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## OF WOOD AND BONE: CRAFTING LIVING THINGS

Asa Simon Mittman

### ABSTRACT

*This conclusion attempts to reconsider the notion of animation, raised throughout the special issue of Preternature. It uses a remarkable sixteenth-century clockwork automaton friar to test the limits of mechanical animation in the medieval and premodern periods. This figure, traditionally ascribed to Juanelo Turriano, mechanician to Emperor Charles V, walks independently, moves its arms and head, rolls its eyes about, and mouths silent words. It beats itself with a stone and raises a cross. The work is compared to those discussed in the collection, to additional automata, and to other conceptual “creatures”—that is, beings created by humans. The conclusion considers the crafting of lifelike corpses, animatable bodies, robots, and the notions of sound and breath. These premodern works are put in dialog with Mary Shelley’s modern Frankenstein (1831) and Michael Landy’s postmodern “Saints Alive” exhibition of kinetic sculptures, based on works in the collection of the National Gallery, London (2013). The essay concludes with a brief discussion of the role of thing theory and object-oriented ontology in current discourse, and the implications these works have for the deployment of these theories in premodern studies.*

### KEYWORDS

*animation; automaton; breath; clockwork friar; Juanelo Turriano; robots*

On my screen, a spectral figure emerges from darkness.<sup>1</sup> There is virtually no setting: a barely discernable dark floor, and blackness. The figure is clothed in the brown robes of a Franciscan friar, belted with a plain white cord. Though his bearing is erect, as he walks forward the friar occasionally inclines his head downward, giving a sense that he stoops more than he actually does. The figure is bald and clean-shaven. He walks around his barren wasteland, raising a cross and rosary to his lips with his left hand, and beating his breast with a stone held in his right. As Elizabeth King, an artist who has done the most extensive work on the friar, notes, he is seen “rolling his eyes, and mouthing silent obsequies.”<sup>2</sup> For a full minute there is nothing else in the frame, so it is hard to judge the

scale. At forty-one seconds, the video slow-fades to a shot of the same figure, now without its robes, rosary, cross, and stone.

Even without clothes, the figure carries on, moving with a calm, stately dignity usually associated with large figures, but, twenty seconds later, we see another slow fade, revealing a close-up of what momentarily seem to be gigantic fingers, holding a key. With great care, with gestures befitting ceremony, the unidentified hand pushes the key into the side of a device and turns it. A fusee—a threaded, tapering drum—rotates with the key, drawing a string around it. And thus, the clockwork friar is reanimated (Fig. 1). At 1:35, we again see the entire figure, and can therefore estimate the size of the whole in relation to the key; this dignified, stately construct stands only about fifteen inches tall.<sup>3</sup> Without his clothes, he is surprisingly non-anthropomorphic. While his small, sandaled feet rise and fall, they emerge from a bell-like housing rather than a pair of legs (Fig. 2). The area between his lower lip and chin is a separate piece, as on a ventriloquist's dummy, which allows him to open his mouth in prayer.



FIG. 1 Automaton figure of a monk with modern robes, cross and rosary, South Germany or Spain, circa 1560, Division of Work and Industry, National Museum of American History, Smithsonian Institution.



FIG. 2 Automaton figure of a monk without modern robes, South Germany or Spain, circa 1560, Division of Work and Industry, National Museum of American History, Smithsonian Institution.

Yet, there is no sound.

The video was apparently shot without sound, but even with audio, the friar would say nothing. He has no artificial lungs or diaphragm, no mechanism to transform air into voice.<sup>4</sup> As he walks, he does not breathe; as he beats himself, he does not gasp; as he kisses his cross, he does not inhale to create even the minutest suction. In the introduction to this collection, Elina Gertsman quotes a “puzzled novice” from Caesarius of Heisterbach’s *Dialogus Miraculorum*, who asks if there can be “breath of life in wood, or stone, or metal.”<sup>5</sup> I would like to pick up this question here in the conclusion, by looking closely at the clockwork friar, this creation of wood and metal, the “clockwork prayer” as King called it, the “clockwork miracle” according to the public radio program Radiolab.<sup>6</sup> It is by tradition ascribed to Juanelo Turriano, mechanician to Emperor Charles V, and associated with a story in which the emperor’s son, King Philip II, promises God a miracle in return for the healing of his own son, Don Carlos.<sup>7</sup> According

to various legends, the young prince falls down a flight of stairs, bangs his head, and takes seriously ill. After the efforts of the best doctors had proved of no avail, the hundred-year-dead corpse of Diego de Alcalá, a Franciscan candidate for canonization, is brought to the sick boy's bedside. It is purportedly either placed in his view, within his reach, or even placed forehead to forehead with Carlos.<sup>8</sup> Whatever transpires, the accounts agree, the following morning Carlos begins a dramatic recovery. In gratitude, Philip commissions the clockwork friar, a miracle of perpetual prayer.

What is the resulting creation (if, indeed, any of this legend is true, and if so, if this work has anything to do with it)? Is it a prayer, without breath? Is it a miracle? Or, with its iron mechanism and wooden frame (Fig. 3), is it just an elaborate clock? I will use the friar and its sibling automatons to explore principles that animate this collection.<sup>9</sup> Is the freely walking clockwork friar in some way more animate than the puppets with articulable limbs and swivelable heads and manipulable wounds discussed throughout, more animate than the robotic Virgen de los Reyes? At first blush, he seems to be. Nearly all the others, without living handlers to manipulate them, *are still*. The clockwork friar, though, once given a winding and a gentle press on his release mechanism, carries on. He roams and performs his actions within a two-foot square without a puppeteer, without further nudge or embrace.<sup>10</sup>



FIG. 3 Automaton figure of a monk, detail of clockwork, South Germany or Spain, circa 1560, Division of Work and Industry, National Museum of American History, Smithsonian Institution.

The friar's motions are quite specific. In King's words:

The figure turns approximately every 20 inches to walk in a new direction. The head is moving now to the left, now the right, now straight ahead; the eyes roll right and left independently of the head but they also look towards the cross when it is raised. The mouth is opening and closing as if repeating the *Mea Culpa* or the Hail Mary: either one, for the right arm is beating the breast, and the left arm is raising and lowering the cross and rosary. As if this were not enough, every few moments, the automaton brings the cross to its mouth and kisses it. This last gesture involves a more complex motion of the left arm and shoulder, together with the lowering of the head and an abrupt motion of the lips. All this in a self-regulating internal assembly of iron cams and levers about the size of your open hand.<sup>11</sup>

He does what he does, without any further input from us, and performs his goals, regardless of our attentions or their lack. And the friar does so "in our world, of its own accord," unmoored as he is.<sup>12</sup> Most automata are connected to bases or other settings that conceal further mechanisms. Even the relatively independent La Virgen de los Reyes and her son, who each bear their mechanisms within their torsos, must remain seated, though she is still carried about, enthroned, in processions. In contrast, as King writes, the friar has "no intermediary prop or set for our imagination, assuring us of the boundaries of what we are about to feel."<sup>13</sup>

So, again, the friar *seems* more animate than the others. I need to acknowledge, in what is a bit of an aside, that my experience of the friar is conditioned by the strange video of it.<sup>14</sup> I have come to the work as we often now experience premodern artifacts, via technologies not native to or conceivable within their moments of creation. The friar, of course, was never meant to be viewed on video, though surely its clockwork mechanism is allied with the history of film.<sup>15</sup> However, this form of mediation is not altogether different from the other forms of mediation whereby we know the animated objects in this collection, including the medieval texts that describe their uses and the responses of contemporaries to them. In no cases can we have unmediated views of "medieval" or "early modern objects," since the periods have passed (and it is dubious to argue that even medieval viewers could have some sort of "pure" experience of an object, since all experience is mediated by numerous non-technological factors and frameworks). We have, instead, *contemporary objects* that were crafted centuries

or millennia ago, but are now as much part of our world as a rock, and not nearly as ancient in genesis. I cannot help but see the friar in action through current technology, but this need not be an impediment to interpretation and response. Indeed, in a sense the video carries on the legendary intent, allowing the artificially animated prayer to be repeated infinitely, even simultaneously, online, while the friar now generally stands still. The effect of the low-quality video of the friar is something like that of Rosalind Nashashibi and Lucy Skaer's "Flash in the Metropolitan," a three-minute 16mm film shot by strobe light in the museum, afterhours.<sup>16</sup> Joy Partridge argues that the film "transforms familiar art objects into strange, haunting, mystical, ephemeral images . . . the historical contingency so painstakingly enforced by gallery divisions and wall-texts dissolves."<sup>17</sup> Seeing the gold and silver reliquary bust of Saint Yrieix in its gallery case, or in the well-lit descriptive photographs on the Met's website, is a wholly different experience than seeing it repeatedly flicker out of and recede back into total darkness in Nashashibi and Skaer's film.<sup>18</sup> Their film turns the "work of art" into a resonant cult idol, which is perhaps what it always was. The video of the friar prevents it from being just a curio, a sculpture, a labeled toy within a vitrine. It not only allows us to see the friar in action, rather than stilled within a case, but also estranges it further from our accustomed modes of art reception. My experience of viewing the video is surely not the same as—not remotely close to—that of the friar's first audiences, but the video's silent, stilted peculiarity is affecting, bringing to the fore and emphasizing, clarifying even, the sense of mystery that, I suspect, was endemic in the friar's original performances. So, the clockwork friar is "strange, haunting, [and] mystical." But is it particularly *animate*? And if so, how does it *become* so? I will look briefly at some of the works and ideas raised in the articles in this collection to see if, together, they can help to answer these questions.

## CRAFTING DEAD BODIES

It should perhaps have been less of a surprise to me than it was to learn how much effort artists put into the creation of *dead* bodies. Medieval art is full of lively corpses. Numerous manuscripts provide images of the meeting of the Three Quick and the Three (equally lively) Dead, such as that which accompanies the Anglo-Norman poem *Le dit des trois morts et trois vifs*, in the De Lisle Psalter.<sup>19</sup> Skeletons frolic in the Dances of Death, more alive than the living they so uncannily double.<sup>20</sup> Among the more elaborate crafted corpses

are the “haunting” transi tombs, such as that of Henry Chichele, archbishop of Canterbury, which displays, to quote Marian Bleeker, “a dead body that is never going to go away, never going to decay,” and yet this dead figure is represented pulling his winding sheet over his thigh to cover his genitals in an apparent gesture of modesty.<sup>21</sup> All of these, though, in a sense, pale in comparison to some of the pallid bodies discussed in this volume. The immense efforts and technical skill required to produce the Christ of Burgos described by Gertsman is impressive, but what is peculiar is that all of this effort—the jointed limbs, calf-skin covering over soft wool, human hair, eyelashes, real crown of thorns, the bleeding wound, and so on—was expended to make a *dead* body, rather than a living one. It has an uncanny presence, but not a lively one. When Isabel had her famous, emotionally charged interaction with it, the statue moved, but it did so as a *corpse* moves: when Isabel dislodged the supporting nail, the arm fell limply downward.<sup>22</sup> This constructed corpse, like its prototype, needs living caretakers to set it into motion. And so, like a corpse, it cannot draw breath, so it remains as silent as the grave.

## CRAFTING ANIMATABLE BODIES

The Polish Christs and Satans discussed by Kamil Kopania are similarly less animated than *animatable*, less vivified than possessing an “inanimacy” that might, as Salih has it, still engender some measure of “latency.”<sup>23</sup> The accounts Kopania describes are wonderful, such as that which presents a late-fifteenth-century statue of the resurrected Christ, complete with built-in ring for hoisting it through the ceiling in the style of *deus ex machina* (or perhaps really *deus in machinam*, since the god is drawn in rather than lowered out).<sup>24</sup> The figure, though, is clearly inanimate, a fixed wooden block comprising figure, robes, and polygonal base. A ring protrudes awkwardly from the figure’s head, by which the rope was attached for elevating the statue upward. The figure’s hand is raised in a gesture of blessing, but its mouth is shut and its face a solid and immobile block of wood. It rises, but does so because of a person above it, pulling on a rope. Even as the figure of Christ ascends toward heaven, he approaches rather than recedes from humanity.

Sarah Salih turns from images to texts about them. As she notes, Psalm 115 challenges the animation of idols: “The idols of the Gentiles are silver and gold, the works of the hands of men. *They have mouths and speak not: they have eyes and see not. They have ears and hear not: they have noses and smell not.*

They have hands and feel not: they have feet and walk not: *neither shall they cry out through their throat*. Let them that make them become like unto them: and all such as trust in them.”<sup>25</sup> The psalm lays special stress on the silence of idols by mentioning this inability twice. Still, medieval sources do not accept the biblical assertion that idols are inert. Instead, many theologians from Augustine onward argued that they were animated by “crafty demons.” The idol is not itself alive, but rather houses a sentient spirit. In this way, as Salih writes, “[i]dolatri . . . is like Incarnation; it constructs hybrids of material and spirit.”<sup>26</sup> Is this the case with any of our objects here? Does the clockwork friar have any *spiritus* within, any of the breath of life that designates “spirit”? Was it intended to? It was (if the legend fits) a crafted miracle, but the mechanics of it are clear. It does not look lifelike, really, for all its movement. It is astonishing, and surely was when it was newly crafted, but it is difficult to know whether such an object, promised to be a miracle wrought by humans in exchange for God’s own, was seen as a miracle of skill or a miracle per se. If the works discussed here have any *spiritus*, where does it originate?

Gerhard Lutz’s essay answers this question implicitly.<sup>27</sup> His investigation is centered not so much on animated images and objects as on the people who animate them. He writes about touching immobile crucifixes and about having visions connected with them. These experiences, he argues, set the stage for more fully embodied images of suffering—the *crucifixi dolorosi*—and perhaps they ultimately press toward movable Christs. As visions of bleeding statues became a common feature of the medieval imaginary, it seems craftspeople began to manufacture bleeding Christs. That is, immobile and inert statues were already invested with some sort of *spiritus* by their viewers, their holders and caressers and kissers, before the bodies of the works themselves were manipulable.

The “robot saints” of Christopher Swift’s essay approach the capabilities of the clockwork friar; indeed, it is his essay that touches on it. Here, we have images like the La Virgen de los Reyes, the patron saint of Seville, that are hinged and mobile like the Christ of Burgos but that, unlike this corpse–mannequin, appear alive and well. Like the friar, the two figures of La Virgen de los Reyes have clockwork mechanisms within them; while the figures do not ambulate, when the mechanism is wound and released, “the heads of the dolls move autonomously.”<sup>28</sup> That is, once triggered, they could move to a limited degree by the impetus of hidden mechanisms, without further input. However, as Swift notes, only the head is driven by gears. The limbs must be moved by human hands and held in place, or they will fall down; the figure is more doll or puppet

than robot.<sup>29</sup> In contrast, the friar moves about on his own, moves his limbs without aid, and performs complex functions. Certainly, the distinction between the Seville pair and the friar cannot be summed up through acknowledgment of the incremental technological refinements that lie between them: the Virgen de los Reyes was not designed as an autonomously walking figure that simultaneously roams through our space, moves its arms independently and complexly, turns and nods its head, rolls its eyes, mouths apparent words, and kisses its cross. And still, though his mouth opens and closes, the friar is no more garrulous than his comparatively inert Spanish cousins whose lips remain fixed and closed, silent, with no breath of life to part them.

It is worth remembering that the Virgen de los Reyes likely did, at some point, make some noise. The torsos of both figures are filled with heavy gears, attached by leather straps to the figures' tilting heads. Did they creak? Did they tick? Insulated by wooden forms, kidskin covering, and the varied costumes they have worn, the mechanics would have been muffled; and placed in the capacious cathedral in Seville or carried in boisterous processions, it seems unlikely that the sounds of the clockwork and straps would have been audible. In more private viewings and more intimate settings, though, perhaps the figures would have emitted a decidedly inhuman whir.

There is another religious automaton, likely produced by the same remarkably skilled craftsman who made the clockwork friar, which is distinctly audible. It is a haloed, bearded saint, now housed in the Museum of Applied Arts in Budapest, similar to the friar in size and design, and also in its clockwork and the motions it drives, though the Budapest saint does not walk (Figs. 4 and 5). Rather than beating himself with a rock, the saint shakes a bell that he holds in his right hand. The bell itself is a mute prop, but within the body there is a "wooden harmony cylinder [with] steel prickles," and there was apparently another device, now partially removed, that added a second harmony.<sup>30</sup> This saint, then, is a clamorous one. Still, even without the harmony cylinder—which has pegs triggering a sequence of notes, as in a modern music box—the saint would likely make *some* sound. The silence of the friar is an artifact of the video, not of the device. The gears are attached to chains that likely rasp across their housings as they move (see Fig. 3). Like living bodies, the friar, the saint, and the Virgen de los Reyes have hidden, internal workings that, even when concealed from view, would produce faint sounds. Their possession of these clockwork organs of motion and sound allows the figures to transcend the status of dolls, filled with stuffing, or sculptures, whether carved out of solid blocks of matter or cast and hollow.



FIG. 4 Automaton figure of a saint, South Germany or Spain, circa 1570–80, Museum of Applied Arts, Budapest. Photo: Ágnes Kolozs.



FIG. 5 Automaton figure of a saint, without robes, South Germany or Spain, circa 1570–80, Museum of Applied Arts, Budapest. Photo: Ágnes Kolozs.

From where do these works draw their power? Caesarius's confused novice, referenced above, exclaims that he is bewildered by the notion that one could conduct a conversation with an *image* of the crucified Christ. Would he be comforted by his teacher's assurance that "The spirit of God exists in every creature, both in essence and in power, and to Him nothing is impossible or miraculous, and he daily works such things as these"?<sup>31</sup> Would it have been helpful for him to imagine that the tremendous profusion of sacred art that overwhelms visitors to medieval churches was all *always potentially animate*, that such miracles were daily occurrences? And would the animated works covered here have seemed miracles of technology and ingenuity, or miracles of God? Or both? In essence, is all sound from within the sound of *spiritus*? The answer is one of perspective rather than ontology.

## BREATH

An exhibition in the summer of 2013 by Michael Landy—described by Salih in her introduction—emphasized our role as spectators and actants.<sup>32</sup> Called "Saints Alive," the exhibition centered on seven large kinetic sculptures based on works in the collection of the National Gallery, London. They all require some prodding to come to raucous life. Buttons and pedals jolt the towering things to life, at times alarmingly. Landy's giant Jerome, pounding his chest with a massive rock, dwarfs us as we, in turn, dwarf the tabletop friar, who gently taps his tiny chest with his pebble. They differ in scale, as well as in violence and vehemence, but they both require that *we* start them up. The violence, in each case, at first seems self-inflicted, but, of course, is not. If the viewer does not press the foot pedal, Landy's Jerome does not beat himself. The friar, too, does nothing without being wound up and triggered into motion. Despite his elegant motions and apparent volition, he—*it*—is also a preprogrammed *thing*.

In the 1980s and 1990s, medieval art history was largely centered on discussions of "images." More recently, the terms have shifted, so that we have been writing more about "objects" and even "things." The recent material turn, with its object-oriented ontology and thing theory, has encouraged reflection on the animated nature of all objects, all things, on the agentic potential of these actants.<sup>33</sup> There is great promise in these approaches. King seems to anticipate this work, inspired by the friar. She considers the cams—notched cogs that

determine the movements of the monk—"the memory of the machine," and speculates, "'It' or 'he' . . . ? . . . I've used both, for the monk is truly a *thing* one moment, a *being* the next."<sup>34</sup> As Salih argues, this potentiality, this latency, is what makes an image into an idol.<sup>35</sup>

The original "viewers" of many of the works in this issue were interactants, participators, facilitators, not passive spectators, seeing but also touching, tasting, listening, *fainting*, recording and reporting and reveling. Yes, people took inert matter, some of it once living, took wood and bone, skin and teeth,<sup>36</sup> metal and mineral, and assembled these components into new arrangements, but like modern efforts toward artificial intelligence, some of these works seemed to jump the barrier between created artifact and active being. They approached, momentarily or enduringly, in ways that likely provided comfort and terror, a sort of singularity, and the queen of Spain swooned.<sup>37</sup> Salih refers to Latour, who believes that "in all our activities, what we fabricate goes beyond us."<sup>38</sup> This phrase evokes that most famous of all "creatures," the one made by Victor Frankenstein, a being that is part demon, part man, part mechanism, and part god.<sup>39</sup> Of course this "creature" has—in the original novel, at any rate—richly *human* intelligence, and in its first moment of life it not only breathes, but does so with force: "It was already one in the morning; the rain pattered dismally against the panes, and my candle was nearly burnt out, when, by the glimmer of the half-extinguished light, I saw the dull yellow eye of the creature open; it *breathed hard*, and a convulsive motion agitated its limbs."<sup>40</sup> King asks, "What is living stuff made of?" On a molecular level, of course, the answer is identical to that for "What is non-living stuff made of?" And yet, Turriano's accomplishment in creating the utterly remarkable—but still breathless—friar is not as complete as Frankenstein's. The final thing, while so much more than a wind-up toy, is not a saint, not a relic, not an idol, but, like all tools, an extension of the will of its creator. Unlike Frankenstein's monster, it cannot break that bond and act of its own volition. It will, for as long as its cogs drive it, repeat the same proscribed motions, and only these. In a scholarly moment when thing theory is ascendant, and all material is coming to be viewed as potent and potentially animate, the objects discussed in this collection—from the stationary to the most impressively mobile—remind us through their incomplete gestures toward *our* sort of life, that we are still, at least in a limited and anthropocentric sense, the ones who breath life into them.

## NOTES

1. "Automaton Friar in Action," *National Museum of American History* YouTube feed, October 30, 2013, accessed August 2014, <https://www.youtube.com/>. The same video is housed on the *Smithsonian Institution Collections Search* site, accessed August 2014, <http://collections.si.edu/>.

2. Elizabeth King, "Clockwork Prayer: A Sixteenth-Century Mechanical Monk: Introduction," *Blackbird: An Online Journal of Literature and the Arts* 1, no. 1 (2002), accessed August 2014, [http://www.blackbird.vcu.edu/vini/nonfiction/king\\_e/prayer\\_introduction.htm](http://www.blackbird.vcu.edu/vini/nonfiction/king_e/prayer_introduction.htm). King republished this essay with slight additions as "Clockwork Prayer," in *Breaking the Disciplines: Reconceptions in Culture, Knowledge and Art*, ed. Marsha Meskimmon and Martin L. Davies (London: I. B. Tauris, 2003), 84–128. I will cite the digital version, as it is more easily accessible. King's own haunting automaton video, "What Happened," is online as well: elizabethkingstudio, "What Happened," December 6, 2010, accessed August 2014, <https://www.youtube.com/>.

3. King, "Clockwork Prayer" (2002).

4. As King notes, "The mouth is opening and closing as if repeating the *Mea Culpa* or the Hail Mary: either one, for the right arm is beating the breast, and the left arm is raising and lowering the cross and rosary." Ibid.

5. Gertsman, this volume; and Caesarius of Heisterbach, *Caesarii Heisterbacensis monachi ordinis Cisterciensis . . . Dialogus miraculorum: Textum ad quatuor codicum manuscriptorum editionisque principis fidem*, ed. Joseph Strange (Cologne: Heberle, 1966 [1851]), trans. H. von E. Scott and C. C. Swinton Bland as *The Dialogues on Miracles*, intro. G. G. Coulton (New York, 1929), vol. 1, 526–28.

6. King, "Clockwork Prayer" (2002); and "A Clockwork Miracle," *Radiolab* Podcast, June 14, 2011, accessed August 2014, <http://www.radiolab.org/story/140632-clockwork-miracle/>. Note that the robe, rosary, and cross of the friar are modern, and seem to have been crafted for the figure around when it was acquired by the Smithsonian in the 1970s.

7. King, "Clockwork Prayer" (2002).

8. Ibid.

9. Swift briefly discusses the friar in this volume. In addition to the friar, there are figures of a female lute player in Vienna, a male saint in Budapest, and another monk in Munich. For images of the figure in Vienna, see "Automat, sog. Cisterspielerin," *Bilddatenbank*, Kunsthistorischesmuseum Wien, accessed August 2014, <http://bilddatenbank.khm.at/>; and "Cisterspielerin," *Europeana*, accessed August 2014, <http://www.europeana.eu/>. Three other lute players exist, but all are believed to be of later date, based on their use of brass rather than iron clockwork. These are in the Conservatoire National des Arts et Métiers, Paris, the Smithsonian, and the Bavarian National Museum in Munich. For images of the figure in Budapest, see "Zenélő automata—(jezsuita?) férfiszent," *Iparművészeti Múzeum*, accessed August 2014, <http://gyujtemeny.imm.hu/gyujtemeny/music-automaton-male-saint-a-jesuit/869>. See also Katalin Soós and Jenő Rácz, "Eine Automatenfigur in Budapest," *Zeitschrift für Kunsttechnologie und Konservierung* 4 (1990): 207–14. For images of the figure in Munich, including a radiograph of the head, see "Automaten und Lochkartenmaschinen," *Deutsches Museum*, accessed August 2014, <http://www.deutsches-museum.de/ausstellungen/kommunikation/>

informatik/automaten/. See also Peter Frieß, "Restaurierung einer Automatenfigur," *Alte Uhren und moderne Zeitmessung* 4 (August 1988): 40–50.

10. Duane Schultz and Sydney Schultz, *A History of Modern Psychology* (Belmont, Calif.: Thompson, 2007), 32.

11. King, "Clockwork Prayer" (2002).

12. Ibid.

13. Ibid.

14. The video where I first encountered this remarkable creation is quite low-quality, soundless and pixelated. It was produced by John Hiller for the Smithsonian Institution, and uploaded to YouTube in 2008 by a musician who goes by the single moniker "Tung" (Tung, "Bassist, Producer, Songwriter," *Tung*, accessed August 2014, <http://tung.me/>). Here, the video has had almost three hundred thousand views, whereas there are only four thousand views of the much better quality video on the National Museum of American History's own YouTube feed, posted five years later.

15. Many pioneers of cinema technology experimented with the use of clockwork to drive their cameras. See, for example, W. K. Laurie Dickson, "A Brief History of the Kinetograph, the Kinetoscope, and the Kinetophone," *Journal of the Society of Motion Picture Engineers* 21, no. 6 (1933): 435–55.

16. Rosalind Nashashibi and Lucy Skaer, "Flash in the Metropolitan," 16mm film (2006). My thanks to the artists for their generosity in sharing a digital video of this film with me.

17. Joy Partridge, "Keep Things Strange," *Material Collective Blog*, June 6, 2014, accessed August 2014, <http://thematerialcollective.org/keep-things-strange/>.

18. "Reliquary Bust of Saint Yrieix," *The Collection Online*, Metropolitan Museum of Art, accessed August 2014, <http://www.metmuseum.org/collection/the-collection-online/search/464333>.

19. East Anglia, ca. 1308–40, British Library, Arundel MS 83, f. 127v. For this image and a selection of related illuminations, see "The Three Living and the Three Dead," *Medieval Manuscript Blog*, British Library, January 16, 2014, accessed August 2014, <http://britishlibrary.typepad.co.uk/digitisedmanuscripts/2014/01/the-three-living-and-the-three-dead.html>. See Elina Gertsman, "The Gap of Death: Passive Violence in the Encounter Between the Three Dead and the Three Living," in *Beholding Violence in Medieval and Early Modern Europe*, ed. Allie Terry-Fritsch and Erin Felicia Labbie (Farnham: Ashgate, 2012), 85–104.

20. For the most recent and extensive study, see Elina Gertsman, *The Dance of Death in the Middle Ages: Image, Text, Performance* (Turnhout: Brepols, 2010), esp. chap. 2.

21. Marian Blecke focused on this aspect of these works in her paper "Mere Dead Things: Transi Tombs, Lollards, and the Haunting of Sculpture," delivered at the International Congress on Medieval Studies, 2013. Draft on file with the author. Blecke provides images and discusses the gesture in a blog post "Henry Chichele's Junk," *Mostly Medieval: Images and Reflections*, May 21, 2013, accessed August 2014, <http://mostlymedievalimagesreflections.blogspot.com/2013/05/henry-chicheles-junk.html>.

22. See Gertsman, this volume.

23. Salih, this volume.

24. Kopania, Fig. 13.

25. Salih, this volume (emphasis added).

26. Salih, this volume.
27. Gerhard Lutz, this volume.
28. Swift, this volume.
29. Ibid.
30. Like the friar, the saint is still functional. Audio used to be online at <http://www.kfs.oeaw.ac.at/DLI/mech/turriano.htm>, which has been archived by the Internet Archive's Wayback Machine at <https://web.archive.org/>. The Iparművészeti Múzeum, Budapest, produced a video (n.d.) of the saint in action. It is archived at in Budapest as a VHS cassette, and at the time of this writing is awaiting digitalization for dissemination.
31. Caesarius, *Dialogues on Miracles*, vol. 1, 526–28.
32. See the National Gallery's website for information about the exhibition: <http://www.nationalgallery.org.uk/whats-on/exhibitions/michael-landy-saints-alive> (accessed August 2014). The Material Collective hosted a group review of the exhibition, "The Mechanics of Being Holy [I, II, III]," *Material Collective Blog*, October 18, 2013, accessed August 2014, <http://thematerialcollective.org/mechanics-holy-ii-iii/>.
33. See, for example, Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham, N.C.: Duke University Press, 2010); Ian Bogost, *Alien Phenomenology, or What It's Like to Be a Thing* (Minneapolis: University of Minnesota Press, 2012); Bill Brown, "Thing Theory," *Critical Inquiry* 28 (Autumn 2001): 1–16; Bruno Latour, *Reassembling the Social: An Introduction to Actor–Network Theory* (Oxford: Oxford University Press, 2005); and the blog maintained by the Material Collective, accessed August 2014, <http://thematerialcollective.org/blog/>.
34. King, "Clockwork Prayer" (2002).
35. Salih, this volume. See also Brown, "Thing Theory," 5, as quoted by Salih.
36. Andrea Noel, "A 300-Year-Old Mexican Jesus Statue Has Real Human Teeth, X-Rays Show," *Vice News*, August 8, 2014, accessed August 2014, <https://news.vice.com/article/a-300-year-old-mexican-jesus-statue-has-real-human-teeth-x-rays-show>.
37. Ray Kurzweil, *The Singularity Is Near: When Humans Transcend Biology* (New York: Penguin, 2005).
38. Salih, this volume.
39. Mary Shelley, *Frankenstein*, rev. ed. (London: Henry Colburn and Richard Bentley, 1831), x: "perhaps the component parts of a creature might be manufactured, brought together, and endured with vital warmth" (emphasis added). Available online at *Open Library*, accessed November 2014, <https://openlibrary.org/>.
40. Ibid., 43 (emphasis added).