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Medieval Robots: Mechanism, Magic, Nature, and Art

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Both as a historical focus and as a narrative vehicle of ‘otherness’, the depiction of technological marvels has often seemed tantalizingly vague. In Orientalist scholarship à la Said, it also ended up being ultimately irretrievable across the mutually reinforcing mirrors of East and West. During the Middle Ages, however, the value, origin, and use of mechanical wonders was already a matter of constant and consistent debate, even before the shape of early modern colonial expansion was properly set.

This was particularly true from the tenth to the 13th century, as the nature of adjacent genres such as eyewitness and fictional accounts was itself in flux and sandwiched between different crusading attempts, which, in turn, helped systematize the geographic imaginary of Greek and Arabic exoticism. Wartime *spolia* and gifts – and, among them, automata, a particular kind of marvel – participated in successive waves of large-scale Latin Christian contact with the distant lands of Byzantium and the Islamicate world. At different junctures, writers, travelers, and envoys came to terms with a sense of economic and technological inferiority. From Sasanian imperial ideology to caliphal policy, passing through meticulous courtly etiquette in Byzantium, diplomatic exchanges marked the establishment of a characteristically asymmetrical habit of gift-giving; in abstract terms, interest in automaton-making and its mathematical underpinnings was an aspect of ‘conspicuous virtuosity’ that punctuated the slow unfolding of geopolitical ceremonial.

This artificial enhancement of the imperial aura is particularly evident in the most famous Byzantine automaton, the Throne of Solomon, whose movements also operated roaring lions and cheeping birds, and which was well-known across the Mediterranean. Greek sources such as the textbook of courtly entertainments *De Ceremoniis* (ca. 956–9) never expressed wonder or curiosity about the throne, nor did they offer a technical explanation of its rising mechanisms, while, at the same time, they implied that it ‘spoke’ in the emperor’s stead for the benefit of foreign visitors, underlying dynastic permanence and authority. By the same token, the Latin diplomat Liudprand of Cremona, who traveled to Constantinople in 949 for Berengar II of Italy, feigned his relative lack of astonishment, relying on the validation and information obtained by him from previous audiences; as for explaining the throne, Liudprand found nothing better to say than comparing it to the timbers of a wine press back at home. In the end, be it one version or another, imperial aplomb was something made not born.

In contrast to Liudprand’s unfazed reaction and his wily preemption of Byzantine awe, which was based on autoptic travelogues and diplomatic reportage, curiosity for automatic marvels would often take a deeper form of surprise or terror. Over the past decades, we have come to think and know more about the emergence of this ‘anxiety’ built around automata, which has tended to be understood – often with little regard to historical discontinuity – largely as an epistemological problem: how the ‘liminal’ features of these mechanical objects affected cultural divisions between man and machine, and how, in turn, these ideas surrounding machine-men can be said to either shift or tie in with the perils of modernity and our own current concerns over the status of humans in late-industrial societies.

Already in classical antiquity, the display of stunning artificial wonders was prioritized over their possible application to the necessities of life (in part, of course,

because Aristotle had forcibly downgraded ‘useful knowledge’ as a lower form of *praxis* and philosophical occupation). Archytas of Tarentum, as early as the fourth century BC, apparently constructed a flying mechanical dove, and there are reports that two second-century writers, Ctesibius and Philo, wrote on water-organs, water clocks and automata. Finally, Hero of Alexandria, the most prolific ancient writer on mechanical devices, who flourished in the first century AD, covered a wide range of topics, including some explicitly aimed at exciting wonder – like, for instance, an automatic theatre retrofitted with thunder and burning fire. Hero, who appears to have worked in an environment where Aristotelianism was well-known, presented useful knowledge as competitive with philosophical writings and rhetorical displays; Hero’s earliest translators, and early modern pursuers of the Alexandrian school more generally, inherited this ambiguous conflation of technical illustration and philosophical pretension. Indeed, automata of Hero’s type and pseudo-Aristotelian mechanics, during the Middle Ages, were given a higher set of preoccupations in alignment with the philosophical trope of *Natura artifex* (Nature as artisan, or the description of Nature’s labor in artisanal terms), as opposed to the practical consequences of hydraulic engineering in farming, mining, transport and warfare.

By the time one reaches 18th-century physiology and the mass culture of the Enlightenment era, with all of the other facets of its ‘public sphere,’ to blur similarities and differences between automaton-makers and their audiences is to carry an even greater form of cultural anxiety, which has great potentials for historical anachronism. Automatic devices can be flattened into symbols for a concern about artificial life that is predicated at the very ‘roots’ of industrialization, inspiring the related idea that there has *always* been a large and interested audience for robots and androids, and that this audience’s sensitivity was *constantly* solicited by the same mechanistic tenets of the philosophy of Hobbes, say, or Descartes. In different ways, Jessica Riskin, Simon Schaffer, Minsoo Kang, and Adelheid Voskuhl have recently offered studies that avoid precisely this kind of teleology.⁽¹⁾ While Schaffer focused in particular on ideas about social hierarchy and economics, by studying the status of automata as commercial commodities, Kang’s engaging survey examined the shift of meaning of these objects in intellectual history and literary texts. Riskin argued that 18th-century automata, once seen as mechanical replicas of humans (and of animals), provided crucial knowledge about anatomy; on the contrary, Voskuhl painstakingly constructed an argument according to which the women automata created by the Jaquet-Droz and Roentgen families were rather a replication of bodily practices, with a range of cultural, political, and even ‘sentimental’ import. These approaches complement one another and represent only a selection of the available, fast-growing scholarly discourse on automata, but they do recapitulate well, in their different emphases, the historiographical dangers of establishing if, when, and how these ingenious mechanical devices made the transition from representation to simulation.

In this stimulating and well-researched book, Elly R. Truitt both extends and, in several ways, inverts this dangerous issue, persuasively suggesting that a critical conversation determining the shape of automata in history predated the 18th century and was not necessarily to be found in the early modern global moment, by extension, but that it took place in the Middle Ages, when cybernetic weaponry and other mechanical proxies – meant for entertainment, instruction, prophecy, or surveillance – enlivened and appeared in *historia* and *romanz*, in travelogues and encyclopedias, in chronicles and *chansons*. First and foremost, Truitt’s narrative systematically fills a neglected scholarly gap in our histories of science and technology, while also offering from a comparative perspective a much-needed update on the mechanical front of medieval wonders. As she describes them, whether they externalize esoteric knowledge, as with the morally dubious powers of medieval philosophers, or they simply manufacture political prestige, as with the subsidized exotica of an authoritarian regime, automata are ‘mimetic objects that dramatize the structure of the cosmos and humankind’s role in it’ (p. 3). The natural and immediate response to automata in medieval sources was not fear but foreignness, or perhaps an odd mixture of the two, which, conveniently, was camouflaged by the ‘monstrous’ margins in maps and encyclopedias of the time (e.g., pp. 18 and 32). As a consequence, the presentation style of pre-modern ‘cyborgs’ and the nature of the reflections they evoked was less concerned with artisanal *metis* per se – and certainly moralistically dismissive of the obscure sources from which its knowledge was acquired – but more prominently engaged with geographical displacement, of which, as this book reveals, automata were both an agent and a product.

In fits and starts, missionaries and compilers of itineraria like the Franciscan William of Rubruck and Odoric of Pordenone, or writers of romances like Rustichello of Pisa, who turned into French the stories of Marco Polo, his fellow prisoner in Genoa in 1298, focused on automata not only for the marvels themselves, but also as an appropriate focal point to conjure up the disruption of Latin Christian viewpoints about foreignness. In medieval lore, it changed little if the accent fell on the mystery-makers, who used secret knowledge to produce stunning effects (p. 139) or, conversely, on the wonders as repositories of secret knowledge, like in the case of the magical tree and of the avian automata made by necromancy and powered by wind at the court of the caliph of Babylon in Cairo, which are present in the *Aymeri de Narbonne*, a *chanson de geste* adjacent to the larger epic cycle of Charlemagne (p. 30). In the end, the historicity of automata sided with territoriality, not craft – it was more mimic than diabolic.

Thus, importantly, this book implies, a certain anxiety regarding strangers capable of manipulating nature never could really subside, but only be diverted into a semantic field which assuaged it by treating its practitioners as strangers with various degrees

of threat, but all distinguished by the inherently fraudulent nature of their pursuits. As Truitt explains, in the section she dedicates to Neoplatonic cosmology and the relationship between art and nature, medieval emphasis fell onto what automata could do. As an archetype, an elaborate wonder such as those found in *Le Roman de Thèbes* (1152–4) matters for the demonic power one could summon or tap into: according to this sympathetic, magical mimesis, ‘once their power is broken, the automata can no longer function (p. 59). Marvels and disembodied intelligences display an astounding variety of uses and possibilities, ranging from studying the *quadrivium* to trafficking with demons, from legitimate divination and astral science to transgressive necromancy. At the same time, while ‘medieval automata are often characterized in terms that evoke lowly artisanal craft, their creators are often described as highly learned men’ (p. 48). That creators of automata were treated as scholars and magicians is evident in the earliest medieval versions of Vergil as a sorcerer, whose classic sources are John of Salisbury’s *Policraticus* (ca. 1159) and Alexander Neckam’s *De naturis rerum* (ca. 1190s).

In these treatments, the Mantuan poet created an apotropaic bronze fly that kept real flies away, and other wonderful objects. At least in part, Vergil’s esoteric knowledge was employed for noble purposes – safeguarding Naples from the noxious vapors and ashes blowing from Mt. Vesuvius, for instance, or solving the problem of rotting meat – and yet, as Truitt notes, what is really significant is that Vergil was credited with a properly magical career only after several appearances in the *romans antiques* of a few decades earlier. Since these texts presented a form of antiquarian pageantry that was heavily inflected by contemporary 12th-century courtly society, it seems logical to suggest, as this book does, that automata were written into the past – credited with strange skills, but also imbricated in the ancient heritage of the nobility. In her description of the bonds between automata and nobility (pp. 63–8), Truitt rightly mentions that such objects are staples of *romans antiques*, but perhaps more could have been done with the legitimizing genealogy of Trojan and Roman legacy bequeathed to the French and Anglo-Norman ruling elites, in order to show how automaton-making and its paraphernalia, be it copper guardians or enchanted funerary spells, offered to later chivalric romances an already formed tradition in which the mechanical marvel stands as a device of prophecy and genealogy. Pertinent followers inside this tradition are *L’Entrée d’Espagne*, a celebrated Franco-Venetian *chanson de geste*, the *Cantari di Rinaldo da Monte Albano*, with their horn-blowing, mechanical talking heads moved by wind, and especially Boiardo’s *Orlando Innamorato*, which offers a very influential account of ‘prophetic’ and subterranean exploits suitably punctuated by automata (for example, in II VIII, 21 3-4 ‘la figura ad arte fabricata’).(2)

These are simply some thought experiments which may unfairly stray, of course, from Truitt's main line of inquiry, which, at that juncture in her book, is about the shifting landscape within the arts of the *quadrivium*. If *Medieval Robots* ends with a perplexing fall into modernity and 17th-century mechanism, to which we will return, it first makes a fundamental intervention with regard to the issue of how courtly, demonic, or celestial automata offer great opportunities to historians of science to contextualize nodes of diplomatic, commercial, and religious exchange. From this vantage, the figure of Gerbert, known for centuries as a medieval Faust – who, while at Reims, constructed a striking mechanical clock and a pair of hydraulic organs – and tied to the Ottonian dynasty from 973 to 997, is a perfect example. Truitt's mention of Gerbert's cosmopolitan ties (p. 74) and the excellent discussion that ensues looks as if an entire history of travels between Catalonia and al-Andalus as a trading zone of scientific knowledge could be written anew from the viewpoint of automata. In fact, the three turns of Truitt's argument (outlined at pp. 8–9) – namely, that automata reveal places beyond Latin Christian West, that they are important liminal objects, and that they complicate the natural/artificial binary – can be easily reformulated into a more comprehensive justification for cross-cultural exchange in the study of scientific thought.

Truitt illustrates this not only analytically, but with some compelling comparisons drawn from significant episodes of the legend of Charlemagne and its many literary tributaries. One of these sequences, in particular, resonates at length throughout the book – or, at the very least, presents remarkable enough ramifications to warrant a separate treatment within the larger canvas and geography and technology. It comes from a mid-12th-century text, *Le Voyage de Charlemagne*, and it features an encounter between Charlemagne and his barons with King Hugo and the fantastic marvels of his court at Constantinople. These include two musical automata, made of copper, and a rotating palace, whose movements, wind-powered, are mimetic of the 'lofty secrets' (p. 12) of astral science, as practiced by Byzantine clerics; once the palace begins to turn, the Franks lose their footing and are thrown to the ground. Finally, after a series of hyperbolic threats and reversals of fortune, Charlemagne wins the day thanks to the miracle performed by a relic that he had previously received by the Patriarch of Jerusalem. As Truitt observes, both emperors use spatial dislocation to gain the upper hand; crucially, Charlemagne's power comes from a relic.⁽³⁾ In terms of setting, the story also confirms the medieval assumption that nature operates more freely in the margins, as one could see in the case of gemstones as well. Rare devices, at times, functioned explicitly as a geographical divide, operating a distinction between the monotheism of the Abrahamic faiths and the animism of the Mongols, for example. Conversely, the hidden qualities and the aura believed to reside in automata responded to medieval rules dictating the performance of wonders as vivid descriptions. In *Medieval Robots*, Truitt collects a large quantity of objects and her

retelling occasionally leaves the impression of an uncomfortable bundle, as in the case of Benôit de Sainte-Maure's *Roman de Troie* (ca. 1165): in so far as Benôit follows 'contemporary artistic practices' of his milieu (p. 57), the embellishment of self-propelled exotica betrays a history of *ekphrasis*, rather than one of automaton-making, especially in its epistemological import. As a result, the reader is confronted with ingenious excursions into the artificial world and its ruses, described sometimes by medieval authors over hundreds of lines (p. 102) and wondering, here and there, if by proxy revitalizing automata of this flamboyant kind do not primarily offer an introduction to ekphrastic rhetoric and if, by extension, the techniques used to bring a device 'before the eyes' interfere decisively with the residual and 'liminal' work of the cybernetic objects themselves.

Later on, taking a cue from a painting of Hector's body and tabernacle in a 14th-century Venetian manuscript of the *Historia destructionis Troiae*, done by illuminator Giustino da Forli, Truitt moves away from fraud and unfamiliar knowledge, shifting the issue of medieval automata both chronologically, by examining traces and sources from the 15th century, and thematically, by addressing the marvel of lifelikeness as part of a larger preoccupation with preservation, putrefaction and rejuvenation. This development is in itself of great historical interest – suffice to think of the embalmed body of Lenin, which was displayed in a mausoleum in Moscow's Red Square for almost ninety years after the leader's death in 1924. While in Lenin's case lifelike effects help what is already politically and culturally situated, and the corpse serves Soviet rhetoric by chemical replacements and embodiment, in Truitt's hands, Hector's body, sitting as though alive (*quasi vivum*, p. 110) makes stronger claims: that its hydraulic enhancements can replicate a mythical character, that they convey through their artificial vessels a frisson of the uncanny, and that they similarly recirculate contemporary Aristotelian ideas about the physics of corruption and decay, although, in fairness, as the author herself honestly recognizes (p. 114), it is not clear at all from the historical context how a formal interest in alchemy could have contributed to such a complicated cultural construction. Perhaps, it would have been more convenient to develop a couple of hints about the role of the senses in the aesthetic appreciation of automata, given a prominent scholarly bibliography on the sensorium, or simply to give a wider textual grounding on the problems of moving statues and heroic portrayal, since, from Suetonius onward (take, for example, *Gaius* 50 or *Nero* 6), visual and textual representations in the Latin tradition do not match, and further problematize the body's disproportion or the fear and loathing of an unshapely power, artificially manufactured in all the wrong places. After all, most of Truitt's exemplary automata are fundamentally about persuasion in relation to social power, and therefore most closely related to epideictic and to the visual (and generic) expectations of *enargeia*.

As far as the last chapters are concerned, *Medieval Robots* continues with a brilliant discussion of the Burgundian amusement park at Hesdin, renovated by Philip the Good at great expenses in the 1430s, and of the Western diffusion of al-Jazari's work – one of the plates from his *Book of Ingenious Mechanical Devices* is elaborated in the book's jacket – which, however tentatively (p. 122), might have directly influenced the amazing drawings of the journeyman artisan and engineer Villard de Honnecourt (fl. 1225-1250). In general, Truitt's lush visual apparatus, ranging from a Macrobian zone map to the visualization of a mechanical clock donated by envoys to Harun al-Rashid, caliph of Baghdad, should be deeply praised because it allows a more egalitarian understanding of the historical forces employed by those craftsmen who created automata with their hands, and of the fragility of their physical and intellectual worldview.

From there to the end, the book abruptly leaves the de-centered web of the medieval encyclopedia and its artisanal workshops to the prescriptive domain of the Hobbesian Leviathan or Robert Boyle's description of the 'artificial life' of watches (p. 152): such jump might have the countereffect of rendering medieval automata more modern than they are. None of this at all challenges Truitt's premise about the necessity to mine the 'missing millennium' (p. 3) or the thought-provoking insights resulting from her own inquiry; it is simply to suggest that perhaps the relevance of cathedral horologes and astronomical clocks, as symbols of the Latin tradition, do not need to be seen exclusively in terms of persistence. Rather than symptomatic of a challenge inflicted to the Aristotelian categories of causes and effect, or simply as testimonies of a *longue durée* what the chief witnesses of Truitt's last chapter on the 'clockwork universe', such as the Flemish chronicler Jean Froissart (p. 146) or the Navarrese Jewish traveler Benjamin of Tudela (p. 144), ultimately demonstrate is that automaton-making and its reception remains inscribed within a canvas of diplomatic largesse and demands to be contextualized, at least initially, as such. These preliminaries, however, do not preclude the kind of back-and-forth from the terrestrial to the heavenly, or from humble monastic clepsydrae to the totality of time, as Truitt stresses in her conclusions.⁽⁴⁾ In the end, *Medieval Robots* is not only a remarkably evocative book, but it also breaks new ground by virtue of being the first survey of its kind in the English-speaking academic world, relocating our discussion of the legacy of ancient automata to novel chronological coordinates. It is reasonable to hope that Truitt's book will lead to a reconsideration of 'Abbasid patronage of science, magical hermetism, and the nexus of technology and ethnography, among many other themes, not to mention to our understanding of the Middle Ages itself.

Notes

1. Jessica Riskin, ‘The defecating duck; or, the ambiguous origins of artificial life’, *Critical Inquiry*, 20 (2003), 599-633; Simon Schaffer, ‘Enlightened automata’, in *The Sciences in Enlightened Europe*, ed. William Clark, Jan Golinski, and Simon Schaffer (Chicago, IL, 1999), pp. 126–165; Minsoo Kang, *Sublime Dreams of Living Machines: The Automaton in the European Imagination* (Cambridge, MA); Adelheid Voskuhl, *Androids in the Enlightenment. Mechanics, Artisans, and Cultures of the Self* (Chicago, IL, 2013).[Back to \(1\)](#)
2. I should mention here that Truitt’s overreliance on French literary texts (defended at p. 7) is potentially troublesome, although ostensibly impeccable given the hierarchy of Francophone genres at the time; one effect is a strange obfuscation of irony, considering that already Henri Bergson, in his 1900 essay *Le rire*, appeared to take a *metallicus rex* as comic relief.[Back to \(2\)](#)
3. Here (as elsewhere in the book) Truitt draws inspiration, quite cleverly, from Caroline Bynum, ‘Wonder’, *American Historical Review*, 102 (1997), 1–26.[Back to \(3\)](#)
4. To show my sympathy for this point in particular, though not nearly as extensively worked out as this leap from Hector’s body to 17th-century nerves and vessels, see Avner Ben-Zaken, *Cross-Cultural Scientific Exchanges in the Eastern Mediterranean, 1560–1660* (Baltimore, MD, London, 2010).[Back to \(4\)](#)

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