

One should perhaps eliminate the living beings from the stage. It is not inconceivable that one would thus return to the art of distant centuries, whose last imprint may well be borne by the masks of Greek tragedians. Will the day come when sculpture—about which a number of strange questions are being raised—will be used onstage? Will the human being be replaced by a shadow? a reflection? a projection of symbolic forms, or a being who would appear to live without being alive? I do not know; but the absence of man seems essential to me. Whenever man penetrates a poem, the immense poem of his own presence snuffs out everything around him.

the king's midwife, Mme. du Coudray [...] designed a "birthing machine" to use in teaching midwifery [...] This machine, of which du Coudray produced many copies to send to midwives and surgeons all over France, had skin and soft organs made from flesh-colored linen and leather, some dyed redder and some paler, and stuffed with padding. The earlier models were built on pelvic bones taken from real skeletons; many of the later ones used wood and wicker. As a "supplement" to the machine, one could buy "liquids," an opaque red fluid and a clear one, along with a set of sponges. The sponges, saturated with the fluids, were to be planted inside the birthing machine by the demonstrator and made to release their fluids at the appropriate moments.

It thus appears that there is but one type of organization in the universe, and that man is the most perfect example. He is to the ape, and to the most intelligent animals, as the planetary pendulum of Huyghens is to a watch of Julien Leroy. More instruments, more wheels and more springs were necessary to mark the movements of the planets than to mark or strike the hours; and Vaucanson, who needed more skill for making his flute player than for making his duck, would have needed still more to make a talking man, a mechanism no longer to be regarded as impossible, especially in the hands of another Prometheus.

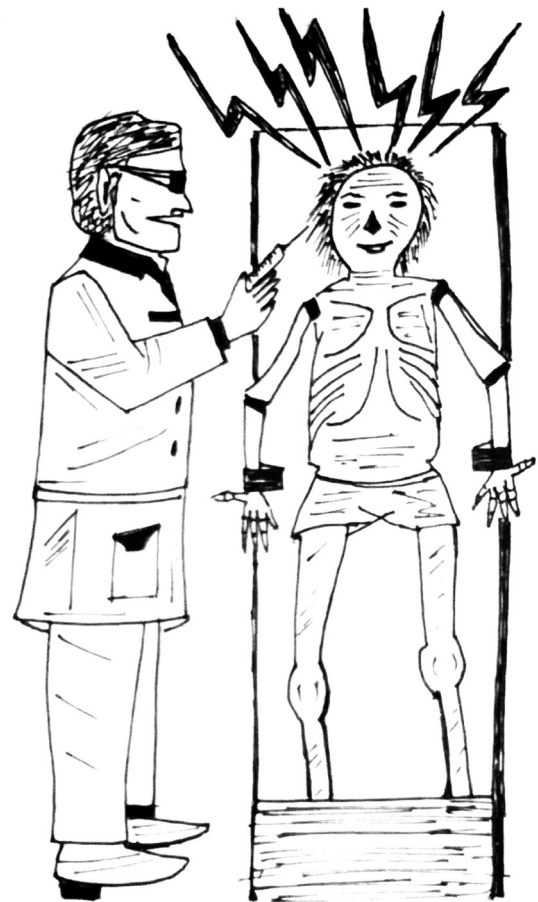
during the last three decades of the century, several people took on the project of simulating the organs and process of speech. The first was Erasmus Darwin, who in 1771 reported that he had "contrived a wooden mouth with lips of soft leather, and with a valve over the back part of it for nostrils." Darwin's talking head had a larynx made of "a silk ribbon... stretched between two bits of smooth wood a little hollowed." It said "mama, papa, map, and pam" in a "most plaintive tone."

Ladies and gentlemen, you see before you two persons of opposite sex, a male and a female, a gentleman and a lady. Nothing but cunning clockwork, nothing but springs and pasteboard. Each of them has the most delicate ruby spring beneath the nail of their left little toe: press it very gently, and the mechanism runs for a full fifty years. They're so perfectly crafted, these people here, that you couldn't distinguish them from ordinary humans if you didn't already know they were paint and pasteboard. They could even be turned into fully fledged members of proper society. They're extremely noble, since they speak with the right kind of accent. They're extremely moral, since they rise by the clock,

take lunch by the clock and retire by the clock. They have a good digestion, which is certain proof of a good conscience. They have the most exquisite sense of decorum, since the lady knows no word for trousers, and the gentleman would never dream of going *upstairs behind* a woman, or *downstairs in front* of one. They're extremely cultured, since the lady can sing all the latest operas and the gentleman wears cuffs. Take note, ladies and gentlemen, they are now at an interesting stage: the mechanism of love is beginning to operate, the gentleman has already carried the lady's shawl a few times, the lady has already rolled her eyes and gazed heavenwards a few times. On several occasions they have both whispered, "Faith, love, hope!" They already seem to be as good as hitched. All that's needed now is a quick "Amen".

Like a child learning to write, an automaton designed by Pierre Jaquet-Droz predicted the coming of age of this type of figure, by writing sentences such as "We are the androids" and "Cogito, ergo sum."

Before I proceed to tell you, gentle reader, what more befell the unfortunate Nathaniel, should you by chance take an interest in that skillful optician and automaton-maker Spalanzani, I can inform you that he was completely healed of his wounds. He was, however, obliged to





A figure is seen habited as a Turk, and seated, with its legs crossed, at a large box apparently of maple wood, which serves it as a table. The exhibiter will, if requested, roll the machine to any portion of the room, suffer it to remain altogether on any designated spot, or even shift its location repeatedly during the progress of a game. The bottom of the box is elevated considerably above the floor by means of the castors or brazen rollers on which it moves, a clear view of the surface immediately beneath the Automaton being thus afforded the spectators.

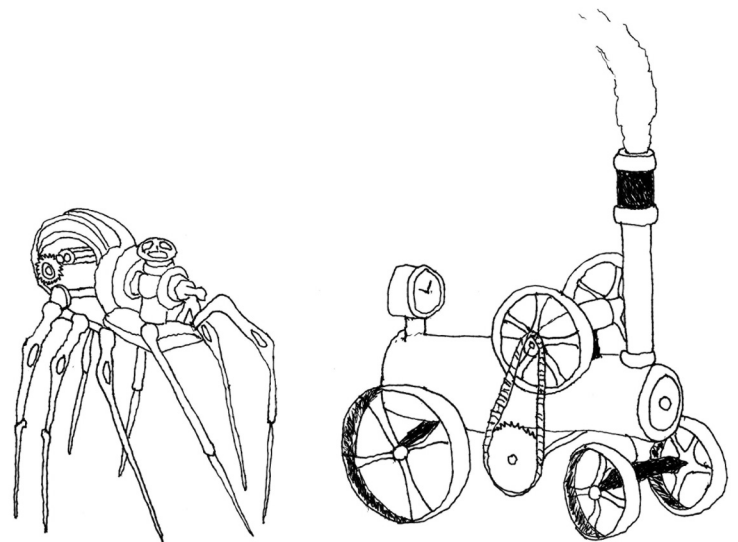
the Turk often reads the very soul of the questioner. This is what I find remarkable. Does this being which answers our questions acquire, by some process unknown to us, a psychic influence over us, and does it place itself in spiritual rapport with us?

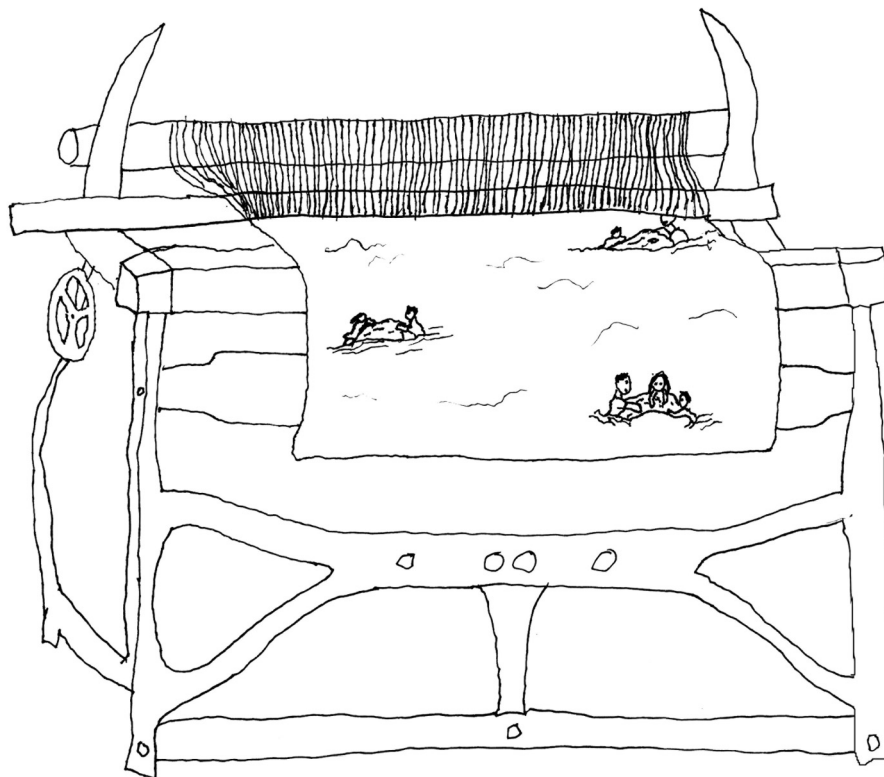
The inventor not only opens the front, but likewise the back doors of the cupboard, so that the wheel-work becomes so exposed, as to afford the most thorough conviction that no living being can possibly be concealed; and in order to do this more effectually, the inventor generally places a wax-light in the cupboard, which enables you to see every corner of it; he then lifts up the Automaton's robe, and turns it over his head, so as to display completely, the internal structure, which consists, in like manner, of levers and wheel-work, of which the body of the Automaton is so full, that there is not room to hide a kitten. Even his breeches, which are in the Turkish taffe, have a little door which opens, to remove even the shadow of suspicion.

leave the university, because Nathaniel's story had created a sensation, and it was universally considered a quite unpardonable trick to smuggle a wooden doll into respectable tea-parties in place of a living person—for Olympia had been quite a success at tea-parties. The lawyers called it a most subtle deception, and the more culpable, inasmuch as he had planned it so artfully against the public that not a single soul—a few cunning students excepted—had detected it, although all now wished to play the wiseacre, and referred to various facts which had appeared to them suspicious, for instance, that, according to the expression of an elegant tea-ite, Olympia had, contrary to all usage, sneezed oftener than she had yawned? "The former," remarked this fashionable person, "was the sound of the concealed clockwork winding itself up. Moreover, it had creaked audibly." And so on.

The professor of poetry and eloquence took a pinch of snuff, clapped the lid of his box to, cleared his throat, and said solemnly: "Ladies and gentlemen, do you not perceive where the trick lies? It is all an allegory—a sustained metaphor—you understand me—sapienti sat."

But many were not satisfied with this; the story of the automaton had struck deep root into their souls and, in fact, a pernicious mistrust of human figures in general began to creep in. Many lovers, to be quite convinced that they were not enamoured of wooden dolls, would request their mistresses to sing and dance a little out of time, to embroider and knit, and play with their lapdogs, while listening to reading, etc., and, above all, not merely to listen, but also sometimes to talk, in such a manner as presupposed actual thought and feeling. With many the bond of love became firmer and more entrancing, though others, on the contrary, slipped gently out of the noose. "One cannot really answer this," said some. At tea parties yawning prevailed to an incredible extent, and there was no sneezing at all, that all suspicion might be avoided.





the Turk strikes strings within us and makes them give forth a clear chord, audible and intelligible to us, instead of being a mere murmur as they usually are. As a result it is we who answer our own question; the voice which we hear is produced from within ourselves by the operation of this unknown spiritual power, and our vague presentiments and anticipations of the future are heightened into spoken prophecy.

'Tis a *deception*! Granted; but such an one as does honor to human nature; a deception more beautiful, more surprising, more astonishing, than any to be met with, in the different accounts of mathematical recreations.



The passion for automatic exhibitions which characterized the eighteenth century gave rise to the most ingenious mechanical devices, and introduced among the higher orders of artists habits of nice and accurate execution in the formation of the most delicate pieces of machinery. The same combination of mechanical powers which made the spider crawl, or which waved the tiny rod of the magician, contributed in future years to purposes of higher import. Those wheels and pinions, which almost eluded our senses by their minuteness, reappeared in the stupendous mechanism of our spinning-machines and our steam-engines. The elements of the tumbling puppet were revived in the chronometer, which now conducts our navy through the ocean; and the shapeless wheel which directed the hand of the drawing automaton has served in the present age to guide the movements of the tam-bouring engine. Those mechanical wonders which in one century enriched only the conjurer 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.

Happening to be at Matlock in the summer of 1784, I fell in company with some gentlemen of Manchester, when the conversation turned on Arkwright's spinning machinery. One of the company observed, that as soon as Arkwright's patent expired, so many mills would be erected, and so much cotton spun, that hands never could be found to weave it. To this observation I replied, that Arkwright must then set his wits to work to invent a weaving mill. This brought on a conversation on the subject, in which the Manchester gentlemen unanimously agreed that the thing was impracticable; and, in defence of their opinion, they adduced arguments which I certainly was incompetent to answer, or even to comprehend, being totally ignorant of the subject, having never at that time seen a person weave. I controverted, however, the impracticability of the thing by remarking, that there had lately been exhibited in London an automaton figure which played at chess. Now you will not assert, gentlemen, said I, that it is more difficult to construct a machine that shall weave, than one which shall make all the variety of moves which are required in that complicated game.



Back in Paris, Vaucanson turned his attention from education to automation and from silk reeling to weaving. His efforts culminated in the automatic loom of 1747.

The contraption, made entirely of metal, immediately suggested a weaving loom.

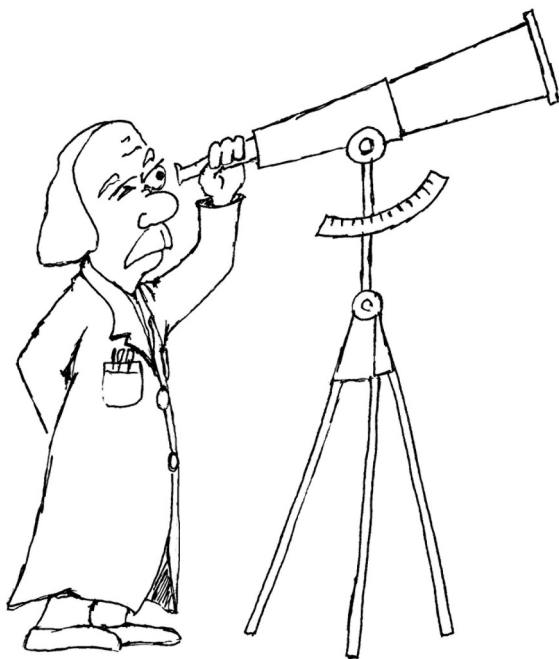
In the early days of artificial life the mere fact that a machine could carry out a complex human activity had the same salience as a mimetic automaton; it could serve as evidence for a materialist-mechanist understanding of life, and, at the same time, it could provoke a rethinking of the boundary dividing humanity from machinery. The automatic loom constituted just such a provocation.

Between the hydraulic paddles and the warp stretched a kind of long chest, no doubt containing the mysterious mechanism that drove the whole contraption.

The loom was a close cousin of Vaucanson's three automata; it was built by the same Parisian artisans, and it worked similarly.

Manufactured in situ by an anomaly of this extraordinary machine, which was specially designed to perform for an attentive audience, the band of fabric grew rapidly, its details powerfully lit by the beacon. The tableau depicted a vast waterway, at the surface of which men, women, and children, eyes bulging in terror, clung desperately to bits of flotsam in a sea of wreckage; and so ingenious were the machine's fabulous gears that the rest could have withstood comparison with the most artful watercolor.

Vaucanson boasted that with his machine a "horse, an ox, an ass makes fabrics much more beautiful and much more perfect than the most clever workers of silk." He imagined an animist factory in which "one sees the fabric weave itself on the loom without human intervention... the warp opens, the shuttle propels itself through, the reed pounds the cloth, the cloth rolls itself onto the cylinder."



The textile motif gradually took shape, and we saw emerge a mountain toward which groups of humans and animals of all species swam for safety. A host of transparent, diagonal zigzags streaked the entire area and allowed us to grasp the subject, borrowed from the biblical description of the Flood. Calm and majestic at the surface of the waves, Noah's Ark soon lifted its regular, massive silhouette, embellished with finely wrought figures circulating amid a copious menagerie.

Vaucanson's automatic loom, his functional simulation of a weaver, was intended to transform the categories of intelligent and unintelligent work. Anticipating Frederick Winslow Taylor's methods, Vaucanson identified a set of tasks generally taken to require intelligence but which, according to him, need not. Any human activity that could be simulated, even a very complex one, did not require intelligence.

The sky progressively expanded toward the zenith, and huge clouds suddenly emerged, thanks to an amalgam of gray threads subtly assorted from the brightest to the murkiest shades. Thick curls of vapor unfurled majestically in the air, harboring inexhaustible reserves to endlessly replenish the horrific deluge.

Thus, the *Iron Man*, as the operatives fitly call it, sprung out of the hands of our modern Prometheus at the bidding of Minerva—a creation destined to restore order among the industrious classes, and to confirm to Great Britain the empire of art. The news of this Herculean prodigy spread dismay through the Union, and even long before it left its cradle, so to speak, it strangled the Hydra of misrule. It is to be hoped that the manufacturers who received this guardian power from mechanical science, will strengthen with grateful patronage the arm which brought them deliverance in the day of their distress.

There is a place for everything, and everything in its place. Nobody is for a moment at a loss to know what he has to do: the organization of the community is complete, and the human agents work with all the exactness of machinery. There is no small display of moral power in thus impressing unity of action on a mass of operatives, not unfrequently exceeding a thousand in number; it is not inferior to the intellectual power which has rendered available all the discoveries of science. These operatives are thus stringently ruled by their own consent: they feel that the government they are under works in all its parts for the promotion of their own interests; their obedience is complete, because it is "a reasonable service;" for if at any time the reason escaped their ken, resistance and disobedience would begin. So strange a combination of perfect despotism with perfect freedom never before existed, and to have produced such a state is one of the noblest triumphs of morality and intelligence.

– How, they asked,
Feeling we have wings
Shall we quit our vile bodies?
– Die, they said.

if it is granted us that the intelligible subject can still be free with respect to a given action, although as a subject also belonging to the sensible world, he is mechanically conditioned with respect to the same action, it nevertheless seems that, as soon as one admits that *God* as universal original being *is the cause also of the existence of substance* (a proposition that can never be given up without also giving up the concept of God as the being of all beings and with it his all-sufficiency, on which everything in theology depends), one must admit that a human being's actions have their determining ground in *something altogether beyond his control*, namely in the causality of a supreme being which is distinct from him and upon which his own existence and the entire determination of his causality absolutely depend. In fact, if a human being's actions insofar as they belong to his determinations in time were not merely determinations of him as appearance but as a thing in itself, freedom could not be saved. A human being would be the marionette or an automaton, like Vaucanson's, built and wound up by the supreme artist; self-consciousness would indeed make him a thinking automaton, but the consciousness of his own spontaneity, if taken for freedom, would be mere delusion inasmuch as it deserves to be called freedom only comparatively, because the proximate determining causes of its motion and a long series of their determining causes are indeed internal but the last and highest is found entirely in an alien hand.

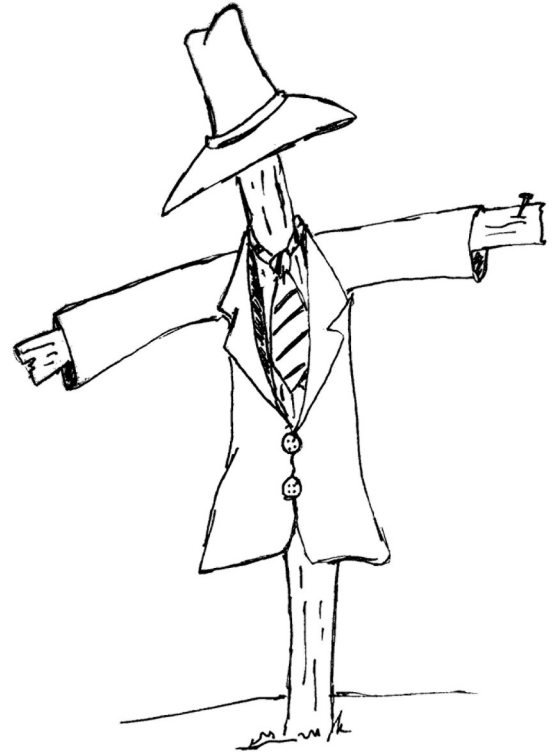
During the first decade of the eighteenth century, a mechanician to the French court named Sébastien designed two artificial hands for a Swedish military officer named Gunterfeld who had lost both arms above the elbow. These hands had flexible fingers that Gunterfeld could control using his stumps by means of a network of threads. The finished product enabled him to don and doff his hat. But the things were uncomfortable and awkward, and he decided he would rather do without.

we believe that the processes of life and consciousness are essentially mechanistic and can therefore be simulated, and yet we are equally firmly persuaded that the essences of life and consciousness will ultimately be beyond the reach of mechanical reproduction.

Just as the intersection of two lines from the same side of a point after passing through the infinite suddenly finds itself again on the other side—or as the image from a concave mirror, after having gone off into the infinite, suddenly appears before us again—so grace returns after knowledge has gone through the world of the infinite, in that it appears to best advantage in that human bodily structure that has no consciousness at all—or has infinite consciousness—that is, in the mechanical puppet, or in the God.

Therefore, I replied, somewhat at loose ends, we would have to eat again of the tree of knowledge to fall back again into a state of innocence?

Most certainly, he replied: That is the last chapter of the history of the world.



NOTES

p. 45: Maurice Maeterlinck, "Small Talk – The Theater" (1890); Jessica Riskin, "Eighteenth-Century Wetware" (2003); Julien Offray de La Mettrie, "Man a Machine" (1748); Riskin, "Eighteenth-Century Wetware"; Georg Büchner, *Leonce and Lena* (1836); and Horst Bredekamp, *The Lure of Antiquity and the Cult of the Machine: The Kunstkammer and the Evolution of Nature, Art and Technology* (1995).

p. 46: E.T.A. Hoffmann, "The Sandman" (1816); Edgar Allan Poe, "Maelzel's Chess-Player" (1836); E.T.A. Hoffmann, "Automata" (1814); Karl Gottlieb von Windisch, *Inanimate Reason; or a Circumstantial Account of That Astonishing Piece of Mechanism, M. de Kempelen's Chess-Player; Now Exhibiting at No. 9 Savile-Row, Burlington Gardens* (1784); E.T.A. Hoffmann, "Automata" (1814); and Gottlieb von Windisch, *Inanimate Reason*.

p. 47: Sir David Brewster, *Letters on Natural Magic* (1832); Rev. Dr. Edmund Cartwright (1785), as quoted in Edward Baines's *History of The Cotton Manufacture in Great Britain* (1835); and Jessica Riskin, "The Defecating Duck, or, the Ambiguous Origins of Artificial Life" (2003).

p. 48: Nine alternating quotes from Raymond Roussel, *Impressions of Africa* (1910) and Jessica Riskin, "The Defecating Duck, or, the Ambiguous Origins of Artificial Life" (2003); Andrew Ure, *The Philosophy of Manufactures* (1835); William Cooke Taylor, *Notes of a tour in the manufacturing districts of Lancashire: In a series of letters to His Grace the Archbishop of Dublin* (1842); and Raymond Roussel, *How I Wrote Certain of My Books* (1935).

p. 49: Immanuel Kant, *Critique of Practical Reason* (1788); Jessica Riskin, "Eighteenth-Century Wetware" (2003); *ibid.*; and Heinrich von Kleist, "On the Marionette Theater" (1810).

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