The Posthumanist Character of Naturalism

By Louise LePage

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Notes to Preface the Paper

My aims in writing and sharing this paper

This paper originates from a chapter I am currently writing for my book, *Theatre and the Posthuman: A Subject of Character* (Palgrave). I am about half way through writing this chapter. Some of its ideas are several years old; others are very, very new. My hope is that sharing some of my ideas with you here will help to clarify those parts that are most interesting and persuasive as well as those that need more thought.

What is the posthuman?

Posthuman

A state that is, in some way, after or beyond the human as we understand it today. So, in my book, I use the word to refer both to a technologically evolved human – a form of human being that has evolved into something different in consequence of technology – and to the kind of post-anthropocentric landscape imagined as we advance through the Anthropocene towards a moment when there are few or no humans left on the planet.

Posthumanist means something a little bit different. Posthumanist is a term that takes the hybrid figure of the posthuman or cyborg – a cybernetic organism – and uses it to critique humanism. Where humanism *others* animals, machines, and the supernatural in order to distinguish an idea of the human and value him above all others, posthumanism purveys a more horizontal landscape, populated by a zoo of lifeforms – animal, machine, and hybrid. Whereas humanism ostensibly views the human as an ahistorical, stable figure who is the maker of history, posthumanism views the posthuman as a hybrid product in continual flux with its environments, composed of history and only partially self-determining.

The Paper

The Posthumanist Experiment of Naturalism

I want to open with what might seem a contentious claim: At its inception, Naturalism was a strange posthumanist experiment. To say such a thing may seem counterintuitive, given Naturalism's highly conventional form and performance style, as well as its focus on fully realized human characters. However, it is worth reminding ourselves that the Naturalist's dramatic stage was, at its birth, a "laboratory" of humanity' (Maggie B. Gale xviii), bound to, as Zola put it, an 'irresistible current' that carried 'society towards the study of

reality' (356). The stage was 'open to every experiment' (Zola, 357) by Naturalist dramatists who cast human beings in ostensibly everyday social situations in order to examine their natures minutely. As I will show in my chapter, far from being a psychologically coherent individual and maker of history, in possession of rational self-awareness, Naturalism's character tended to be a social animal – a hybrid figure formed of parts: temperaments, heredity, and environment. Located on humanist faultlines, this posthumanist character was complexly and precariously formed and cast in an ongoing process of undoing and remaking itself.

The Naturalists' posthumanist experiment continues into the present day. Radical new conceptions of human, or humanlike, beings are cast in social situations by playwrights and theatre-makers who look in innovative ways to the science-fictional future in order to explore what human beings might become as technology continues to advance.

This paper starts by summarising the kinds of human and character forms that appear in the drama and theories of Henrik Ibsen, August Strindberg, and Émile Zola. It then moves to examine its contemporary forms on stages populated by robots.

The Changing Character of Naturalist Theatre: From marionettes and monsters to... marionettes and monsters?

Naturalist characters were created in response to changing historical beliefs about the natures of human being and reality. Far from being a conservative form, Naturalism was a radical reaction to the nineteenth century's romantic, tragic, and bourgeois dramatic stages. These stages were populated by 'marionettes', so named by Zola (359), 'stage monsters' – that's George Bernard Shaw's term (179), and 'automatons' – this was Strindberg's word (58), figures rejected by the Naturalists for failing to be sufficiently humanand lifelike. What's really interesting is that these figures – machines, puppets, and monsters – comprise the humanist subject's traditional 'others': figures by which humans differentiate themselves. The goal of the Naturalists in rejecting such dramatic forms was to create characters that were more realistic, more human. The irony is that, in striving to remake characters more realistically, the Naturalists created *posthumanist* figures, ambiguously settled between notions of human being and the very objects from which they strived to distinguish humans. The Naturalist characters are realistically human by virtue simultaneously of their animal, mechanical, and supernatural forms and their distinctiveness from those forms. It is by studying this faultline running through Naturalism's dramatic character that its posthumanist qualities are revealed. I don't have time to do so here in my paper but in my chapter, I am going to include a study of Zola's beasts, corpses, and ghosts, Strindberg's animals and conglomerates, and Ibsen's dolls, each of which represent entities and objects to confound any notion of an ontologically distinct or lifelike human form.

Test Objects for the Human: Dreams, beasts, and machines Sherry Turkle, who writes about the psychology of human relationships with technology, observes that, historically, a number of 'test objects' have served as measures against which humans interrogate and define their own

ontological edges. Quoting Ralph Waldo Emerson's 1832 diary reflections, Turkle writes: 'Dreams and beasts are two keys by which we are to find out the secrets of our nature ... they are our test objects' (22). Turkle remarks that 'Emerson was prescient' in identifying what she calls these 'test objects' for, later in the century, 'Freud and his heirs would measure human rationality against the dream' while 'Darwin and his heirs would insist that we measure human nature against nature itself – the world of the beasts seen as our forebears and kin' (22).

That animals were an important 'test object' for the Naturalist playwrights will come as no surprise. It is well established that Charles Darwin's evolutionary narrative was immensely influential of the Naturalists' work. After Darwin, humans came to be conceived as being kin with animals, bound up in a dynamic and high-stakes evolutionary drama. Darwin put paid to any notion of a stable, ahistorical, and rational humanist subject. Instead, the human form became ambivalently settled between stasis and flux, riven by atavistic impulses as competitive environments put pressure upon species to survive through adaptation.

Consider the novel and play versions of Zola's *Thérèse Raquin*. These stand as a kind of dramatic thesis that man is an animal and machine. In his 'Preface' to the novel, Zola refers to the characters of Lauren and Thérèse as 'human beasts, nothing more' (1-2), explaining: 'I set out to study, not characters, but temperaments' ('Preface' 1). Lauren and Thérèse are not human but 'animal machine[s] acting under the influence of heredity and environment' (this is Zola paraphrasing Claude Bernard qtd. in Rothwell xix). Strindberg's play, Miss Julie, meanwhile, is founded on Darwinist-inspired evolutionary principles of competition, struggle, survival, and extinction. Strindberg writes that it is an inevitably 'brutal, cynical, [and] heartless drama' (Strindberg, 'Preface' 57). For Strindberg, some characters are more human than others, with the most human comprising those capable of changing and rising via strength of character and self-determination, through a branching and proliferating tree of (natural-social) life. Strindberg's exemplar of such a human is his character Jean, whom he describes as a 'lord of creation' (Miss Julie 98). Contrastingly, Kristin is to be found at the bottom of the scale, described by Strindberg as 'a female slave' and as being 'like an animal'i (Strindberg, 'Preface' 63). Meanwhile, in Ibsen, we encounter, more than anywhere else, the Darwinian influence of heredity, sexual selection, and a conception of human being and behaviour that considers people kinds of dolls, controlled by forces including other people and society at large.

That dreams might have been test subjects for the human form as dramatized by the Naturalists will come as a more surprising proposition. Of course, the (human) mind is fundamentally important to Naturalism's dramatic landscape. What we see in the Naturalists' plays, especially those of Anton Chekhov and Ibsen, is an innovative dramaturgical focus on mind through the construction of character and the establishment of subtext. In the plays of the Naturalists, audiences wonder: 'What are these characters really

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¹ Sprigge, Johnson, Carlson, and Motton all refer to Kristin as 'a female slave' although none refer to her as an animal, and Robinson gives no explanation as to why he identifies Kristin as such, although his use of the word in reference to her 'hypocrisy', which he describes as being 'unconscious' (63), gestures towards a failure to achieve the intelligent and purportedly *human* self-awareness of Julie or Jean.

thinking?' and 'Why have they just done that?' Such questions demand that audiences examine and establish not only quality of character but also the constituent parts of character, drawing upon the sum total of dramatic evidence available: details of appearance, behaviours (past and present), use of language, and so on, in order to arrive at an interpretation of character, composed of physiology, heredity, and environment, that makes sense of the action.

However, the significance of mind does not stop at the door of character. The Naturalists' work incorporates symbolic or uncanny elements, which seem to contradict their positivist universes. Consider how, in *Miss Julie*, as the eponymous heroine seems to sleepwalk towards her suicide, a sense is generated that we have been cast into dreamlike territory. In *Thérèse Raquin*, the characters of Laurent and Thérèse, traumatised by their murder of Camille, encounter his uncanny doubles in the forms of his corpse and ghostlike manifestation. Such elements and moments are anomalous in relation to a Naturalistic form that is founded upon the materialism of evolutionary narratives.

The Naturalists predate Freud and his measurement of human rationality against the dream – i.e. his thesis that people, rather than being self-knowing and rational, are motivated by their irrational sub- and unconscious desires. However, the later years of the nineteenth century saw a growing interest in the new science of psychology. The Naturalists lived through a period when the mind – previously scientifically unchartered territory – started to be studied. There was 'a growing sense that civilized humans were unable to read their own minds' (2017, 2) and might even be prey to 'primitive' and 'atavistic brain states' (ibid). Furthermore, as Jane Goodall notes, '[t]hrough the Romantic period and into the later Victorian era, the correlative mysteries of psychical and somatic otherness retained a compelling fascination, to which writers, artists, and actors responded in diverse ways' (2017, 4). So, while the Naturalist movement was premised upon a conception of reality that was positivist, the contemporary fascination with the workings of the mind, far from precluding engagement with mysterious phenomena such as dreams, doubles, and the uncanny, actually encouraged such. What changes during this period is that the phenomena move from being the province of idealism and the Romantic tradition to that of Naturalism's 'sociological imagination' (Rebellato, 'Naturalism and Symbolism', 9), which transformed them into natural and social objects of scientific study.

Naturalist Theatre's Twenty-First-Century Progeny

In my chapter, I intend to explore these uncanny dramatic moments in order to explore character form and the tension that pertains between what is seen on the Naturalist stage and what is imagined. For the present, however, I am going to skip, now, to the twenty-first century and to theatre I recognise as being progeny of the Naturalists. In my chapter, I identify four plays and performances as being particularly compelling posthumanist experiments. These pieces are not always themselves naturalistic. Sometimes they represent a theatrical slice of life, but not always. Sometimes their actors adopt a psychologically realistic approach to performing characters, but sometimes

they don't. And frequently they find form as a play, but sometimes they find other forms of expression.

What marks these plays and performances as descendants of the Naturalist theatre movement is not naturalistic form or style *per se*, which has become so conventional as to have reified into the kinds of lifeless forms the Naturalists originally reacted against. It is in the ways in which today's playwrights and theatre-makers draw upon technology in theatrically and formally experimental ways with a view to reflecting upon the nature of human, and nearly human, being in the present century. It is in their study of life as it might become in a climate in which the nature of the human is threatened by its post.

The play I am going to introduce in this paper is *Heddatron* by Elizabeth Meriwether, in a production by Les Freres Corbusier, which took place Off-Off-Broadway in 2006. The play features here, amongst Naturalist theatre's contemporary descendants, by virtue of its focus on the nature of human being as well as its experimental form, which arises from the philosophy of Naturalism. In the first place, *Heddatron* treats Naturalism metatheatrically: Meriwether's play loosely bases itself on *Hedda Gabler*, incorporating Ibsen's play as a play-within-a-play. Naturalism also comes under the spotlight both in a character's school report on the Naturalist playwrights, delivered to the audience, and in staged, imagined scenes between Ibsen and Strindberg. In the second place, *Heddatron* chimes with the Naturalists in the ways it foregrounds the human alongside the robot in an evolutionary narrative. Formally, *Heddatron* is nothing like its Naturalist forebear. The play, indeed, is a kind of rogue cyborg featuring robot characters and performers alongside human ones in a hybrid form composed of pastiche, direct address, slapstick, dreamlike sequences, film projection, and a playwithin-a-play. However, in addressing contemporary questions about the nature of consciousness and creativity in relation to human and robot being, and in experimenting with a correspondingly chaotic, misbehaving, playful, hybrid form, the play can be situated as a rebellious descendant of the Naturalist tradition.

Before I talk about *Heddatron*, I want to return to the idea of test objects, which is so important to my posthumanist study of characters, and propose that *the* test object of the twenty-first century is the robot.

The Robot: The twenty-first century's test object

The theatre director, Peter Brook, has famously expounded that for an act of theatre to be engaged, we need nothing more than for '[a] man [to] walk[] across this empty space whilst someone else is watching him' (11). Brook's choice of 'man' is, of course, interesting, not, for once, for its troubling gender assumptions but for its species assumptions. What happens when a *robot*, as opposed to a human, walks across an empty space whilst someone is watching it?

One might assert with some confidence that theatre is fundamentally a human, if not humanist activity, since it comprises a shared space and form for contemplating our human condition, for working through our beliefs, our histories, our politics, our social forms, problems, challenges, and so on. Up until this moment in history, robots have had little to do with such an activity or space. However, the new millennium has brought with it technological

changes, which mean that robots are becoming a part of our world in fact, not just in fiction; we appear to be on the cusp of a new age in which humans and robots will start sharing social spaces and interacting with each other. Some contemporary plays and performances reveal their fascination with this prospective social shift. This fascination, combined with increasing accessibility to robots, means that robots are moving onto our stages, which carries with it implications for our understanding about human being, society, and even theatre. While these plays and performances may not be straightforwardly naturalist in form, their ambition to present stage laboratories for the experimentation and examination of the human or posthuman forms, cast in social settings, while drawing upon contemporary technoscientific forms and knowledge, confer upon them a kind of membership to the theatrical lineage of Naturalist drama.

While robots, understood as mechanical workers, have no tradition in theatre, their kin – automata: mechanical entertainers – most certainly do, as the theatre scholar Kara Reilly shows. The stage automaton has fascinated audiences for millennia as it dramatizes propositions and doubts about the human form. Consider the chess playing Mechanical Turk² and the diminutive, aristocratic, and doll-figures made by Pierre Jaquet-Droz in the eighteenth century, positioned in the creative roles of musician, draughtsman, and writer. Such stage automata function as a kind of provocation, seeming to say: 'Look: I'm a machine but I am clever and artistic and I look very like you. I am probably a trick, an illusion, but what if I'm not?'

Such provocations are not confined to stage automata. Some machines inherently challenge conventional historical assumptions about the human form. This is because the machine, as already stated, comprises one of the humanist subject's traditional 'others', one of the entities that allows us to know ourselves as human in comparison. Writing towards the end of the twentieth century, Turkle identified the computer as the new test object (22) by which humans positioned and knew themselves. In seeming to think, the computer troubles the Western belief in human uniqueness as comprising essentially rational, thinking beings, a belief that was most famously elaborated by René Descartes' centuries old edict: cogito ergo sum ('I think, therefore I am'). Turkle writes: 'people tend to perceive a "machine that thinks" as a "machine who thinks" (my italics) (29). An entity that seems to think conjures an idea that the entity has a mind. People have a tendency to infer such a thing, proposes Turkle. Irrespective of whether or not a computer can actually think, the appearance of thought can be sufficient to prompt ontological doubt and make us wonder: what does it mean to think? Do humans think? Might machines think? If so, who or what is thinking?

I am not convinced that Turkle is correct in all parts of her thesis. Certainly, machines – in this case, the computer – put pressure upon our notions about thought and human being. We know that the word, 'computer', was first used in relation to a human being and we also know that computation has been informed by, and now reflects back upon, our modes of understanding the human mind. However, do I consider the computer as a 'who' who thinks? When I see a computer perform a really clever computation, I don't tend to think, 'This computer is a clever thinker'; I think:

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² In fact, the Mechanical Turk was not an automaton – it was an elaborate illusion – but it was framed for audiences as an automaton.

'That's really clever programming. Wouldn't it be great if it worked even faster and could do x, y, z as well?' Similarly, when I see a mechanical arm draw a portrait, as we see with Paul the robot,³ while the status of the machine's artistic output may be up for grabs – is this robot arm's producing art? – I don't find myself thinking: 'This robot arm is an artist'. For people to make such an imaginative leap in perception; to interpret the machine as being humanlike – in the sense of comprising an individual thinker, drawer, and performer – the machine needs to offer performative cues of humanlikeness.

Enter the robot. When we see a robot, we recognize and are, perhaps, drawn to certain of its features, which seem very like our own. If its cues are sufficiently legible, we tend to anthropomorphise that robot and confer upon it a mind that knows and makes decisions.⁴ We see ourselves in the robot. However, the humanist tendency is to draw away from this mechanical other, to insist upon our human differences, insisting, often, upon our uniquely human features. Formerly, these uniquely human features were deemed to be intelligence and the capacity to reason, but having been outstripped in these areas by chess-playing computers such as Deep Blue and problem-solving ones such as IBM's Watson,⁵ now we tend to view such qualities as creativity, free will, and emotions as the exclusive province of human beings, as the plays under discussion in my chapter confirm.

I propose that the robot is the twenty-first century's most compelling test object, at least in technologically advanced parts of the world. The robot carries forward species specific questions about mind but in addition to this, in having a physical body, which frequently resonates with the form of a human or animal, and in being animated – it *moves* – the robot works vividly to pose such questions as: 'Does this robot think?'; 'Who or what is thinking?'; 'What is life?'; and 'Can a mechanical artifact find living form?' When the robot finds humanlike form and is sufficiently believable in its performance of humanlikeness, the question becomes even more specific: we wonder: might the robot become or be, to all intents and purposes, human? By implication, we also wonder: 'Are humans just complex kinds of machines?'

In fact, the robots I am going to be talking in relation to *Heddatron* are merely make-shift figures and shapes on wheeled, remote-control platforms. These robots are light-years away from the kinds of humanoids that pressurise the border between humans and robots. (These more sophisticated robot forms will be discussed in my chapter.) However, *Heddatron* is an important milestone in twenty-first-century posthumanist naturalism, comprising the first play to feature robot performers performing robot characters, and so it warrants discussion. Furthermore, the forms of these robots remain profoundly provocative given both their place on the humanist stage and their contextualisation alongside humans in an evolutionary landscape.

³ This film clip shows Patrick Tresset set up, and be drawn by, his robot, Paul.

⁴ Many anti- and posthumanists argue that such a tendency is troublingly humanist, transforming difference into sameness, which is valued according to the priviledged position of the historically white, educated, Western male.

⁵ Watson is capable not only of reading and remembering all the research on cancer but also of solving the problem of how to treat a rare form of cancer (Lance Whitney).

Heddatron: Robotic realism or cybernetic symbolism?

In 2006, *Heddatron*, by Elizabether Meriwether – who, incidentally, is the writer of the US sitcom, *New Girl* – was first performed by Les Freres Corbusier Off-Off-Broadway. It has since enjoyed a score of productions in North America. *Heddatron* poses a madcap scenario in which robots that have spontaneously developed self-awareness abduct a bored, pregnant housewife from Ypsilanti and whisk her off to the jungles of Ecuador. There they make her perform Ibsen's *Hedda Gabler* with them, overseen by the character of Ibsen. Jane's story with the robots runs alongside other narrative strands of the play, the most important of which is the one framed by Jane's daughter, 10-year-old Nugget, who narrates her school report on the Naturalist playwrights and, in the process, introduces imagined scenarios performed between Ibsen, his wife, his maid, and Strindberg. Strindberg's monkey also enjoys a role in this part of the drama.

The theatrical landscape of *Heddatron*, then, depicts not only people but a posthuman dramatic zoo: robots at various stages of technological evolution as well as a monkey. (In Les Freres Corbusier's production, a human performs the monkey, dressed in a silly costume.)

Evolutionary theory underpins the premise of the play: that robots might one day evolve to the point of attaining consciousness, at which moment human history will enter the hypothetical event of the *singularity*. Murray Shanahan explains the singularity as follows:

In physics, a singularity is a point in space or time, such as the center of a black hole or the instant of the Big Bang, where mathematics breaks down and our capacity for comprehension along with it. By analogy, a singularity in human history would occur if exponential technological progress brought about such dramatic change that human affairs as we understand them today came to an end. [...] Our very understanding of what it means to be human – to be an individual, to be alive, to be conscious, to be part of the social order – all this would be thrown into question, not by detached philosophical reflection, but through force of circumstances, real and present. (xv)

Heddatron builds itself around this hypothetical event, an event so radical it casts humans into posthumans whose forms and world cease to be recognisably human. Predictably, Les Freres Corbusier's production refuses to adopt a sensationalist tone, instead adopting a profoundly irreverent one. Having posited robots in a progressive history of technology dating back to 1876 and Alexander Graham Bell's invention of the telephone, the production brings us back to a near future, which looks very like our own world, and undercutting apocalypse with pastiche. Consider the robot who informs us about the singularity in a short film (this film prefaces Les Freres Corbusier's performance of *Heddatron*): this is Billy the robot who finds animated form here.



Image of Billy the robot in Les Freres Corbusier's short film, which sets out a history of machines and prefaces the play, *Heddatron*. Graphic design by Mike Solomon

Billy is one of the play's dramatis personae and the robot who later plays the part of George Tesman in *Hedda Gabler*. Billy has a square metal head, which looks as if it has been fashioned in a crafting workshop by children. With a characteristically jerky and tonally flat robotic voice, Billy intones: '[B]efore the next century is over, human beings will no longer be the most intelligent type of entity on the planet.' Such a prospect is difficult to believe, however, given his old-fashioned robotic identity.



From the scene in which Jane (Carolyn Baeumler) performs as Hedda in *Hedda Gabler* robots playing the characters of Aunt Tessman, George, and Berta. Photograph by Joan Marcus



From the scene in which the robots, Hans and Billy, first appear to the suicidal Jane (played by Carolyn Baeumler)
Photograph by Joan Marcus

The silliness of the play's concept – that robots abduct a bored, pregnant housewife in order to perform Hedda Gabler in an Ecuadorian jungle – is carried over into the play's 2006 production. The production casts robot performers that have a homemade aesthetic. Amongst these robots are two robots indicative of 1950s and 1960s science fiction (Hans and Billy); another is a crudely costumed broom (Berta), while another is a cut-out silhouette of a female in Victorian dress (Aunt Tesman) – and these forms are positioned on platforms that move around like remote-controlled cars. These robot performers are meant to represent robots that have attained consciousness. More than this, two of the robots have apparently fallen in love with, and become obsessed by, the human, Jane, and, in a manner that humorously equates sex with making theatre, they kidnap Jane in order to perform with her.

I am going to show you three short clips, now, from this first production of the play. The first clip shows the robots', Billy's and Hans's, first appearance on stage in Jane's front room; and the latter two clips are drawn from the rehearsals of *Hedda Gabler* by Jane and the robots. The quality of the recording, particularly its sound, is not great so I have put up subtitles. Also, please be prepared for some really, really distracting and annoying laughter.

Show clip.

Steve Dixon, in his book, *Digital Performance*, observes that 'some degree of camp seems inherent in almost all performing anthropomorphic and zoomorphic robots' (273) and he describes robot performance in terms of

'metallic camp', where 'camp' is understood to denote performance that mimics and exaggerates, but fails to achieve, the human, while 'metallic' points to qualities of loudness, aggressiveness, or resistance (273-4). In fact, I am not sure that Dixon's observation still stands in relation to some of the more recent and technologically sophisticated robot performers appearing in plays today. However, we certainly see metallic campness in the performances of the robots in *Heddatron*, where the robots' performances are loud, knowing, and self-conscious failures, which draw attention to their failures through, for example, humour – consider Aunt Berta's attempt to sit down.

Clearly, we are not meant to take *Heddatron*'s robots seriously. For example, Billy and Hans are ridiculous creatures, albeit occasionally poignant. Their performances of sexual and gendered hu-*man* identities are loud and knowing failures. We are not meant to believe these robots really are humanlike entities: intelligent, creative, self-determining, and with a capacity to fall in love. Having said this, Meriwether's philosophical proposition for this play *is* serious. Though she presents *Heddatron* as a comedy, treating Ibsen and his naturalist form to irreverent pastiche, Meriwether's turn to an ostensibly naturalist play articulates how the philosophical grounding of naturalism – which takes a materialist view of the universe – allows for the possibility that robots might one day become conscious and find themselves exceeding their programming and becoming creative authors of their forms and lives.

Works Cited

Brook, Peter. The Empty Space (London: Penguin, 2008).

- Dixon, Steve. Digital Performance: A History of New Media in Theater, Dance, Performance Art, and Installation (Cambridge, MA and London, UK: MIT Press, 2007).
- Gale, Maggie B. 'Introduction' in Maggie B. Gale and John F. Deeney, eds. Routledge Drama Anthology and Sourcebook: From Modernism to Contemporary Performance (London and New York: Routledge, 2010), pp. xv-xxii.
- Goodall, Jane. 'Between Science and Supernaturalism: Mimesis and the Uncanny in Nineteenth-Century Theatre and Culture'.

 Interdisciplinary Studies in the Long Nineteenth Century, 24 (2017) https://doi.org/10.16995/ntn.781>
- Heddatron, dir. Alex Timbers in a production by Les Freres Corbusier. Privately held filmed archival copy.
- Reilly, Kara. *Automata and Mimesis on the Stage of Theatre History* (Basingstoke: Palgrave, 2011).

- Rothwell, Andrew, trans., intro., and notes. *Thérèse Raquin*. By Émile Zola. Oxford and New York: Oxford University Press, 1992.
- Shanahan, Murray. *The Technological Singularity* (Cambridge, MA and London, UK: The MIT Press, 2015).
- Shaw, George Bernard. 'A Dramatic Realist to His Critics' in Eric Bentley, ed. The Theory of the Modern Stage: An Introduction to Modern Theatre and Drama (London: Penguin Books, 1990), pp. 175-196.
- Strindberg, August. 'Preface' to *Miss Julie*. Trans. Michael Robinson. *Miss Julie and Other Plays* (Oxford: Oxford University Press, 1998), pp. 56-68.
- Tresset, Patrick. 'Building and testing a Paul-III drawing robot'. *YouTube*, 19 June 2014, https://www.youtube.com/watch?v=sv25kgFThj8.
- Turkle, Sherry. *The Second Self: Computers and the Human Spirit*. 12th Anniversary Edition (Cambridge, MA and London, England: MIT Press, (2005 [1984]).
- Whitney, Lance. 'Are Computers Already Smarter than Humans?'. *Time*, 29 September 2017, http://time.com/4960778/computers-smarter-than-humans/, accessed 25 June 2018.
- Zola, Émile. 'Naturalism in the Theatre'. Trans. Albert Bermel in Eric Bentley, ed. *The Theory of the Modern Stage: An Introduction to Modern Theatre and Drama* (London: Penguin Books, 1990), pp. 351-372.