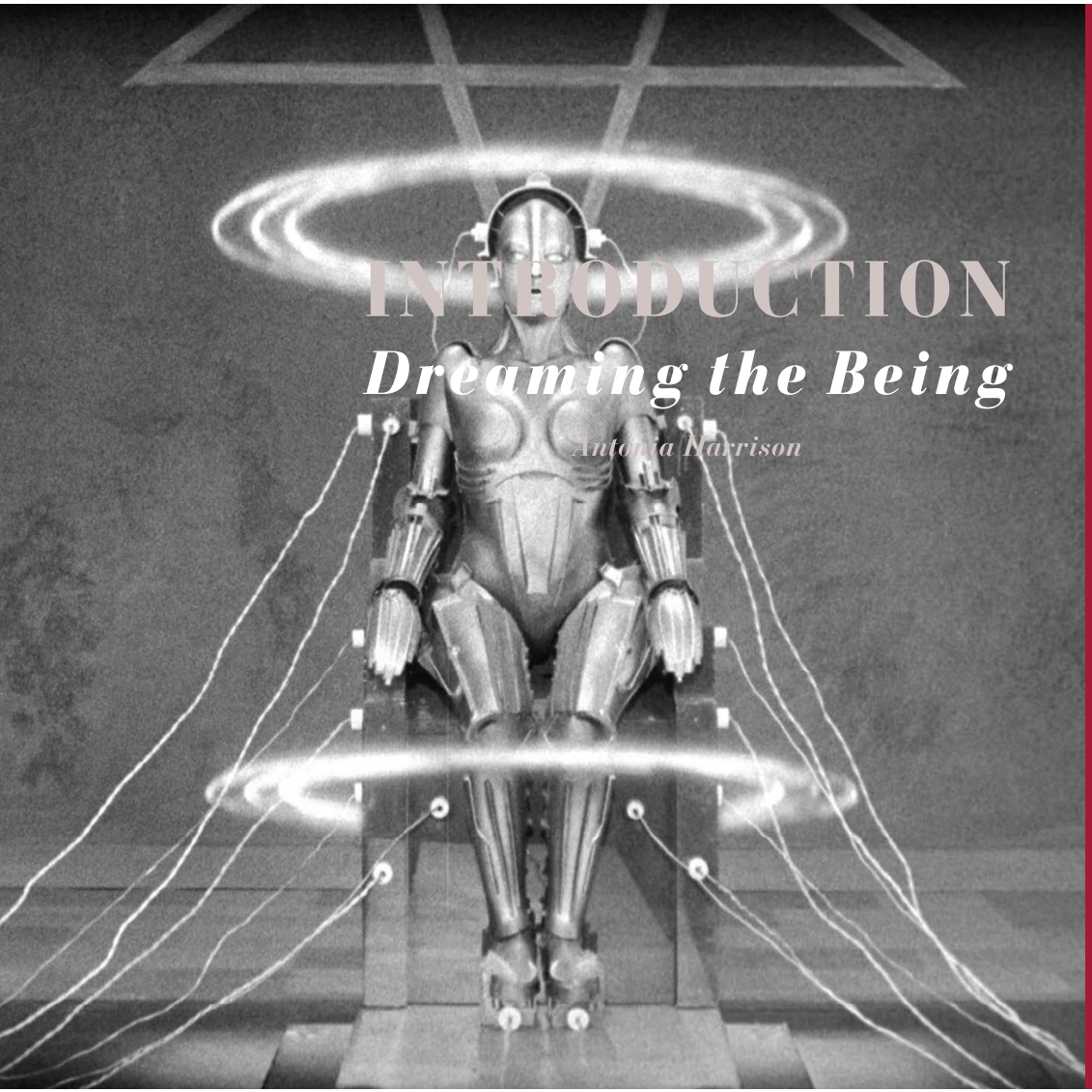


INTRODUCTION
Dreaming the Being

Antonia Harrison

IN THE *(automated) eye* OF THE BEHOLDER

Automata in human culture and the enduring myth of the modern Prometheus

Franziska Kohlt

For centuries Automata have held our cultural imagination between fascination and excitement, intrigue and terror.

In the 1770s, the public spectacle of the chess-playing 'Mechanical Turk' or John Joseph Merlin's 'Silver Swan' baffled royal courts and the general public alike, who not only marvelled at their intricate technical execution but were also deeply unsettled by the strangely lifelike, yet not *live* nature of what they saw. In 1919, the psychologist Sigmund Freud dedicated his essay 'The Uncanny' to this effect. The title in the original, 'Das Unheimliche', suggests the 'unhomely': something that is like us but, in a very hard-to-define way, is not like us at all.

Freud puts his finger on the Janus-faced presence of automata in human culture. They simultaneously look forward and backward; they are embodiment both of our hopes for the future and of our anxieties about the past and present. Their imitation of life holds up a mirror to it, constantly leading us to reflect on the fundamental questions it poses. What is human? How does life function? Is life a mere mechanism? And if we can reproduce it, what, really, makes us special? Our fascination with ever-more perfect automata is accompanied by a creeping fear.

Maria waking up in Fritz Lang's Metropolis, 1927, Fritz Lang. Walter Schulze-Mittendorff - WSM art metropolis / Murnau-Stiftung, Wiesbaden, Germany

Inanimate Reason; or a circumstantial account of ... M. de Kempelen's Chess Player ... Illustrated with three copper-plates ... Translated from the original letters of M. Charles Gottlieb de Windisch, c.1700's, Carl Gottlieb von Windisch / Wolfgang von Kempelen. © The British Library Board. 1103.e.37.(1)

Automated Worlds

The answers to why we build automata, for what purpose, and why are they fascinating and terrifying at the same time, can be found in their mythological origins.

The idea of engineering automated beings existed long before technology made it possible. Mythological automata are hidden in plain sight – for instance, in the tale of Prometheus. The Titan transgresses against the gods by stealing fire from Mount Olympus, moulding humans out of clay and, according to the Ancient Greek playwright Aeschylus, even teaching the gods mathematics, science and medicine. Prometheus is then condemned by Zeus to be chained to a rock and to have his liver pecked out by an eagle every day.

Because Prometheus was immortal, and his punishment was meant to endure in perpetuity, the eagle – which is described as a bird of shining bronze – was also an automaton, as no living being could administer eternal punishment. The eagle was at the service of its maker Hephaestus, or Vulcan as the Romans called him. The deity of the forge and metalwork, of fire and weapons of war, Hephaestus was the blacksmith god who was known for his skill as maker of automata. He was the creator of the giant Talos, guard of Crete, described in the tales of the Argonauts, and of the workers employed in his workshops: automata he engineered to perform tasks too strenuous for human or animal servants. The line between human and automaton, however, remains clear. While the automata of Hephaestus surpassed living creatures in endurance and strength, they lacked free will, intellect or feeling. The legitimate creation of *true* human life remained the remit of the Olympian gods, and was granted to inanimate things only in exceptional cases, as in the case of Aphrodite giving life to the statue of the sculptor Pygmalion. The purposes for which Pygmalion's luscious female companion was created were, although mythological accounts differ, not of the strictly intellectual kind that Prometheus had in mind when he stole the Olympian flame. Gods remained superior; mankind remained an image of God; and automata were merely servants to both.

Prometheus devoured by the eagle, 1754, Unknown artist. Universal History Archive / UIG / Bridgeman Images

Section view of French inventor Vaucanson's mechanical digesting wood wooden duck invention. Robert Houdin reparing of the mechanical in 1845 showed it was a deception. Tallandier / Bridgeman Images

Automated Bodies

Prometheus's ambiguous position as a champion of mankind and a threat to the status quo made him a powerful symbol of subversion. Rather than Pygmalion, it was he who became the icon of the French Revolution and the Age of Reason – the symbol of the bringer of science and rationality in the revolt against archaic structures.

In the 18th century, the technology that had until then been mythological fantasy started to become reality. Jacques de Vaucanson, dubbed 'the new Prometheus' by Voltaire, created his own automaton bird: the 'Digesting Duck', one of the most famous automata of the era. This bird-automaton walked like a duck and quacked like a duck, and appeared to process food through a hidden digestive mechanism.

Although the whole process relied on a trick – the duck had two compartments, one for the ingested food, and one for the prepared, apparently digested food, which produced the illusion of actual digestion – it was significant that it was an animal, and not a humanoid automaton (a task reserved for God). Even when Vaucanson designed the celebrated Flute Player automaton, he did not claim to imitate all the live processes of a human being; instead, his machine only excelled at one skill (even if it did so, according to contemporary accounts, to an uncannily perfect and even superhuman degree).

Vaucanson's automata reflect the culture of anxiety and wishful thinking that accompanied their making. That animals were nothing more than slightly more complex automata was a doctrine reiterated well into the 19th century in the works of Thomas Henry Huxley, the man nicknamed 'Darwin's Bulldog', or Herbert Spencer, who was credited with originating the discipline of evolutionary psychology. Yet even in the age of Darwin, after the publication of whose *Origin of Species* in 1859 the boundary of what exactly what marked the difference between human and animal became ever more blurred, the thought of an automaton surpassing, or even replacing, mankind remained blasphemous.

The unspoken fear that mankind could become redundant increasingly haunted the 19th-century imagination, as automation now appeared not as an ornate novelty that could easily be locked away in a cupboard but as enormous, steam-powered machinery unleashing power far surpassing anything manual labour could ever achieve. The automaton oscillated uncomfortably between the roles of slave and master in an age when locomotives and steam-powered looms changed the life of the individual forever. While the masters of the new machinery evolved into a newly prosperous class of factory owners, another class became enslaved to both master and machine. Confined to their hazardous working conditions, they were not infrequently subjected to injury and death – not by human hands but automated arms, and, ironically, often in the production of even more machines.

Automated Minds

Automata and automation galvanised the minds of some of the greatest thinkers, inventors and scientists of the Victorian age. Following the adoption of the programmable Jacquard loom that could weave elaborate patterns encoded on punched cards – an important forerunner of modern computers – an automated thinking machine was only a leap of the imagination away.

Unlike the Mechanical Turk, which anticipated chess moves by an apparently automated thinking process but, like the duck, relied on a trick – a human being sitting underneath the chessboard to control its movements – the devices of Charles Babbage had man-made but automated minds of their own. Babbage's Difference and Analytical Engines were inspired by the automated looms and the smooth sequences of movements of Merlin's automata - at whose display he first met his future assistant, Lord Byron's then teenage daughter Ada Lovelace. Programming the machines' complex punched card system, Lovelace is now honoured as the first computer programmer and the Difference Engine as the beginning of artificial intelligence.

To Babbage's despair, the completion of the thinking machine in his lifetime was thwarted by the impossibly small parts that would have been required for it. Lewis Carroll, the Oxford University mathematician and author of *Alice in Wonderland*, visited Babbage four years before the latter's death, in 1867, and noted that none of his fantastic machines existed beyond fragments. The Analytical Engine was eventually built according to Babbage's plans, and functioned smoothly; but not until 1991.

Nevertheless, even the theoretical possibility of Babbage's machine showed that the Olympian flame Prometheus had taken from the gods had passed into human hands, and that the dizzying rise of technological advancement was still accompanied by the old fear of fall and punishment. This in turnh gave rise to a new genre of literature, scientific romances which imagined the outcome of mankind unbound playing God – what-if stories that rarely had a happy ending.

TING-TONG FRANKENSTEIN
PIC TO GO HERE

The Automated Imagination

- Mary Shelley's Frankenstein -

Such stories continued a by now familiar mythological theme – eptiomised in the most famous example of the genre, Mary Shelley's 1818 novel *Frankenstein, or: The Modern Prometheus*. Often credited as the first 'science fiction' novel, *Frankenstein* explores the Titan hero's ambivalent name ('Prometheus' meant 'forethought' in Ancient Greek) in a contemporary setting. In Shelley's novel forethought teeters on the edge of furthering scientific progress on one hand and bringing death and devastation on the other, to a degree no one had quite attempted before .

In Shelley's narrative, the science student Victor Frankenstein becomes infatuated with alchemy and the idea 'to give life to an animal as wonderful and complex and wonderful as man!' Intoxicated by the partial insight into life and its properties alchemy offers him, he fails to understand the human being as more as the sum of its parts. The intoxication with *his* own desire hinders his foresight of the possible consequences, should his experiment of creating life succeed. He is unprepared when his 'monster', an initially benign intelligence trapped in a composite body, asks his creator not to become a full equal – he concedes that, as an artificial creation, he may not hope to become that – but merely to have a partner created for him. Only with hindsight does Frankenstein realise his responsibility; he initially, rejects the monster's wish, and commits again the mistake of not employing foresight that responds to desires beyond his own. His creation becomes the fear of human usurpation by its own creation; it is not the gods but, as was inevitable ever since the possibility of automation, the *creation* that assumes the position of God over its creator. The tables turn, and the monster demotes Frankenstein to its own, former position, destroying everything beyond his physical life and all he holds dear.

Frankenstein, **1831 (3rd edn), Mary Shelley (Buxton 201. Frontispiece). The Bodleian Libraries, The University of Oxford. © Bodleian Library, Oxford 2015**

Frankenstein's incomplete 'sight' represents his incomplete understanding of being in charge of something potentially powerful, which in turn reflects mankind's relationship with technological possibility. Whether the torch of science was a curse or a blessing was ultimately the responsibility of the scientist – who, Shelley highlights, by failing to balance progress, human welfare and stability, could only create more of the sam. This is a tale that, even after 200 years, has lost none of its relevance. The figure of Victor Frankenstein has given rise to numerous modern reincarnations but, from H G Wells's *Doctor Moreau*, to R L Stevenson's *Dr Jekyll and Mister Hyde*, these all have one thought in common: the potential to be them is inherent in us all.

E T A Hoffmann - [illustration Stuart Patience]

The stories of the German composer, draftsman, and author of fantasy and horror, E T A Hoffmann (1776-1822) followed the dangerous limitations of human 'sight' and understanding, which indicated the feebleness of the human mind, to their inevitable conclusion. Hoffmann's vivid imagination was obsessed with automata. His fiction explores the haunting possibility that machines are already more powerful than we think, reimagining their capabilities and blurring the boundaries between what is real and what is fictional.

In Hoffmann's short story 'The Automata' of 1814, the Mechanical Turk is not only capable of anticipating chess moves but of reading the heart's desires – in the case of his student protagonist, that of a mysterious beautiful woman with an almost supernatural ability at singing and playing the piano, like Vaucanson's Flautist. Deeply unsettled by the revelation of the automaton's 'mind', the young man gradually loses his own, foreshadowing Hoffmann's masterpiece, 'The Sandman' of 1817, which in turn inspired Freud's 1919 esay 'The Uncanny'..

'The Sandman' tells the tale of the student Nathanael, who anxiously anticipates the stability promised by his imminent return home to his fiancée when his nervous mind conflates the arrival of a glass salesman in town with his father's blinding and subsequent death during an alchemical experiment – and also with the Sandman, an eye-snatching bogie from German folklore. Nathanael finds the apparent remedy for his nervous condition in his desire for the beautiful Olympia – an ingeniously lifelike automaton onto which he projects his desire for stability and its fulfilment. But his Promethean fall is foreshadowed in Hoffmann's haunting metaphor of the eye: the mythological mirror of the soul, the boundary between the real and the imagined, and the greatest challenge for the automaton-maker. In an inverse process to Frankenstein, Nathanael does not lack foresight; instead, he deliberately obscures it. In fear of losing his eyes, and thus his clear and complete vision of the world in which he has responsibility, he acquires from the salesman not 'eyes', as he calls his new glasses, but a spy-glass through which he observes a curation of the world – mostly images involving Olympia – through just one eye. In a self-inflicted but artificially-enhanced and incomplete vision, his world is reduced to one unsettling dimension of human experience, and he can lose himself fully in his desires. Consequently, Nathanael loses his mind when this selective world, his 'divine woman' Olympia, and all the hopes for uncompromised safety and stability he had projected onto her, breaks into pieces. His last sight is the Sandman, who has become one with the alchemist-automaton-maker and the trader of false visions, who now leaves the town to pursue his business of deluding the feeble-minded into self-destruction elsewhere, like a darker, malevolent Prometheus.

Now to our work!, 2018, Stuart Patience.
Courtesy of the artist

Hoffmann's automaton-Olympia is not only like the Olympian flame but an image of the Olympian gods: the *man-made* image of God, which causes the fall of a man not by its superiority but by exploiting mankind's faults and failings. The threat the automaton poses is, ultimately, its perpetual stability, which humans resent because it reminds them of their own instability and mortality. The inherent human inability to live up to ideals, and the anxiety that the self-engineered human hierarchies – created in the hope for stability – will eventually be overturned, suggests all human striving will eventually prove futile. This is the essence of Freud's 'uncanny': we fear our doubles, our mirror images, our 'Doppelgängers', because they are *like* us, and we are not like *them*, because we have made them what we wanted to be, not what we are.

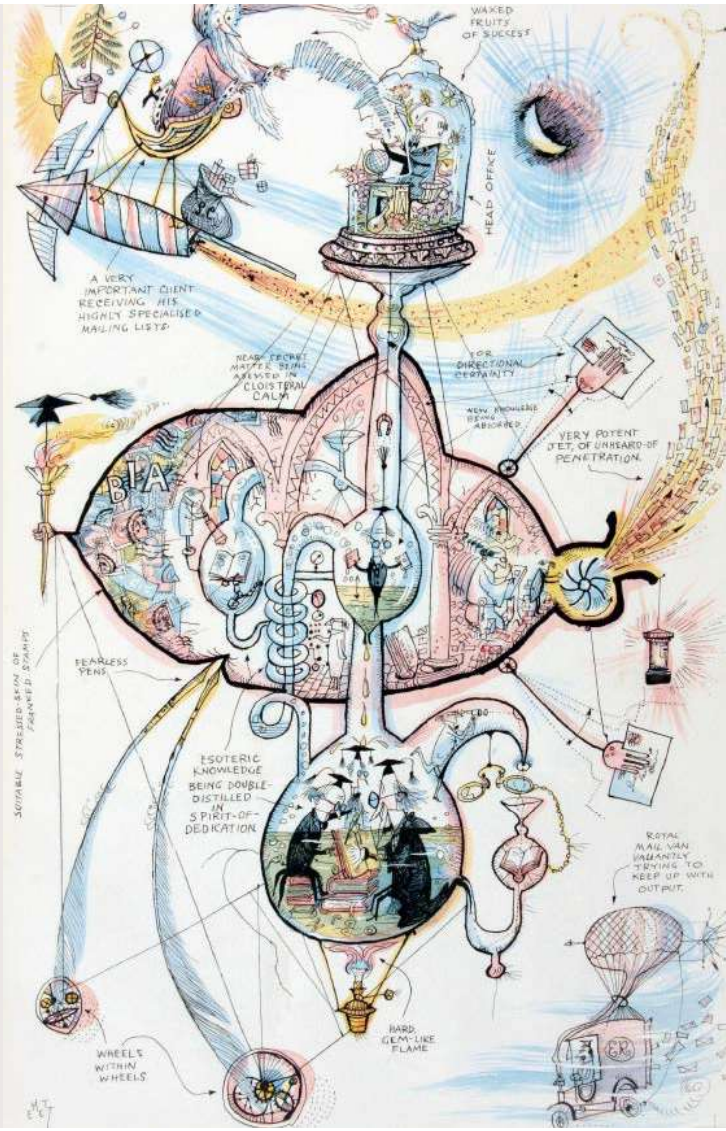
Automated History

Mankind's automated 'Doppelgängers', which showed how the highest flights of human intellect and the darkest depths of human history are never far apart, also foreshadowed the popular culture of the twentieth-century, which was rich in both.

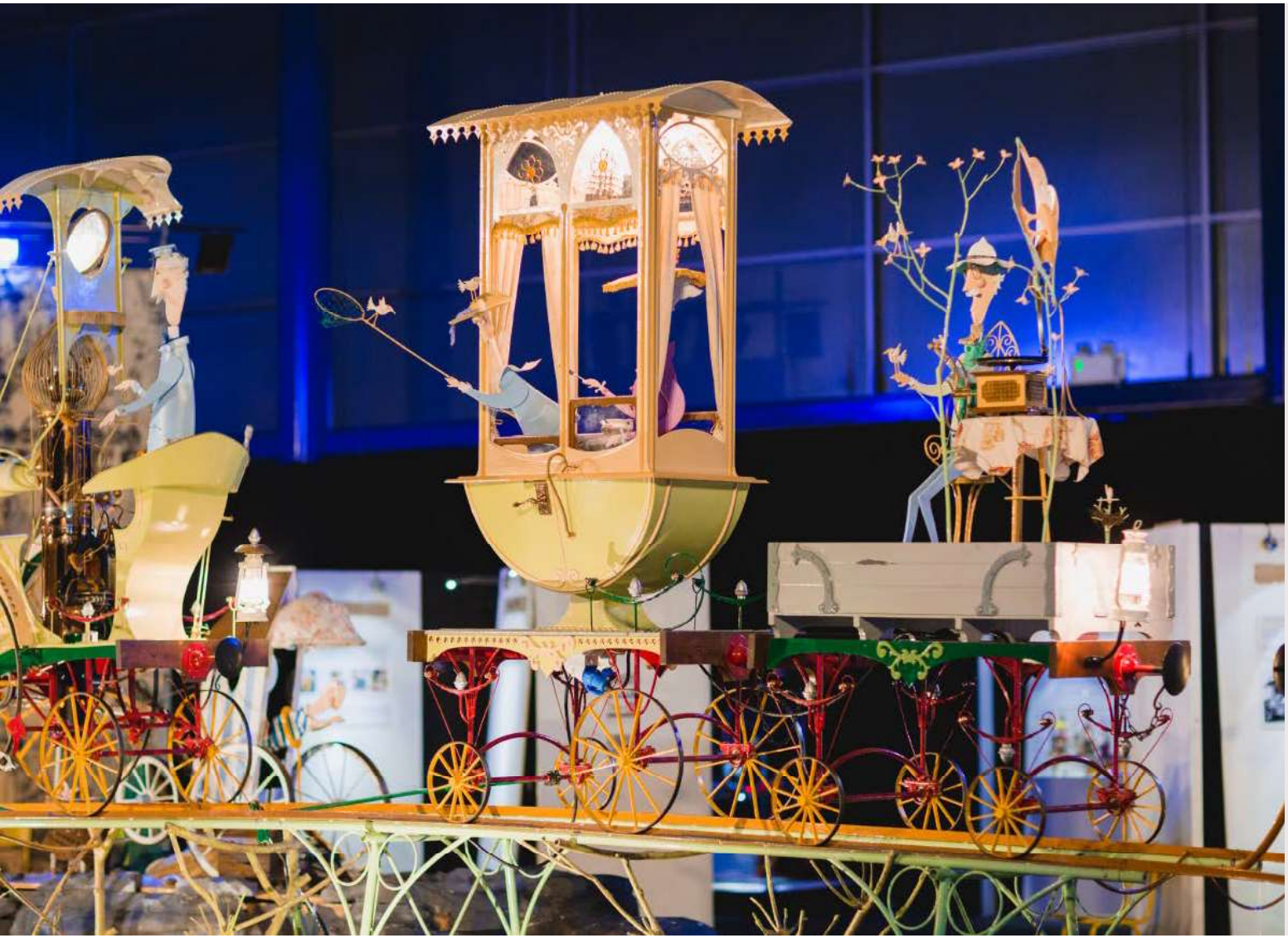
In 1927, Fritz Lang's landmark silent film *Metropolis* galvanised, with uncanny prescience, the consequences of atwo-tier urban society, in which a privileged upper class reaped the fruits of their industrial inventions while the underground machines' furnaces fed on men. Lang's film not only reflected on the past century but cast a pitch-black shadow forward towards the imminent rise of Nazism and the Nazis' construction of automated machinery to exterminate the lives of those declared unfit to be part of their society. In Lang's film, it was once again the mythological automaton that expressed the narrow line between one and the other. The animated, humanoid robot Maria, symbolically the name of the virgin mother of Christ, turns into the Whore of Babylon in the hands of an ostracised, embittered scientist in order to mislead the population of Metropolis into bringing about its own demise, fuelled by the underground Moloch-machines. Lang used the same term for the mythological child-eater – 'Moloch', the Canaanite god of child sacrifice – which Karl Marx and Friedrich Engels had applied to the operation of the Manchester textile factories to give shape to fear.

At the same time in Britain, the young Alan Turing began to develop what would eventual fulfil, to some degree, Babbage's dream of the thinking mind-machine. By 1940 Turing had helped to design a machine that solved 'the "mechanism" of the body' and recreated the mind – and thus, he hoped, the soul. The desire to recreate the soul was one that obsessed him after the death in 1930 of his closest school friend, Christopher Morcom, and led to the creation in 1936 of the Turing Machine, the binary device that in turn paved the way for the digital computer.

The development of automata in post-war Britain followed a form rather different from that which Turing had perhaps anticipated. Rowland Emett's whimsical automata of the late 1940s and 50s enchanted the public as the first, Georgian automata had done. Emett's evocation of the Victorian railway in the form of his kinetic sculptures 'Nellie', 'Neptune' and 'Wild Goose', which carried visitors through wonderland-like displays of the 1951 Festival of Britain held in 1951, looked backwards rather than forwards. The railway that his automata-locomotives operated – 'The Far Tottering & Oyster Creek Railway' – conveyed a rather different picture than the satanic railway engines depicted by artists and cartoonists of the 19th century. Over thirty years later, Emmet's automated trains ambled through his *Quiet Afternoon in Cloud Cuckoo Valley* of 1984 to the sound of a music box, lulling a child into a dream without the aid of a Sandman and longing for a nostalgic future. The names of these machines harken back not to mythological Titans, but to a lost past, in the similarly whimsical names of the rural branch-lines that had fallen victim to Dr Beeching's cuts of the 1960s such as the Bluebell Line, the Watercress Line or Emmett's local Cuckoo Line.



The Post Office SpaceShip, Rowland Emett. The Emett Estate



Automated Futures?

Emett's 'Cloud-Cuckoo Valley' not only referenced a defunct Sussex railway but also a term coined by the Greek playwright Aristophanes in his play *The Birds* to describe idealistic thinking – thinking such as the utopian hope that technology could be harnessed for a better future. That such a repurposed concept from antiquity has still lost none of its currency was amply demonstrated in the 2014 animated feature film *The Lego Movie*, whose protagonist 'master-builder' – who is not entirely by coincidence named Emmet – embarks on a journey to Aristophanes' 'Cloud-Cuckoo-Land' to liberate the minds of his fellow citizens of the pre-planned, capitalist Lego-Metropolis governed by Lord Business and thus to restore happiness.

Neither is it a coincidence that latest revival of the mythological automation is taking place in our own age of artificial intelligence, as a surge in reboots of 1970s and 80s science fiction classic films such as Ridley Scott's *Alien* (1979); nor that one of these reboots directly citedthe name of the first Titan who wrestled the automaton: Scott's *Prometheus* of 2012. In the latter, the desire of Ridley Scott's android David to become fully human, like Fritz Lang's Maria, expresses the fears deeply entangled in our relationship with technology: whether, while we can, we should play with fire and play God.

The cultural history of automata is the history of how we tell stories about ourselves, and the articulation of our inherent terror of our creations turning up us. This theme has been translated to fit nearly any period and any situation of human life. It permeates George Bernard Shaw's 1913 tale of the transformation of the Cockney flower girl Eliza Doolittle, *Pygmalion*. It is revealed in the names we give to contemporary systems such as the online bookdealer Amazon's Artificial Intelligence Unit, 'Mechanical Turk', or Google's Smartphone Operating System, 'Android' – expressing, perhaps subconsciously, our ever-uncomfortable relationship with such innovations.

Automata continue to be the stuff of which modern dreams – and nightmares – are made. A mirror to our ideal of being human, as well as to every abyss of the human condition, they are the vessel of modern mythologies.

A Quiet Afternoon in the Cloud Cuckoo Valley, 1988-89, Rowland Emett. Photographed by JamesBastable.co.uk (cloudcuckoovalley.com)