pollination between Jewish and Christian philosophy. Also, just after what he says in the passage quoted above, Alemmano notes that the same end, the creation of an artificial humanoid, can be accomplished not only by understanding the correct proportions of the elements which make the human's physical frame possible, but also by understanding the correct combinations of letters that "correspond to the level of the elements in relationship to … forms" (172; the similarities between the formulae of letters and numbers used to animate artificial humans of all types in the Middle Ages and Renaissance, and the programs composed of letters and numbers we presently use to animate our robots). This, as Idel argues, shows that, from Alemmano's point of view, "In order to create an anthropoid, it is not sufficient to be acquainted with the science of *Sefer Yetzirah* … but also with some medical and natural science dealing with the real human body from its biochemical aspect" (173-74). All of these facts represent fairly strong circumstantial evidence of an interrelation between Jewish and Christian notions of the artificial anthropoid in this era. One more bit of evidence of such a relationship comes from Yagel, one of Alemanno's disciples. Writing in the late sixteenth century, Yagel asserts if an adept is to "create … a man," he "will be able to do this through the wisdom of nature" — that is, through natural processes such as those used by Paracelsus and Agrippa (Yagel qtd. in Idel 181). As both Alemanno and Yagel were physicians, like Paracelsus and Agrippa, the tantalizing possibility arises that the ideas about the golem and homunculus were cross-pollinated through the avenues of this profession, and even, perhaps, given added credibility by Vesalius's implicit discovery that the structure of the human body could be explained mechanically. Evidence that there was some sort of crossover is clear, at any rate; for Yagel also names the gentile philosophers who give instructions for how to "produce things and new creatures," and refers to Agrippa's work, as well as to Bacon's.

As the noted science historian William Newman has remarked, the recipe that Paracelsus gives for the *homunculus* in his sixteenth-century work *De natura rerum* is similar to that given in the ninth and tenth-century works attributed to Jabir bin Hayyan: "Jabir's *Kitab al-tajmic*, for example, advises that one take an undefined 'element' … or 'sperm' and seal it up in a mold with detachable parts. One then

inserts this into a perforated vessel, which is heated in a water bath to putrefy. By varying the shape of the mold, one can produce any sort of being, such as a young girl with a boy's face, or an adolescent with the intelligence of a man" (330). Although Newman does not find a direct line of transmission from the Arabic of Jabir to Paracelsus, it seems likely to me, given the pervasive borrowing of all things alchemical from the Arabs by the West, that a version of Jabir's instructions for making artificial humans percolated its way to the Swiss alchemist. After all, not all texts that Renaissance scholars used survived the period; moreover, given Paracelsus' itinerant life, it is likely that some of the texts he came in contact with — and books of his own, for that matter — are lost.

Conjectural evidence for the percolation of the directions for making a *homunculus* from medieval Arabic sources is given by Newman. He notes that a fourteenth-century Latin work, *De essentiis essentiarum*, falsely attributed to Thomas Aquinas, mentions the Arab alchemist Razi's effort to make an artificial human in some sort of container (326). Also, William of Auvergne refers to an Arab work that purports to be by Plato called the *Kitab al-nawamis* (*Book of Laws*). This book, mentioned by both Newman and by the great science historian Lynn Thorndike, contains instructions for making "rational animals" by a grotesque process of organic putrefaction similar to that of making the homunculus. The resulting entity is a non-descript, animate being, "clothed in human skin," that after being steeped in milk and rainwater for a year can tell its maker "all things that are absent" (Newman 330-31; see also Thorndike 3 139). The parallels between the artificial androids we find in medieval alchemical texts and those of the Renaissance, the persistence through the same periods of the accounts of metallic men created by such scientists as Bacon, and the association of the golem with such robotic androids as Bacon's all provide connections that are important if we are to understand the extension of medieval ideas into later eras and, in a symmetrical way, the anticipation of Renaissance ideas of artificial humanoids by medieval thinkers.

It is important to emphasize, however, that the foregoing has implications beyond the Middle Ages and the Renaissance. When I mention the extension of medieval ideas into later eras, I mean to include the present era as well. Indeed, this early interest in androids, whether real or fictional, bears parallels to today's preoccupation with similar constructs, both real and fictional. Although analogies between the pre-industrial and posthuman representation of artificial humans can only be limited to broad comparisons, early instances of the artificial anthropoid anticipate, in a general way, the kinds of philosophical issues regarding subjectivity that cyborgs bring up for our "posthuman" society — where humans stand to become "mixtures of machine and organism, [and] where nature has been modified (enculturated) by technologies, which in turn have become assimilated into 'nature' as a functioning component of organic bodies" (Graham 10-11). The most striking general commonality between the representations of intelligent, artificial servants in the early modern era and those of the present is the threat they appear to represent — although the symbolic nature of that threat has reversed over time. In the literature of our time, the threat of the posthuman condition, of our dependence and intermingling with machines, is that it diminishes the importance of the human mind and body. A number of thinkers, such as N. Katherine Hayles, Mark Hansen, Mike Featherstone and Roger Burrows, or Scott Bukatman have discussed such issues extensively. Hayles probably expresses the danger that the posthuman condition poses to the privileged status of humans most succinctly when she states that, "the posthuman is likely to be seen as antihuman because it envisions the conscious mind as a small subsystem running its program of self-construction and self-assurance" (286). It is also likely to see the body as a disposable accoutrement. The literature of the earlier era also represents a fear that humans will be diminished — all of the creators in the fictional literature we have examined are in danger of losing control of their creations, and thus of having their agency called into dispute. But the source of this danger is actually an *over*emphasis on the human mind, the arrogant belief of the creator-scientist in his own cleverness. Hence, the artificial servant serves as a marker of the dangers of the humanist glorification of individual human abilities and its concomitant threat to social stability.

A good way to begin examining this common sense of threat that the idea of the posthuman cyborg and its pre-industrial expression share is to discuss their value as what Hayles calls "discursive constructions" (118). That is, the idea of the artificial anthropoid, as opposed to its real instantiation, serves as a way of symbolically exploring the blurring of human boundaries. For Hayles, the boundaries that the idea of the modern cyborg calls into question are those between human and machine,

human and animal, and human and inanimate object. These same dualities are called into question by the early modern idea of the artificial human, though in somewhat different ways than with today's cybernetic devices. In the posthuman scenario, one may say that, in general, the concept of the cyborg causes an elision of boundaries between the human and non-human because it dehumanizes the subject, emphasizes function over (human) form, and, in doing these things, also redefines nominally human functions in more simplistic, less privileged terms. For example, the obscuring of the human/animal distinction in cyborgs, notes Hayles, is the product of "replacing [the idea of] cognition with neural feedback" (84); thinking, in other words, becomes redefined as a simple circulation of electric impulses. In this way, human thought is recast as information flow, a rhetorically diminished function that would seem common to any animal. Hayles sees this kind of recasting of functions as part of the overall denigration of the body, in posthuman thought, in favor of "informational patterns" (2). This process of denigrating the body leads to a tendency to view it as a mere prosthesis of our thoughts — which also leads us to more readily accept the idea of "extending or replacing the body with other prostheses," such as robots, digital sensors, or even artificial body parts (3). For example, Hayles mentions that one of the real ways cybernetic devices have been incorporated into the human system is the fashioning of "a helmet with a voice activated firing control for a fighter pilot" (84). Although most people think of prosthetics as replacements for something one has lost, cybernetic devices such as this helmet are, implicitly, conditioning us to accept prostheses meant to *enhance* the body's function — to make it more-than-human. Thus a transcendence of the human is an embedded goal in the present-day project of combining the human and the machine.

Hayles has reservations about such projects, as, indeed, have other cyber-theorists — from science fiction writers like Philip K. Dick to scientists like Norbert Wiener. Like them, she envisions a dystopia where technical know-how has allowed human ambition to run rampant, "a culture inhabited by posthumans who regard their bodies as fashion accessories," and who are "seduced by fantasies of unlimited power and disembodied immortality" (5). In such a future, the human mind is also eclipsed by faster, more powerful artificial intelligences to which we have ceded much of our decision making. Such visions, engendered by rapid advances in our science that have led to the advent of cybernetics and robotics, are reflected in stories about robots and androids in our literature. Concerns similar to these in spirit, if not in kind, are also, I suggest, anticipated in literature concerning pre-modern creations. As with cybernetic constructs, medieval and Renaissance concepts of the android caused, in their time, a destabilization of the boundaries between the human and non-human. As with the posthuman condition, this could also be seen as the result of these androids' predication on dehumanization, on an emphasis on function over (human) form, and on a recasting of human functions in more simplistic, less privileged terms. First of all, it is important to realize that the artificial creations of scientists such as Bacon, Grosseteste, or Paracelsus are essentially manufactured slaves, and slave-status is by definition subhuman. Furthermore, their form is also diminished: they are humanoid, but not quite human. Bacon's and Grosseteste's constructs are only heads without bodies; the organic *homunculus* is not only an asexual creation, but is also stunted in stature and associated with a mechanistic, disgusting gestation process involving horse manure and human blood, and their functions, although powerful, are servile. They act as prosthetic enhancements of their makers' intellectual powers: the talking heads allow their creators the power to solve difficult philosophical and mathematical problems, to build impossible constructions, and to know the future. Similarly, the *homunculus*, in its Arabic form, enhances its maker's ability to "see the unseen."

Hence, transcendence is also a goal of pre-modern android creation, stretching all the way back to Aristotle. Not only is he perhaps the earliest Western philosopher to contemplate the possibility of artificial, intelligent labor, but his ideas of human technical capacity arguably underlie all following consideration of that topic. The very word "technology" has its roots in Aristotle's idea of *techne*, the Greek concept that encompasses all of the human arts, including science and the mechanical arts and, implicitly, any techniques, technology and technical implements that they include. Aristotle maintains that *techne* is a means of both imitating and improving upon nature. He makes this point clearly in his *Physics*, where he states, "generally art in some cases completes what nature cannot bring to a finish, and in others imitates nature" (199a1.15-16). In chapter 25 of his *Poetics*, he goes even further by asserting that, though the artist making his artifact can represent things either as they are, as they are thought to be, or as they should be (1460b1.8-10), the best is that "the artist ought to improve on

his model" (1461b1.13). Thus, Aristotle sets a philosophical standard for succeeding generations of Western philosophers and scientists that supports both the manipulation of nature and the supra-natural quality of human technology and its products. His standards clearly imply that the products of human *techne* can lend godlike power, and this implication is supported by the pseudo-Aristotelian treatise called *On the Universe.* In that work, the author compares the power of a human with a machine to the power of the gods: "But it is most characteristic of the divine to be able to accomplish diverse kinds of work with ease and by simple movement, even as machine operators by one turn on a machine accomplish many different operations" (398b1.12-15). So it is not surprising that Aristotle brings together the concepts of *techne*, godlike power, and the ability to improve upon nature, and the ease of accomplishing work in the form of the artificial servants that he mentions in his *Politics* (1253b1). For the foregoing Aristotelian formulations lead logically to his pondering the possibility of replacing "natural" slaves with artificial ones — which, as he imagines them, could be made to be less troublesome and more efficient.

During the early modern period, the aim of transcending human limits stemmed not only from Aristotle's work, which also seems to be an origin of our own cybernetic ambitions, but also from a different origin than it does in the posthuman era. In the earlier period, the goal of transcendence reflected the Renaissance Humanist project of actuating the godlike, or the superhuman, within each human; however, there are shades of concern that are similar to those of our time about scientific progress and hubris buried in the symbolic value of the early modern android, as well. First, as with today, there are obvious Promethean dimensions to the accounts about medieval scientists' brass men and physicians' *homunculi*. The intent in almost every case is that the creation will afford its creator some kind of superhuman power to extend human dominion over nature. Thus, the symbolic value of the early modern android is not only Promethean in the sense that it demonstrates the ability of the natural philosopher to imitate God's creative power over life and death, but also, more practically, it is a metaphor (and sometimes, as with "true" claims about scientists' androids, a literal "demonstration") of human potential to subjugate nature. In this sense, the early modern android represents the defeat of natural barriers to survival, of practical limitations of the body, and of nature itself. For example, as writers such as Jonathan Sawday, Klaus Maurice and Otto Mayr, and Roy Strong demonstrate, some of the most common purposes for designing elaborate mechanical devices, in the Middle Ages, and especially in the Renaissance, were to enhance people's abilities to make war, to do chores, and to augment the imprint of human design upon formal gardens. In general, they argue that the use of mechanical devices and automata in the Renaissance was seen as a way to manipulate, imitate or supercede the natural world. Indeed, the many elaborately illustrated "machine books" printed in the Renaissance are, according to Kenneth Knoespel, a mark of the inventors' ambitions to be able to provide accessories to aid the conquest of natural human limits (99).

But this blurring of the limits between God and human — or natural and supernatural — in the early modern representation of androids involves another aspect of the Humanist desideratum of eliciting from humans their superior potential: the blurring of the spirit/human boundary. Many of the artificial androids were purportedly animated by captive spirits. This, along with these scientists' ambitions to transcend nature's limits, elicited a fear similar to that expressed about cyber-creations by modern thinkers such as Hayles. The story that someone could actually create an artificial human, mechanical or organic, was always associated with public reprobation and fear, as well as awe. So philosophers who dabbled in alchemy and the creation of androids were often outcasts, being hounded from town to town, like Paracelsus and Agrippa, or being publicly censured, like Roger Bacon. Although there is no space here to delve more deeply into the implications of such old and common representations of androids relative to the posthuman, one last parallel might provide impetus for further study. That is, when we consider that one of the key defining characteristics of the posthuman subject is a cognitive capacity that is not localized, but is instead spread among various, networked elements, we may say that androids like Albertus Magnus's, or partial androids, like Bacon's or Grossteste's, inasmuch as they provide prosthetic, but physically separate enhancement of their makers' cognitive powers, and inasmuch as they therefore represent an enhancement of their makers as subjects, can be seen not just a prosthesis, but as an enhanced self — perhaps in a some sense an evolutionary predecessor to the posthuman subject. The idea of the android as an enhancement to the body or brain of the maker is, as we have seen, both very old and remarkably consistent in its symbolic value.

It appears to represent the mysterious and awesome force of the scientific mind and, simultaneously, to trigger a sublime reaction that mixes awe at human technical potential with loathing of its existential consequences — consequences that extend to a sticky quandary about what separates our gods and even our machines from us. If we have this confluence of concepts at work at least as far back as the Middle Ages, it certainly should not be surprising to find similar ideas pervading legends, literature and natural philosophy through the intervening ages. If nothing else, what I present here should reveal is that we have no monopoly, in our age, on the idea of blending the traits of the human and the machine. Ultimately, the various pre-modern representations of androids and the various, general points of contact between the ideas and issues raised by them may point toward the concerns of the posthuman more than we have realized.

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