Introduction
The Victorian Automata/Automatism Schema

Suzy Anger

In a paper given to the Metaphysical Society in 1875, John Ruskin satirized the ubiquitous use of the language of automatism in that decade, carrying the joke to extravagant lengths.[1] He begins by predicting what will be "the first automatic impulse of all our automatic friends here present" in response to his talk, and then moves on to poke fun at physicalist accounts of mentality, particularly theories that ground morality in biology. Bandying about a term from thermodynamics, he mocks the idea that "this automatic development of solar caloric in scientific minds must be grounded on an automatic sensation of injustice."[2] In the same year, in *Deucalion*, again challenging naturalist theories, he nostalgically pronounces that in the old days, "if we heard anyone saying clearly absurd things, – as, for instance, that human creatures were automata – we used to say that they were out of their 'senses,' and were talking non-'sense'."[3] Ruskin's spoof-cum-diatribe makes vivid the pervasiveness of discussions of automatism and automata in the culture, although in his critique he was, not uncharacteristically, swimming against the tide.

The language of automatism and representations of the automaton were common in Victorian culture, taking on varied forms and moving across multiple sites. Conceptions of automata and automatism provided an expansive framework for expressing diverse ideas and values. Automata raised troubling questions about human intelligence and the boundaries between technology and biology, but they also charmed and entertained crowds. Industrial "automata" in factories outproduced the human body, and reduced human workers to agentless automata. Automata were said to escape the fallibility of the human senses; some writers, like Étienne-Jules Marey, claimed that they deliver graphically an objective, universal language that "could be called the language of the phenomena themselves, so superior is it to all other modes of expression."[4] Automatism diminished humans, denying their exceptionalism.

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Automatism dethroned consciousness. But automatism promised, as well, the transcendence of the human body and mind. Automatist mental states were thought to permit access to higher planes of reality and to expanded mental powers. Automatism was credited with intellectual and creative achievements impossible for the conscious mind. Writing in the journal *Mind* on political philosophy in 1899, Bernard Bosanquet declares "social automatisms" to be "the condition of social progress," an interpretation that would later be opposed by Marxist thinkers like Antonio Gramsci and Louis Althusser.[5] For Bosanquet, that "extension of the private mind, which is a consolidation of it with the social fabric" and "receives the *imprimatur* of the State" is "essential to cooperative existence" (168). Together the image of the automaton and the discourse of automatism were capacious, ubiquitous, and multivalent. They were debated and affirmed. They conveyed limitations and dissolved them. They expressed fears. They delivered fantasies.

This collection explores automata – both mechanical and human – and the pervasive use of the language and symbolism of automatism across disciplines, discourses, and sites in the Victorian period (broadly construed to include the United States and Europe). "Automaton" means both humans who are – or at least behave like – machines and mechanisms that appear to be human. "Automatism" is used to signify similarly divergent concepts, things that are self-moving and self-determining but also things that are mechanized and lack spontaneity.[6] These varying and even contradictory uses of the words point to some of the central concerns that circulate around ideas of automata and automatism, questions about the efficacy of consciousness and volition, the limits of agency, the boundaries between the organic and the mechanical, and what it is to be human in a scientific and industrial age.

Such questions and preoccupations did not, of course, arise for the first time in the nineteenth century. Automata simulating living creatures had for centuries figured in scientific inquiry and provoked philosophical questions. Theories of human mechanism were deliberated, most notoriously in La Mettrie's human-machine (*L'homme machine,* 1747). This volume asks what is distinctive about the cultural uses and meanings of automata and automatism in the Victorian period. How did the specific developments of the period inflect those long-standing questions about the relationships between humans and machines? What new conceptions of the human did nineteenth-century theories of automatism produce? What social, technological, scientific, philosophical, political, and aesthetic

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shifts did automata and their representation generate? How were automata and automatism recruited in constructions of race? How does Victorian thought on automata continue to shape current understandings of mind, agency, and mechanism? These questions have particular resonance today as well, when those issues have melded with our current preoccupation with robotics and artificial intelligence (AI).

That constellation of ideas clustering around automata and automatism became a significant organizing structure of knowledge in the nineteenth century. Historian Kurt Danziger's construal of the concept of "generative schemas" as "networks of categories that make possible the linguistic expression of what are held to be observed or hypothetical facts" is helpful for thinking about the workings of the automata/automatism framework in the period.[7] Generative schemas, as Danziger explains the concept, are general metaphorical frameworks expressed across public discourses. These "underlying metaphorical systems have *generative* properties," Danziger writes, and are transferred across domains. "[T]hose who share them are in a position to emphasize different sets of implications, any of which could be suggested by the original metaphorical schema."[8] What I call the automata/automatism schema constitutes in the Victorian period just such an organizing and productive framework, a network of ideas and analogical reasonings that bring together and generate overlapping, sometimes opposing, concepts, ideas, objects, and interpretations, moving across psychology, medicine, science, sociology, economics, politics, and literary and popular culture.

The remainder of this introduction examines some key examples of the Victorian automata/automatism schema and introduces the contributions to the volume. In demonstrating the significance of this schema to Victorian culture, the essays contemplate a variety of material sites – the courtroom, the home, and the theatre. They enter into the laboratory with its newly invented recording and inscription devices. They reflect on automatism as a legal defense, as a conduit to occult knowledge, and as a method for aesthetic creation. They draw out connections to industrialism and labor and to race theory. They engage with scientific developments: evolutionary theory, thermodynamics, brain science, and physiological psychology. They consider the beginnings of AI, attempts at mechanisms that would replicate human intelligence and mentality. Together the essays demonstrate that the automatist/automata schema informed the Victorian worldview, producing perceptions and constructing realities.

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I The Human Automata

a Automatism

The word "automatism" appears pervasively in writing at the end of the nineteenth century, although the word was of fairly new coinage at the start of the Victorian period.[9] Psychophysiology made "automatism" an essential concept in explaining behavior, and by the end of the period it had become everyday psychological language. The new psychology produced a transformed conception of humans, understanding them as part of a complex causal system. The belief that a great deal of human behavior is determined by automatic or unconscious processes was accepted and discussed widely in both specialist and popular forums.[10] Reflex action became an established physiological fact by the first part of the nineteenth century, and Marshall Hall's theory of spinal cord reflexes was extended to reflex actions of the brain.[11] Experimental research on reflexes confirmed a separation between sensation and consciousness. Thomas Laycock made the case that brain reflexes function "automatically and mechanically, without the intervention of any sensation, feeling, thought, volition, or act of conscious mind whatever."[12] Automatic functions, sensorimotor responses, made what had been earlier understood as conscious mental processes into purely mechanical ones.

The prominent psychologist W. B. Carpenter coined the phrase "unconscious cerebration'" in the fourth edition of his *Human Physiology* (1852) to describe reflex and other modifications of thought that are outside of conscious awareness. In *Principles of Mental Physiology* (1874), Carpenter writes: "a large part of our Intellectual activity … is essentially *automatic*, and may be described in Physiological language as the *reflex action of the Cerebrum*."[13] Reasoning, complex cognition, and creativity can all occur as automatic reflex action. If the dominant split in thinking about the human had been physical versus mental, or body versus soul, a new organizing division entered the discussion: conscious/volitional versus automatic.

Some who acknowledged the importance of automatic brain functions nevertheless held tenaciously to an account of a conscious directing will. Although Carpenter accepts that automatisms – unconscious cerebration – result in complex behaviors, such as problem-solving or the composition of poetry and symphonies, he insists, here in an 1875 lecture entitled "Is Man an Automaton?," that automatic functions are "directed and controlled by the will; – the Ego willing the result, and leaving it to the automaton to work it out."[14] Carpenter acknowledges the role of

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automatism, but places it in service of a determining self. Over time, he argues, what were once volitionally directed behaviors become automatic "habits"; but again for Carpenter the will guides those automatisms, at least in a healthy mind.

Many agreed with Carpenter that nervous reflexes play a predominant role even in creative activity. E. S. Dallas's *The Gay Science* (1866) proposed that all creative work is produced unconsciously. Oliver Wendell Holmes asserted: "The creative act is not voluntary at all, but automatic."[15] Robert Louis Stevenson famously attributed the story of *Dr Jekyll and Mr Hyde* (1886) to his metaphorical "brownies" who work outside of his awareness. But others opposed the idea that creative works, regarded as the highest human achievements, could be produced without a directing consciousness. Linda Austin's chapter in this volume situates the reception of Anthony Trollope's work in a prominent line of criticism resistant to the role of automatism in creativity.[16] A version of that view is evident in Max Nordau's contention that genius overpowers automatisms, thereby preserving the spontaneity of conscious thought. "Even the highest centers are not purely human as long as their perfection does not reach beyond automatism," he writes.[17] Austin shows how criticism from Trollope's time into the twentieth century adhered to a model of conscious intention in creativity, and demoted Trollope's writing because of his mechanized writing habits.

The concept of automatism was used by the new psychology in diverse ways. As experimental psychology was established, research on automatic processes of mind moved into physiology laboratories, where precision instruments registered responses and involuntary actions. In early psychiatry, automatisms were connected to insanity and understood as pathological or animal-like behavior, a resurgence of lower and earlier developed functions of the brain. Evolutionary models of mind reserved volition, rationality, and consciousness for what was deemed the further evolved brain, contending that automatisms were more dominant in nonwhite races, women, and the lower classes than in white European men.

The theory of human automatism that best captured the Victorian imagination was Thomas Huxley's conscious automatism. Huxley argued, to great notoriety at the 1874 meeting of the British Association of Science, that humans are automata. According to Huxley, an inefficacious consciousness takes itself to be in control, when in reality it merely accompanies the automatic, unconscious production of behavior. That is, all human behavior is automatic. In explaining his theory, Huxley draws explicitly on the history of the production of mechanical automata. He invokes the

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admired eighteenth-century automata maker Vaucanson – who remained an often-mentioned touchstone of achievement in the Victorian period for his complex mechanisms – discussing a soldier with neurological damage, who apparently performs complex actions with no conscious awareness of his doings. Is the soldier, Huxley asks, "in the condition of one of Vaucauson's [*sic*] automata – a senseless mechanism worked by molecular changes in his nervous system"?[18]

Huxley's polemical presentation of human automatism was debated extensively for the remainder of the century. My chapter in this volume examines the uptake of the conscious automaton debate in the broader culture, considering the implications of the view for thinking about consciousness and literature. In Chapter 6, Tyson Stolte demonstrates the influence of theories of human automatism on James Thomson's thought and his portrayal of agentless characters in a deterministic world in the poem "The City of Dreadful Night" (1874). Stolte argues that Thomson's departure is that he does not allow his characters even the illusion of the efficaciousness of consciousness. Yet, Stolte shows, Thomson's readers were able to interpret that poem as expressing a view closer to Carpenter's directing will than to Huxley's conscious automatism. George Levine, in his contribution, shows that Darwin's theories have been taken by many, including his contemporary Samuel Butler, to entail the Huxleyan view that people are conscious automata and that intelligence and intention play no roles in a mechanistic natural world. Levine demonstrates that instead aspects of Darwin's writing undercut a thoroughgoing automatism and a world emptied of mind and volition.

b Volition, the Law, and Hypnotism

A persistent note in Victorian writing is that automatist theories radically diminish the role of volition in human action, and in so doing give rise to anxieties about moral, religious, and legal responsibility.[19] If behavior is determined, nonvolitional, and automatic, then it seems that individuals cannot rightly be held responsible for their actions. Discourses of automatism shaped ideas of criminal responsibility and influenced legal proceedings and rulings, as Roger Smith and Joel Peter Eigen have demonstrated in important monographs.[20] Courtroom defenses and verdicts had recourse to the new defense that criminal acts had been performed by perpetrators in unconscious, automatist mental states, such as while sleepwalking. Roger Smith's contribution to this volume shows that noted criminal trials involving automatism from the 1850s on worked as public

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theater and helped crystallize the terms of the more abstract philosophical debates on automatism in the 1870s. Smith argues that the ostensibly descriptive language of automatisms imported moral and emotional, that is, evaluative meanings, even while questions regarding automatism and volition worked to shift attention away from the social conditions that, in fact, led to crime.

Even at the start of the Victorian period, mesmerism and, in 1843, James Braid's more scientifically accepted hypnotism (physiologically produced trance states), had established the workings of automatisms in human action. A person (often understood as weak-willed) succumbed to the mesmerizer's control or performed actions while in an alternative mental state. Discussions of mesmerism also raised concerns about the role of volition in action. Could a mesmerist control the actions of a person, rendering them a machine without awareness or moral sense, a human automaton? The idea of the mesmerized or hypnotized human subject continued to figure in public discussion and literary productions throughout the century, with concerns raised regarding the possibility of automatized subjects driven by the will of the hypnotizer. Popular literature obsessively produced stories of criminal acts performed in a hypnotic state, and of woman rendered automata, perhaps most famously in George du Maurier's *Trilby* (1894). Arthur Conan Doyle exploits that scenario in his 1887 novella *The Parasite*, where his scientist narrator explains that his fiancé had "been reduced to a condition of automatism…. A person at a distance had worked her as an engineer on the shore might guide a Brennan torpedo."[21] Doyle imagines that a human could be guided like a remote-controlled weapon, her "nervous mechanism" externally controlled by the will of another. Worries about hypnotic suggestion in crime were not restricted to fiction, but played a role in both medicine and criminal cases at the end of the century.[22] A somewhat subtler, but conceptually related idea appears in George Gissing's late-century fiction, as in *The Nether World* (1889), where characters are said to be "driven automaton-like by forces they neither understood nor could resist."[23] For Gissing, the force is no longer externalized in someone's will, but is instead environmental – social – and perhaps hereditary; the environment rather than another agent compels the crime. Shuhita Bhattacharjee's chapter in this volume examines the depiction of the mesmerized person in Richard Marsh's little-studied popular fiction beyond *The Beetle* (1897), arguing that Marsh employs the figure of a female or impoverished subject rendered an agentless automaton to make manifest social and legal injustices and power imbalances.

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c *Automatism in Occultism and Spiritualism*

Theories of automatism were rejected by some not only because they threatened beliefs about human agency, but also because they diminished human exceptionalism. Automatism made the mental a part of the natural world and put humans on a continuum with animals and, for a few commentators, even machines. Those who resisted what they regarded as a reductive materialist view sought to reassert the reality of the soul and mental capacities that went beyond what naturalist science would accept. Outside of orthodox religion, spiritualist and occultist movements presented evidence of communicating spirits and an unseen realm that could in some respects be known by the human mind. Psychologists such as Carpenter and Morton Prince, on the other hand, drew on theories of automatism to debunk claims of communication with the dead and other psychical phenomena. They explained the phenomena by appeals to unconscious cerebration, the power of suggestion, hallucination, or mental pathologies.

But theories of automatism were increasingly adopted by those who sought to establish the reality of extraordinary mental powers or to provide evidence of the continuation of a nonphysical self after death.[24] Spiritualist mediums were said to enter into automatist states in which they were able to contact the dead or access alternative planes of reality. The medium's body (often a woman's) in an automatized trance could deliver spirit communications.[25] Automatic writing, widely discussed late in the century in medical and psychological journals, was declared by some to be evidence of contact with another world. For Frederic Myers at the end of the century, "automatisms" became a central category of explanation of extraordinary mental phenomenon. Automatisms for Myers permit access to subliminal or secondary consciousnesses. He describes these as "*nunciative*," that is, message-bearing, automatisms.[26] Nunciative automatisms may deliver "supranormal" knowledge coming from sources outside the person, but more often they are "messages communicated from one stratum to another stratum of the same personality" (524). Myers's automatisms return control to "the 'self' which supplies the initiating power" (523), a self that resides outside of normal consciousness yet is not pathological. Aren Roukema's chapter in this volume explores themes of psychic power and mind control in the context of scientific racism. Roukema examines popular occultist fiction that depicts psychic automatisms in ways that challenge Victorian evolutionary science's racial hierarchies that position white European

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men at the top of the evolutionary ladder. The works Roukema analyzes instead situate psychical superiority and advanced mental power in nonwhite characters.

d Automatism, Race, and Scientific Racism

As Roukema's chapter shows, proponents of race science exploited evolutionary theory to argue that less evolved – that is, nonwhite – brains were dominated by unconscious, instinctual, and automatic functions. That nonwhite people are automaton-like and lack agency became a pernicious leitmotif in the writing. Long Bui has shown in his *Asians as Automata* that Chinese laborers in the nineteenth century were denied personhood and demoted to labor machines: "Asians act and behave like numbed automata bereft of deep feeling, spontaneous thought, and human consciousness."[27] Those ideas recur frequently in British travel writing in the period. The anonymous writer of a piece on Hong Kong, for example, writes that "reason and physiological knowledge fail in explaining the constitution of the Chinaman, and you can scarcely help wondering whether he is part of the organic creation at all, but not rather some marvelous automaton cunningly devised by Providence for the special benefit of the European."[28] The racist Eurocentrism is so extreme as to read like satire, in its claims for white ownership of reason, scientific knowledge, God's partiality, and even biological matter.

Similar strands of scientific racism are embedded in much of the psychological research in the period. Meade Bache, in a paper on "Reaction Time with Reference to Race" (1895) in *The Psychological Review*, argues with convoluted logic that it can be demonstrated that "the negro is, in the truest sense, a race inferior" because of his superiority in "the quickness of his automatic movements." He continues: "The negro is, in brief, more of an automaton than the white man is."[29] As Chris Dingwall's chapter in this volume shows, such self-interested constructions permitted white people to understand themselves as being in sole possession of rationality, as autonomous and self-determining, while representing Black people in opposing terms as automatic and externally controlled. Examining developments in the United States following the abolition of slavery, Dingwall traces the character of Topsy from Harriet Beecher Stowe's *Uncle Tom's Cabin*'s representation of the slave girl as mechanized human to the subsequent factory production of Topsy dolls, arguing that the cultural uses of Topsy point to the "racist iconography" of automata in the nineteenth century.

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II Mechanical Automata

a Race and Mechanical Automata

That same racist iconography is on display in Victorian mechanical automata, both in exhibitions and as commodities. A succession of orientalist automata, with "exotic" names such as Hajeb and Ajeeb, reproduced Wolfgang von Kempelen's famous eighteenth-century automaton chess player, the Turk. Ajeeb, described as a mystical "Moorish figure," was another sham mechanical chess player (like Maelzel's Chess Player analyzed by Poe). Ajeeb was exhibited at the Royal Polytechnic Institute in 1868 and displayed at London's Crystal Palace into the 1870s, before being toured across Europe in the following decade.[30] Contemporary articles raised the possibility of occult or mesmeric explanations for the automaton's skills, reinforcing cultural narratives regarding the irrationality of the "East."[31]

Mechanical Black and Asian automata were widely available as collectible items in the later decades of the century. In his discussion of the gender of automata, M. Norton Wise has briefly linked the increase in production of Black automata to evolutionary theories that asserted the greater automatism of the nonwhite mind, as well as the female mind.[32] Louis Chude-Sokei, in *The Sound of Culture,* examines the connection of Black bodies to laboring machines in the United States: "In the antebellum period the relationship[s] between blacks and machines were so established that there were a great many 'automaton "Negroes"' produced in America."[33] In Chapter 2, Edward Jones-Imhotep and Alexander Offord observe that the many Black automata created in the nineteenth century carry out distinctly nontechnological activities: fruit-selling, banjo-playing, smoking, and singing. Jones-Imhotep and Offord question why historical research has not paid greater attention to the pervasiveness of Black automata, and contend that turning to discourses of scientific racism to explain the pervasive production of Black automata is to replicate the white gaze. Instead, they argue, Black automata should be understood as racist objects, constructed to create and sustain a myth that Black people and technology are not compatible.

b Thought Problems, Spectacles, Exhibitions, and Commodities

Jean-Claude Beaune, in an influential article on the history of automata, argues that mechanical "automata represent the dream, the ideal form, the utopia of the machine."[34] Automata are alluring because they appear

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to be alive and to act on their own. But, as the racist automata of the nineteenth century make clear, mechanical automata have many meanings. The particular forms automata take, the dress they wear, the painted color of their skin, the activities they engage in, where and how they are sold and to whom, all matter to their meanings. In the Victorian period, mechanical automata continued to raise abstract philosophical problems and to entertain, but they also increasingly embodied desires and reflected particular social meanings as they were enmeshed in an accelerating commodity culture.

The popular stage magician Jean-Eugène Robert-Houdin describes in his *Memoirs* (1859) the great delight he took in constructing entertainment automata – his "progeny."[35] Stretches of his autobiography dwell, with a curious affective intensity, on the unparalleled happiness that he experiences when inventing a writing/drawing automaton; he discovers that he has "unconsciously produced an exact likeness of" (202) himself – the mental automaton creating the mechanical one. Setting his automata in motion for the first time, the initial question he puts to it is a Frankenstein-like: "Who is the author of your being?" (202). Robert-Houdin associates his invention of automata with reproduction of self, but also with a deity-modelled control. There is another curiosity in his account. He explains that he strived to make his automaton's mechanism silent, attempting to "imitate nature, whose complicated mechanisms work almost imperceptibly" (205). But because of that lack of noise, viewers undervalued his writing/drawing automaton, taking the silence to indicate simplicity of construction. It was only when he reworked the mechanism so that it produced a "whizzing sound" that audiences came to admire the complexity of his creation and his talents. While it has been common to understand mechanical automata as vehicles allowing thought experiments on human mechanism,[36] Robert-Houdin's story suggests that mechanical automata appeal not only because they draw attention to similarities between humans and machines, but also because they underscore differences, refusing to represent the reduction of the biological to the mechanical.

Automata played a role in exhibition and entertainment culture in the Victorian period, as they had in the late eighteenth century. Fraudulent chess-playing automata continued to draw crowds in the nineteenth century. They were on display at fairgrounds, at technological exhibitions, and in galleries of practical science. Newspaper articles reported on the crowds gathered around music-playing automata at expositions such as London's International Exhibition of 1862.[37] Automata were used in stage spectacles, in magic displays, or in shows in which performers mimicked

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mechanical automata. Stage automata befuddled audiences, raising questions about the differences between humans and machines and about the ultimate capabilities of mechanism. John Tresch argues that automata on display left viewers uncertain as to whether uncanny forces were involved or whether the actions were solely mechanical: "the performances made audiences hesitate, oscillating between mutually contradictory interpretations of the scenes before them."[38]

Research specifically focused on mechanical automata in the second half of the nineteenth century has primarily looked at the French context. Christian Bailly's *Automata: The Golden Age* collects images of elaborate mechanical automata produced in Paris in the last decades of the nineteenth century – dancers, musicians, conjurers, acrobats, white children involved in leisure activities, snake charmers, and Chinese opium smokers. Monkeys dressed in human attire, doing human activities, abound, suggesting that these automata embodied questions not only about the boundaries between humans and machines, but also humans and animals. Automata were increasingly a collectible commodity. Automata makers, working in their own quarter in the Marais district, created aesthetically impressive, artisan luxury automata for collectors. (Bailly reports that some automata sold for the amount on which a less affluent family could live for a year.[39]) Those costly automata were sold by jewelers, who worked with watchmakers such as the renowned Patek Philippe to produce them for well-to-do buyers. As cultural capital, those automata, exported around the world, hovered somewhere between art and collectibles.[40] They were not as unique, expensive, or difficult to produce (given machine-aided production) as the automata of the eighteenth century had been. But, as Kara Reilly has shown, luxury automata were distinctly different from the relatively inexpensive, mass-produced automata that became popular as toys in the later nineteenth century and common objects in homes.[41]

Reilly's essay in this volume looks at automata that reproduce celebrity stage performers in the late nineteenth century. She shows that automata were important not only on the stage, but also as commodity collector items that allowed the public to possess a "living" version of the performers. Her history of collectible stage luminary automata gives insight into the construction of the idea of celebrity, strategies of marketing, and the acceleration of commodity culture at the end of the Victorian period. Technologies of mechanical automata developed over the course of the period, from clockwork, to steam, to electricity. Automata also began to incorporate new technologies of stored memory. By the century's end electrical automata were widely used in advertising in shop windows. Automata

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presenting as imitations of humans helped make consumers into imitations, modelling identities and desires.

If the automata of the eighteenth century drew on mechanism as explanatory model for the biological and sought to reproduce (simulate) the physiological functions and appearances of the body, externally and internally (as in Vaucanson's much-discussed duck ostensibly imitating the process of digestion), Jessica Riskin argues that in the nineteenth century "the ambition was not to simulate" physiology. Automata in the period "instead were artistic renditions of animal and human activities."[42] Attempts at mechanical simulation gave way to new technologies focused on abstract functioning rather than material replication. There were some exceptions. Étienne-Jules Marey, for instance, constructed automata, including a mechanical flying insect, to support the graphic representations of flight inscribed by his recording apparatuses.[43] Automata continued to play somewhat of a role in scientific exhibitions in the Victorian period. An 1841 article on "Automaton Figures," reports on "Professor Wheatstone, who exhibited a speaking automaton at the Dublin meeting of the British Association for the Advancement of Science."[44] Physicist Charles Wheatstone's construction of automata influenced his later work on acoustical theory and the propagation of sound, important in the development of telegraphy.[45] His speaking automata (which copied not a human figure but instead the human vocal tract) later inspired Alexander Graham Bell in his development of the telephone. Charles Dickens's "Full Second Report of the Mudfog Association for the Advancement of Everything" (1838), notoriously satirizing the published reports of the British Association for the Advancement of Science, pokes fun at the use of automata in scientific exhibitions in the section "Display of Models and Mechanical Science."[46] Dickens's men of science advance plans for the construction of an automaton park (well before the development of actual amusement parks at the end of the century). The park, for dissolute young nobleman, would offer mechanical old women and cab drivers to knock around, along with automata policemen to take the offenders into custody and automata magistrates to exonerate them the following morning. Dickens's parody evinces his perceptive awareness that mechanical automata reflect social ideas.

Contemporary considerations of the history of mechanical automata connect the development of automata directly to industrial capitalism and the work of empire, situating the earlier emphasis on automata as aesthetic objects or entertainment as preludes to practical, profit-making industrial uses. Hermann von Helmholtz, in his frequently cited discussion of

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Droz and Vaucanson, admires the eighteenth-century creations because they "enrich the mechanical experience which a later age knew how to take advantage of."[47] Industrial machines in his day are produced to "perform one service, but shall occupy, in doing it, the place of a thousand men" (190). David Brewster, in his discussion in *Letters on Natural Magic* (1832), sees the wonder-inspiring automata of the eighteenth century as paving the way for "purposes of higher import," the factory machines of the nineteenth century: "Those mechanical wonders, which in one century enriched only the conjuror who used them, contributed in another to augment the wealth of the nation; and those automatic toys, which once amused the vulgar, are now employed in extending the power and promoting the civilization of our species."[48] For Brewster, the mechanization of reason in Babbage's calculating machine sits at the apex of progress, outdoing any previous mechanical virtuosity.

c *Industrial Automata and the Beginnings of Artificial Intelligence*

Invocations of industrial automata like Brewster's and Helmholtz's were common in nineteenth-century discussions of the factory and labor. "[T]he automaton became a symbol for human machine relations in the industrial age," writes Adelheid Voskuhl.[49] The automaton is used to signal degraded, alienated labor, a dehumanized worker demoted to will-less mechanism, but also signifies a complex, mechanical system that, though not conscious or living, is understood as intelligent. In an instance of the former use, Marx refers to the factory worker as a "'living' automaton."[50] Journalist William Cooke Taylor in his 1844 work on the factory system similarly claims that repetitive "mechanical processes" "degrade the workman into an automaton."[51] Taking the analogy in the other direction, Andrew Ure's well-known description of the factory, quoted by Marx in *Capital* (1867), portrays the factory as "a vast automaton, composed of various mechanical and intellectual organs," a description that gestures at the idea that a complex system of machinery can be regarded as possessing intelligence.[52] Marx's famous description of the factory system depicts it as an "automaton" that reduces the worker to a part of the system: "the automaton itself is the subject, and the workmen are merely conscious organs, co-ordinate with the unconscious organs of the automaton, and together with them, subordinated to the central moving-power."[53] Making the automaton "the subject" seems to situate agency in the factory mechanism, "endowed … with intelligence and will" (401). But the description

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also, like Huxley's, puts unconscious, nonvolitional automatism in control, consciousness existing in the workers, but entirely inefficacious. Simon Schaffer has argued that "to make machines look intelligent it was necessary that the sources of their power, the labor force which surrounded and ran them, be rendered invisible."[54]

Writing on factory industrialization, then, worked to further destabilize the distinction between mechanical automaton and living person, biologizing the machine and mechanizing the human, while diminishing the significance of consciousness.[55] Contemplation of the overlap and boundaries between the human and the mechanical took new shape in the second half of the period in response to innovations in industrial technologies. As Anson Rabinbach has shown, a transformed model of the human in relation to industrial production emerged. The laboring body was reconfigured as a thermodynamic system: "the working body was but an exemplar of that universal process by which energy was converted into mechanical work, a variant of the great engines and dynamos of the industrial age."[56] That new conceptualization encouraged comparisons between the mechanisms of human and industrial automata and gave rise to dreams of increased human efficiency and economic productivity. Those constructions also fueled fantasies of competition between industrial and human automata.

Conceptions of the factory as an intelligent system, like discussions of the mechanistic nature of mental activity, directed attention to the question: What is intelligence? That question was magnified by the first efforts to create "thinking machines," most famously in Babbage's attempts to automatize intelligence in his plans for his Difference and Analytical Engines.[57] As the physical mechanism was accepted as increasingly important to mental activity, cognition was regarded as decreasingly mysterious and consequently something that could conceivably be achieved by a machine. As has been frequently observed, early endeavors at calculating devices together with deliberations on ostensibly intelligent chess-playing automata (though in fact hoaxes) were precursors to current AI and robotics.

The development of machines replicating processes such as perception, memory, and reasoning further suggested that cognition does not require a conscious living subject. The economist Alfred Marshall delivered to Cambridge's Grote Society in 1868 a remarkable early paper, "Ye Machine," in which he presents a detailed plan for unconscious machine intelligence. He envisions machines with "bodies" and "brains" that sense and respond, and even reason mechanically: "A Machine can be caused to

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receive from the outer world, in the form of pressure, light, sound, etc., *impressions* or modes of motion which shall effect changes in the … relations of its internal parts."[58] Those changes are "sensations," in his terms, which result in "actions" by a process mediated by simple "ideas." Marshall drew on current psychophysiological models in describing his intelligent machine, which would carry out processes of association, develop automatic behaviors through repetition, and possess memory. The devices would over time come to have "different moral characters" (130) and be capable even of creative production.

At the end of the Victorian period, Nikola Tesla forecast the invention of autonomous, thinking automata:

> The automatons so far constructed had "borrowed minds," so to speak, as each merely formed part of the distant operator who conveyed to it his intelligent orders; but this art is only in the beginning. I purpose to show that, however impossible it may now seem, an automaton may be contrived which will have its "own mind," and by this I mean that it will be able, independent of any operator, left entirely to itself, to perform, in response to external influences affecting its sensitive organs, a great variety of acts and operations as if it had intelligence.[59]

Tesla is confident that this can be achieved, because he models the machine on himself: "I am an automaton endowed with power of movement" (184). Cognition, he argues, can be realized in multiple media; substance is not important: "Whether the automaton be of flesh and bone, or of wood and steel, it mattered little" (185). Such speculations, if largely hypothetical and at the time still closer to scientific romance than reality, worked to refashion ideas of the automaton, bringing human and automaton ever closer.

If machines can think and perceive, what is left that makes humans special? Similar to current worries about AI and chatbots turning out writing and art, the specter of machines capable of thinking and even of producing creative works occasioned both anxieties and satire. Richard Altick discusses the performance of the "Eureka machine," a "poetry making machine" for composing Latin verses, which was on display at the Egyptian Hall in 1845. Altick notes that an advertisement in *The Athenaeum* announced that the instrument was "the nearest approach to a thinking machine ever yet produced."[60] The supposition that a machine could produce creative works was strongly resisted by some, as were the arguments in psychophysiology that creative work originated in automatic brain processes. As early as 1844, in a piece on "J. Babbage's" "New Patent Mechanical Novel Writer," *Punch Magazine* satirized the possibility of machine-composed literature, while simultaneously critiquing what some characterized as the

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mechanical nature of novel-writing of the day. Ada Lovelace, in a much-quoted remark, claimed that Babbage's "Analytical Engine has no pretensions whatever to *originate* anything. It can do whatever we *know how to order it* to perform."[61] On her account, the automaton cannot invent anything; she reserves that special power for human mentality. But the concern that automated intelligence would be able to reproduce the products of human creativity circulated in the culture. At the end of the century George Gissing's overworked character Marian in *New Grub Street* (1891), seeing an advertisement for a "Literary Machine," hopes for "some automaton to supply the place of such poor creatures as herself, to turn out books and articles."[62] Gissing condemns the relentless labor and the pace of writing for the literary market, but Marian's fantasy is grounded in the assumed overlap of biological brain and nonliving mechanism.

Sally Shuttleworth's chapter in this volume considers George Eliot's fiction, particularly "Shadows of the Coming Race" (1879), in the context of the development of machines with cognitive capabilities, such as logic machines and machines that could detect, interpret, and record sensory input on the model of human perception. Shuttleworth argues that George Eliot is concerned that her literary realism cannot compete with machines that outstrip human abilities of sensing and observation in accurate representation of the world. In Chapter 3, Simone Natale contends that theoretical questions that later emerged in the study of human–computer interaction (HCI) allow a reconsideration of Victorian discussions of human interaction with automata that display seemingly intelligent behavior. Bringing nineteenth-century automata into dialogue with current AI, Natale demonstrates shared ground – if in different terms – between HCI and Victorian writing on automata.

III Automatism and Automata in Literary Texts

As many of the chapters in this collection show, the automatism and automata schema significantly influenced the fiction of the period. Literary works drew on that schema, constructing new understandings of human behavior and imaginatively extending the ideas in new directions. Those works in turn influenced thought in psychology and future technological innovations. Critical work on the Victorian period has demonstrated Victorian literary authors adopted the language and conceptions of physiological psychology, which informed their depictions of behavior and mentality.[63] Thomas Hardy, for example, was particularly fascinated by the debates on human automatism, and they are prominent subjects

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of discussion in his notebook entries as well as in his fiction. An entry included in his *Life* reads: "Write a history of automatism, or impulsion – viz. an account of human action in spite of human knowledge, showing how very far conduct lags behind the knowledge that should really guide it."[64] His characters are repeatedly described in related terms as, for instance, in *The Woodlanders* (1887) where Giles Winterborne works "daily like an automaton."[65]

Thomas Vranken and Stephen Knight in their chapter in this volume demonstrate that the genre of detective fiction was informed by conceptions of the automaton and automatism from its inception. The chapter argues that both are central to the worldview of the genre, which mines images of mechanical automata and models detective reasoning on mechanism. Minsoo Kang's chapter explores the conceptual boundaries between the ideas of automata and puppets. His chapter provides a prehistory of the Victorian period, examining a moment at which "automaton" and "puppet" were not used as near synonyms to signify a lack of agency. In Romantic literary works, Kang shows, automata and puppets were briefly opposed to one another, with the puppet understood as being in harmony with supernatural forces that give it freedom. The Romantic puppet is occasionally seen in the Victorian period, but more often puppet and automaton are used interchangeably to suggest a person acting mechanically. Certainly, Oscar Wilde's poem "The Harlot's House" (1882) illustrates the coincidence of the two terms for late Victorians in its representations of the mechanical and unthinking behavior of the participants. The dancers appear to be "strange mechanical grotesques" (l. 7) who move "[l]ike wire-pulled automatons" (l. 13) or act like a "clockwork puppet" (ll. 19–20).[66]

In the last decades of the century, fantasies about intelligent automata far more advanced than what was or is currently possible, became a staple of short fiction. Often the stories hinge on automata that pass as human, playing on anxieties about whether, as technology advances, it will remain possible to distinguish between the two (the first of Turing's two famous questions). Many stories in this subgenre depict female automata, created by male inventors, on the verge of marriage to a human man, an idea that is picked up in William James's famous "automatic sweetheart" argument, in which an automaton indistinguishable from a real person would still fall short of the human.[67] The inventors in the popular stories strive to create automata that successfully deceive others about their origins in order to establish the inventors' mechanical genius. These repeated tropes support Wise's contention that the increased production of female mechanical automata in the nineteenth century can be accounted for by

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the acceptance of the scientific claim that women are more mechanical and less evolved than men.[68] In Alison Buckler's "The Making of Laura Lee" (1902), published in The *Gentleman's Magazine*, the automaton is a "magnificently regulated piece of mechanism; and that is all you might say of many real women."[69] These stories, however, emphasize as well the conventional, scripted nature of human thought, conduct, social life, and gender roles. George Augustus Sala's "Patent Woman" (1875), like a number of other female automaton stories, carries on a running joke about the sameness, repetition, and the automaticity of society woman, while implying that the automata reflect men's conditioning.

The stories also play on fantasies of technological reproduction and the extension of human intellect, forecasting advances in intelligent technologies and media while engaging with the mechanical mind argument. In E. E. Kellett's "The Lady Automaton"(1901), the inventor's realized ambition is to create "an instrument which should not *repeat* words, but speak out the suitable answer to them," "a sort of anti-phonograph."[70] Ambrose Bierce's story of a murderous, chess-playing automaton, "Moxon's Master" (1899), prefaces the automaton narrative with discussion of recent physiological theory and mechanical conceptions of mind, posing the question of whether a machine can think. In E. P. Mitchell's "Ablest Man in the World" (1879) an "idiot's" brain is replaced by a superior mechanical one; human "fallible intellect" is replaced with "artificial intellect" in an early imagining of a cyborg figure.[71] Mitchell's inventor asserts that the mechanical mind he has made, far surpassing Babbage's calculating machine, has "eliminated the personal equation" creating "a perfect logic machine" (62).

Richard Menke's chapter uses Auguste Villiers de L'Isle-Adam's decadent scientific romance novel *L'Eve future* (1878) and its female automaton, Hadaly, to think through conceptions of subjectivity and technology. Despite being created by a fictional Edison in order to gratify male desire, the intelligent automata Hadaly (exploiting new media technologies) is revealed to have genuine agency. Hadaly's agency, however, is not autonomous and individual, but instead that of a network, both organic and mechanical. Menke argues that Villiers's automaton, reflective of cultural norms, is relevant for understanding current AI.

This volume is organized into four parts, each emphasizing main themes that the chapters explore, although there are many connections across the contributions, as already suggested in this introduction, which would encourage different groupings. The first part, on "Mechanical Automata," considers the history, meaning, and uses of mechanical automata in the period, exploring them as technology, commodity, entertainment, and with

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respect to race, labor, and machine intelligence. Part II, "Automatism," examines the proliferation of ideas on mental automatism in different cultural domains: the law, psychology, literature, and evolutionary science. The chapters in Part III, "Literary Genre and Popular Literature," explore the influence of automata in detective, occult, and popular fiction. The final part, "Intersections," looks at representations of automatism and automata in connection with related figures: dolls and puppets, on the one hand, and new technologies and media, on the other.

The automata/automatism schema, as the chapters in this collection show, shaped the Victorian worldview. That framework of understanding was to become widely accepted by the early part of the twentieth century. It was the foundation of ideas as diverse as Henri Bergson's theory of the comic (1900) as an antidote to the mechanization of life when a person "conveys the impression of pure mechanism, of automatism";[72] Viktor Shklovsky's theory of defamiliarization (1917), in which art and literature counter "the automatism of perception";[73] D. H. Lawrence's committed resistance to automatism: the psyche's "deepest dread is perhaps the dread of automatism";[74] and André Breton's *Manifesto* (1924), where Surrealism is defined as "Psychic automatism in its pure state by which one proposes to express – verbally, by means of the written word, or in any other manner – the actual functioning of thought."[75] The accumulation of perceptions, theories, representations, practices, and objects made the explanatory mechanism of automatism seem obvious for modernism.

Notes

1 Sincere thanks to Heidi Rennert and Becca Sheppard for their help proofreading the chapters in this volume, and their care with the notes.

2 John Ruskin, "(Theorem): Social Policy Must Be Based on the Scientific Principle of Natural Selection," in *The Papers of the Metaphysical Society 1869–1880*, 3 vols., ed. Catherine Marshall, Bernard Lightman, and Richard England (Oxford University Press, 2015), 1: 294–230, p. 295.

3 John Ruskin, "Deucalion: Collected Studies of the Lapse of Waves, and Life of Stones," in *The Works of John Ruskin*, ed. Edward Tyas Cook and Alexander Wedderburn (Cambridge University Press, 2010), 26: 85–370, p. 115.

4 Étienne-Jules Marey, *La methode graphique dans les sciences experimental et principalement en physiologie et en Medecine* (Paris: G. Masson, 1878), iii.

5 B. Bosanquet, "Social Automatism and the Imitation Theory," *Mind* 8, no. 30 (April 1899): 167–175, p. 167, 168.

6 See Thomas Laycock's discussion in "Reflex, Automatic, and Unconscious Cerebration: A History and a Criticism," *Journal of Mental Science* 21, no. 96 (January 1876): 477–498, p. 491.

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7 Kurt Danziger, "Origins of the Schema of Stimulated Motion: Towards a Pre-history of Modern Psychology," *History of Science* 21, no. 2 (June 1983): 183–210, p. 183. Danziger's conception of "generative schemas" derives in part from psychologist Jean Piaget's use of "schema" and is related to sociologist Pierre Bourdieu's conception of schema as habitus.

8 Kurt Danziger, "Generative Metaphor and the History of Psychological Discourse," in *Metaphors in the History of Psychology*, ed. David E. Leary, William R. Woodward, and Michell G. Ash (Cambridge University Press, 1990), 331–356, p. 333 (emphasis in original).

9 Adam Crabtree writes that "'Automatism' is a word of fairly recent coinage. It probably first occurred in the English language in an article in *Blackwood's Magazine* (Anonymous, 1838) – where it was used as a synonym for 'automaton.'" "Automatism and the Emergence of Dynamic Psychiatry," *Journal of History of the Behavioral Sciences* 39, no. 1 (Winter 2003): 59–70, p. 52. The word "automatism" in fact predated this Victorian instance, being used by William Godwin in 1793 and by Samuel Coleridge, who declared himself in a letter to Robert Southey in 1794 to be "an Advocate for the Automatism of Man," though both of those uses are in the context of debates over necessitarianism. *Collected Letters of Samuel Taylor Coleridge,* 6 vols., ed. Earl Leslie Griggs (Oxford University Press, 1966), 1: 147.

10 See Kurt Danziger, "Mid-Nineteenth-Century British Psycho-Physiology: A Neglected Chapter in the History of Psychology," in *The Problematic Science: Psychology in Nineteenth-Century Thought*, ed. William R. Woodward and Mitchell G. Ash (New York: Praeger, 1982), 119–146; Sally Shuttleworth and Jenny Bourne Taylor, eds., *Embodied Selves* (Oxford University Press, 1998); and Rick Rylance, *Victorian Psychology and British Culture 1850–1880* (Oxford University Press, 2000), among others.

11 See Georges Canguilhem's conceptual history of the reflex, in *La formation du concept de réflexe aux XVIIe et XVIII siècles* (Paris: Presses Universitaires de France, 1955).

12 Thomas Laycock, "Further Researches into the Function of the Brain," *The Medico-Chirurgical Review, and Journal of Medical Science* (July 1855): 120–144, p. 122. See Kurt Danziger's discussion of the reflex concept in *Naming the Mind* (London: SAGE Publications, 1997), 58–62.

13 William Benjamin Carpenter, *Principles of Mental Physiology* (Cambridge University Press, 2009), 515 (emphasis in original).

14 W. B. Carpenter, *Is Man an Automaton? A Lecture* (London: William Collins, 1875), 25.

15 Oliver Wendell Holmes, *The Autocrat of the Breakfast-Table* (Boston: James R. Osgood & Co., 1873), 221.

16 See Linda M. Austin's, *Automatism and Creative Act in the Age of New Psychology* (Cambridge University Press, 2018), which examines resistances to automatist accounts of creativity.

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20 Roger Smith, *Trial by Medicine: Insanity and Responsibility in Victorian Trials* (Edinburgh University Press, 1981); Joel Peter Eigen, *Unconscious Crime: Mental Absence and Criminal Responsibility in Victorian London* (Baltimore: Johns Hopkins University Press, 2003).
21 Arthur Conan Doyle, *The Parasite* (New York: Harper Brothers, 1895), 29–30.
22 See Stefan Andriopoulos, *Possessed: Hypnotic Crimes, Corporate Fiction, and the Invention of Cinema* (University of Chicago Press, 2008) and Mary Elizabeth Leighton, "Under the Influence: Crime and Hypnotic Fictions in the *Fin de Siècle*," in *Victorian Literary Mesmerism*, ed. Catherine Wynne and Martin Willis (Amsterdam: Rodopi, 2006), 203–222.
23 George Gissing, *The Nether World* (Oxford University Press, 1999), 280.
24 Minsoo Kang writes that "for a full understanding of the automaton motif in the Western imagination as a whole, one must take into account both aspects of the mechanical entity, to see how the object functioned in different historical contexts as the representation of *both* human empowerment *and* oppression, liberation *and* subjugation, transcendence *and* debasement." *Sublime Dreams of Living Machines: The Automaton in the European Imagination* (Cambridge, MA: Harvard University Press, 2011), 305.
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40 Bailly, *Automata*, 19; Nicholas Foulkes, *Automata: A Brief History of the Automata from Ancient Times to the Fée Ondine* (Paris: Éditions Xavier Barral, 2017), 226.
41 See Kara Reilly, *Automata and Mimesis on the Stage of Theatre History* (London: Palgrave, 2011).
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51 William Cooke Taylor, *Notes of a Tour in the Manufacturing Districts of Lancashire*, 2nd ed. (London: Duncan and Malcolm, 1842), 126.
52 Andrew Ure, *The Philosophy of Manufacture; or an Exposition of the Scientific, Moral and Commercial Economy of the Factory System of Great Britain* (London: Charles Knight, 1835), 13.
53 Marx, *Capital*, 2: 419.
54 "Babbage's Intelligence: Calculating Engines and the Factory System," *Critical Inquiry* 21, no. 1 (Autumn 1994): 203–227, p. 204.
55 See Tamara Ketabgian's analyses of the Victorian intertwining of the organic and the mechanistic, in their imaginings of the machine: *The Lives of Machines: The Industrial Imaginary in Victorian Literature and Culture* (Ann Arbor: University of Michigan Press, 2011). See also David Channell's discussion of the blurring between the vital and the mechanical, characteristic of mid-nineteenth century thought. David F. Channell, *The Vital Machine: A Study of Technology and Organic Life* (Oxford University Press, 1991), particularly pp. 80–90.
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57 See Spufford and Uglow, eds., Cultural Babbage.
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65 Thomas Hardy, *The Woodlanders* (Oxford University Press, 2009), 203.
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