At the age of thirteen, **Emery Blagdon** set out vagabonding around the American West. It wasn't until 1935, fifteen years later, that news of his mother's terminal cancer would bring him back to his home where he would end up settling for the rest of his life. Once there, he busied himself by tending to his vegetable garden, making toys for his nieces and nephews, and putting his tremendous mechanical acumen to sporadic use around town (he was known to have constructed a working tractor from the ground up). Gradually, however, Blagdon began to lay the groundwork for what would become his masterpiece—an immersive environment situated in a small outbuilding next to his modest, ramshackle home, which he called his "Healing Machine."

Blagdon's initial pieces included intricately woven wire sculptures and mobiles (which he called his "pretties"), and colorful, abstract geometric paintings that he would produce on discarded boards. Around the beginning of the 1960s, however, Blagdon began to festoon the inside of what would become his workshop with a massive collection of his wire sculptures. He simultaneously conducted experiments with electrical currents that he rerouted from his house's power lines into the shed in an attempt to harness the electricity's healing powers. By all accounts, the air in Blagdon's workshop positively hummed with electrical energy—there were corners of the shed where one's hair would stand on end. Sadly, after nearly three decades of working on his Healing Machine, Blagdon died of cancer in 1986, having never sought any treatment beyond the energies emanating from his fantastic personal laboratory.

In both his writings and his artwork, **Henrik Olesen** attempts to excavate alternate histories and repressed subtexts relating to homosexuality in primarily art-historical contexts—ranging from the work of Conceptual and Minimalist artists of the 1960s, back as far as the fourteenth century. For his work *Some Illustrations to the Life of Alan Turing* (2009), Olesen uses the life of the titular cryptanalyst and pioneering computer scientist to point to the construction of what he calls the "postmodern body"—a body that is not a fixed constant but is fluid, changeable, and multifaceted.

Over the course of his relatively short life, Alan Turing was credited with facilitating one of the major intelligence breakthroughs of the Second World War (cracking the German naval Enigma code), laying the groundwork for both the discipline of computer science and the creation of the modern computer, and beginning the inquiry into the possibility of artificial intelligence. Despite these significant achievements, Turing's sexual relationship with another man in 1952 led to him being tried and convicted of "gross indecency," and sentenced to undergo chemical castration. In 1954, after enduring two years of estrogen injections, Turing committed suicide by eating a cyanide-laced apple—thought to be a reference to his favorite fairy tale, "Snow White."

In Olesen's work, the dualities that structured Turing's life (public/private; gay/straight; male/female; mind/body; human/machine), both on an internal, psychic level and through the external exercise of power, are expressed through the metaphoric use of the binary code that served as the basis for Turing's proto-computer. But throughout his series, Olesen also indicates the possibility of the breakdown of the rigidity of these binaries, a freedom Turing never experienced in his own lifetime.

In both his writings and his artwork, **Henrik Olesen** attempts to excavate alternate histories and repressed subtexts relating to homosexuality in primarily art-historical contexts—ranging from the work of Conceptual and Minimalist artists of the 1960s, back as far as the fourteenth century. In his work *Anthologie de l'Amour Sublime* [Anthology of Sublime Love] (2003), for example, Olesen inserted the homoerotic illustrations of Tom of Finland and photographs of gay bondage into the Surrealist collages of Max Ernst. For all of the Surrealists' attempts to liberate themselves through the subversion of bourgeois psychosexual mores and shining light on unconscious drives, homosexuality nevertheless remained an invisible, unspeakable taboo, as defined by Olesen in this work.

Olesen extends this critical engagement with Surrealism in his works *Apple (Ghost)* (2008), *Imitation/Enigma (2)* (2008), and *The Body is a Machine* (2010), all three of which also reference his interest in the life of cryptanalyst and pioneering computer scientist Alan Turing. In *Imitation/Enigma (2)*, Olesen has created a faithful imitation of Man Ray's *The Enigma of Isidore Ducasse* (1920), a sewing machine wrapped in a blanket that refers to the nineteenth-century poet Isidore Ducasse (who published under the name Comte de Lautréamont) and his strange, galvanizing simile: "As beautiful as the chance encounter, on a dissecting table, of a sewing machine and an umbrella." Here, the shrouded "enigma" of Man Ray's original is transformed in the context of Turing's life so that it takes on a double meaning: signifying the German naval code Enigma, which Turing was instrumental in breaking, and the veiled nature of Turing's homosexuality. Olesen's painting *The Body is a Machine* further articulates the idiosyncratic line he draws between Turing and Surrealism, presenting a body/machine roughly in the style of Francis Picabia, who, along with his friend Marcel Duchamp, took up the absurd, or useless, machine as a metaphor for the unruly nature of desire.

Since the middle of the 1950s, **Konrad Klapheck** has made graphic, restrained paintings of mechanical appliances and household fixtures. His paintings are charged with a surreal sense of their anthropomorphic qualities that he often further reinforces and elaborates through their titles. While his painting style was developed in response to the gestural painting of Tachisme (often touted as the European equivalent of Abstract Expressionism), his interest in the metaphoric resonance of everyday mechanical objects was a result of his early encounters with the work of Max Ernst and Marcel Duchamp, as well as a host of Surrealist artists, including, and in particular, René Magritte.

Though he depicted a range of objects in his paintings, including faucets, adding machines, clothes irons, tires, and gas canisters, his first mature paintings depicted typewriters—a choice that provides an avenue for reading the rest of his work. With the mass proliferation of the typewriter in the late nineteenth century, the act of writing had become severed from the hand; it was the moment when, as media theorist Friedrich Kittler put it, "writing and the soul fell apart." The typewriter, in this case, can be seen as a kind of harbinger of alienation, a cipher for the machine's ability to sever us from reality. Klapheck, however, with the insistent anthropomorphism of his machines, appears to push this picture of alienation in the mechanical age still further, suggesting that we have not only been separated from the world around us, but from ourselves as well. Like Duchamp and Francis Picabia before him, Klapheck hints that our desires and drives have become mechanized, and that we are no longer in the driver's seat—if, that is, we ever were.

Over the course of his career, **Philippe Parreno** has created a varied body of work, spanning video, installation, and sculpture, in addition to various collaborative projects with his contemporaries. For his video work *The Writer* (2007), Parreno made use of a famed eighteenth-century automaton, designed by the Swiss watchmaker Pierre Jaquet-Droz, to produce the gnomic phrase, "What do you believe your eyes or my words?" The automaton, originally designed to promote Jaquet-Droz's watchmaking business, was one of a set of three, each of which performed a different function. The Writer was the most complex automaton of the three as it was fully programmable to write any linguistic message.

Parreno's chosen phrase points to the strange ambiguity presented by the automaton itself, which has been given the ability to feign life through intricate mechanical means. This ambiguity is, of course, the key to the allure of the automaton, a phenomenon that has fascinated mankind since ancient Greece. The explosion of the automaton's popularity in the eighteenth and nineteenth centuries—with stories such as E.T.A. Hoffmann's "The Sandman" (1816) featuring automatons and subsequently provoking analyses by psychologists Ernst Jentsch and Sigmund Freud—led to the automaton's adoption by the Surrealists, in part as a metaphoric stand-in for the destabilizing forces of industrialization.

Parreno's return to the automaton is also related, tangentially, to his 1999 project with Pierre Huyghe, *No Ghost Just a Shell*. For this piece, they purchased the rights to a readymade animated character, "Annlee," designed by a Japanese studio for use in anime, and created works that addressed the liminal nature of her existence. Like Annlee, the nature of the automaton's being is one of mere semblance—once the mechanical nature of the ghost apparently possessing the machine has been revealed, we are left only with a shell.

Before his early death in a plane crash at the age of thirty-five, **Robert Smithson** established himself as a pioneering figure of Post-Minimalism and Land art. In his later work, Smithson rebelled against the self-contained, machine-produced minimalist objects realized by his contemporaries, creating works that incorporated his interests in geology, entropy, and site-specificity.

Despite being deeply engaged with scientific discourses and investigations in the production of his work, Smithson was suspicious of technological progress and opposed to the intermingling of art and technology—made popular in the 1960s by collaborative platforms such as E.A.T. (Experiments in Art and Technology) and the Massachusetts Institute of Technology's Center for Advanced Visual Studies (CAVS). Smithson expressed these concerns in a letter to György Kepes, founder of CAVS, in which he declined Kepes's offer to participate in an exhibition that was to be part of the 10th São Paulo Biennial in 1969. "Technology promises a new kind of art," Smithson declared, "yet its very program excludes the artist from his own art." In keeping with his abiding interest in entropy, Smithson called into question the positivist percepts of technological inquiry, stating: "All the 'fancy junk' of science cannot hide the void."

Although the optical fireworks provided by Smithson's work *The Eliminator* (1964) might make it easy to confuse with the research-based, technologically optimistic work produced by some of his contemporaries, Smithson saw this piece as an engine for the elimination of knowledge, as the title implies, rather than its advancement. "*The Eliminator* overloads the eye whenever the red neon flashes on," Smithson explained, "and in so doing diminishes the viewer's memory dependencies or traces.... *The Eliminator* is a clock that doesn't keep time, but loses it. The intervals between the flashes of neon are 'void intervals' or what George Kubler calls, 'the rupture between past and future.'"

Emma Kunz's elaborately detailed, mandala-like geometric drawings were not conceived as artworks. Rather, she created them to be used as guides in healing rituals, placing the drawings on the floor between herself and her subject, and using them to divine energy disruptions. Aware of her artistic and mediumistic abilities from a young age, when she began making drawings in her school notebooks, Kunz developed an interest in radiesthesia, a divining process that deals with the detection of energy fields. With this knowledge, Kunz would employ a quasi-mechanistic method of drawing in which she would use a pendulum to guide the creation of her intricate geometries. Moreover, each of these pieces would be completed in a single, marathon session, occasionally lasting more than twenty-four hours.

Kunz believed that her drawings were a product of "the most profound interiorization of the outward and the purest exteriorization of the inward," which allowed her to discern negative energy and transform it into healing energy. Though all of her drawings are the result of this ebb and flow of external and internal energy, her *Work No. 086* (n.d.) provides us with the most explicit representation of her personal cosmology. In it, we find a pair of robot-like figures, which strangely recall the nine "malic molds" of Marcel Duchamp's *The Bride Stripped Bare By Her Bachelors, Even* (1915–23), floating in a field of what appear to be energy vectors, a comparison made initially by curator Harald Szeemann in his 1975 exhibition "The Bachelor Machines." In transforming herself into a conduit, channeling energies through her pendulum and onto the page, we can conjecture that Kunz saw herself as a kind of healing machine, the final output of which—her drawings—is all that remains of her mysterious processes.

In 1957, **Otto Piene** and Heinz Mack founded the group ZERO in Düsseldorf, Germany. Over the course of its decade-long existence, ZERO grew to be an umbrella organization, bringing together the practices of abstract and kinetic artists throughout Europe, and extending its influence as far away as Japan. During his time with ZERO, Piene helped to organize exhibitions and happenings, and co-authored the group's various manifestos. He also produced a body of ambitious works that engaged with the optical, spatial, and chance-based operations of natural phenomena such as light, fire, and smoke. Piene's most recognized works from this period were his series "Lichtballett" [Light Ballet], for which he created kinetic sculptures that produced shifting, kaleidoscopic patterns of light—recalling the influential Bauhaus professor László Moholy-Nagy's *Light Prop for an Electric Stage* (1929–30), updated for the postwar technological era. In keeping with ZERO's conviction that their works acted as a balm for the battered psyche of a world recently torn apart by war (their 1957 manifesto declared their goal to be "the peaceful conquest of the soul by means of calm, serene sensibilization"), Piene viewed his "Lichtballett" as healing machines. "When…art communicates," he said, "it is not so much a transmitter of ideas and information as it is a sender of energy. How the visually transmitted energy changes into a spectator's emotional energy remains a secret. Certainly the dosage plays a part. The real sun burns and singes; an artistic synonym of the sun can calm and heal. Calm and quietness define the climate of the light ballet."

After the dissolution of ZERO in 1968, Piene moved to Boston, where he became one of the first fellows at the recently founded Center for Advanced Visual Studies (CAVS) at MIT, alongside Stan VanDerBeek and Hans Haacke. CAVS was the brainchild of the influential visual theorist György Kepes, a former employee of Moholy-Nagy's design studio and professor at the New Bauhaus in Chicago, whose place as director Piene would eventually come to occupy from 1974 until his retirement in 1994.

In 1968, the Institute of Contemporary Art (ICA) in London staged the first large-scale international art exhibition devoted to computer art and advances in computer technology, "Cybernetic Serendipity." The exhibition, curated by **Jasia Reichardt**, featured the work of artists, computer scientists, and engineers, and illustrated the numerous ways in which computers had been deployed in the production of drawing, painting, sculpture, poetry, dance, animation, and music. Over the course of its two-month run, the show proved to be incredibly popular, with attendance estimated between 40,000 and 60,000 visitors. In addition to its public success, the exhibition was also instrumental in establishing a place for computer art in the wider discussion of contemporary art and was one of the first exhibitions to refrain from differentiating between the works of artists and engineers.

In her writings about the exhibition, Reichardt notes the show's indebtedness to the work of Norbert Wiener, the founder of the science of cybernetics, whose pioneering 1948 book *Cybernetics* bore the subtitle "Control and Communication in the Animal and the Machine." Wiener referred to the way in which the nervous systems of animals, like the workings of certain machines, operate according to systems of feedback. When considering the work of Ulla Wiggen, one of the artists included in "Cybernetic Serendipity" whose semi-abstract paintings of the inner workings of computers recall that of post-painterly abstractionists like Frank Stella, this analogy is particularly valuable. Not merely pseudo-technical schematics, Wiggen's works have a subtle anthropomorphic quality that suggests that she, like Wiener, was attempting to point to the equivalences between the body and rapidly advancing computer systems. When seen in this light, the paintings reveal themselves to be a kind of anatomical study of the computer age—each one an attempt to trace the lineaments of the complex machines that seem poised to take on lives of their own.

In 1959, **Gianni Colombo** cofounded the Milan-based collective Gruppo T along with Giovanni Anceschi, Davide Boriani, and Gabriele Devecchi. The group, along with Padua-based Gruppo N, created works of optical and kinetic art that they positioned as a form of perceptual research. Their technologically optimistic, seemingly objective pursuit stood counter to the dominant environment of expressive painting characterized by Art Informel and was spurred by the rising tide of postwar Italian industrialization. The groups found their theoretical advocate in philosopher and writer Umberto Eco, who coined the movement's defining term, "programmed art" ("Arte Programmata"), in an essay for their first major exhibition in 1962. Eco's book *Opera Aperta* (*The Open Work* in English), published in the same year, valorized works of art that were designed to be completed by their audiences—an idea which resonated strongly with the aims of Gruppo T and Gruppo N.

This idea of the open work was also integral to understanding Colombo's art. His early series of "Rilievi Intermutabili" [Interchangeable Reliefs] from 1959, for example, consisted of wooden balls sandwiched between sheets of rubber that could be rearranged by the audience into a near infinite array of compositions. But in 1964, Colombo expanded beyond his contemporaries' discrete object-works with the creation of his first immersive kinetic environment—further pushing his desire to completely involve the viewer in his works. While the production of interactive environments would mark his work from that time forward, it is his 1967 piece *Spazio Elastico* [Elastic Space], which won him a prize at the 1968 Venice Biennale, that remains his most recognized. Composed of florescent rubber bands arranged in a three-dimensional grid, illuminated by black light, and animated by motors, *Spazio Elastico* was an environment designed to catalyze variable perceptual experiences and, in keeping with the scientific bent of Gruppo T, "as an experimental test-construction to research the optical and psychical behavior of the users."

The centerpiece of **Franz Kafka**'s short story "In the Penal Colony," first published in 1919, is an elaborate execution machine known as the Harrow. Under an inscrutable and irrational justice system, characteristic of Kafka's fiction, those condemned to die in the machine are neither informed of their charges nor are they presumed to be anything but guilty. Once strapped into the Harrow, however, the condemned's crime is transmitted to them by way of an embellished decree inscribed on their body with needles, which burrow progressively deeper into their flesh over the course of twelve hours. Though the script is impossible to decipher ("It is not calligraphy for school children," the colony's head officer quips), after the sixth hour of torture the condemned is said to undergo an ecstatic epiphany in which their crime (and, by extension, the ultimately "just" nature of their punishment) becomes intuitively understood.

In 1954, the theorist and historian Michel Carrouges wrote a text entitled "The Bachelor Machines" that discerned structural similarities between Kafka's Harrow and a host of other machines from art and literature imagined by Alfred Jarry, Raymond Roussel, Edgar Allan Poe, Jules Verne, and Marcel Duchamp. Of chief importance among these was Duchamp's *The Bride Stripped Bare By Her Bachelors, Even* (1915–23)—a dual-paneled work in glass depicting a metaphorically charged machine divided into two distinct "realms": an upper realm devoted to the titular "Bride" and a lower realm, which gave Carrouges's essay its title, devoted to the nine "Bachelors" attempting to court her. Taking Duchamp's machine as a guide, Carrouges read Kafka's Harrow (as well as the other machines that he subjected to analysis), as constructs that inextricably intermeshed the opposing terms of male and female, machine and body, sex and death.

In 1975, Swiss curator Harald Szeemann used Carrouges's essay as the basis for an exhibition at the Kunsthalle Bern, also titled "The Bachelor Machines," for which he commissioned full-scale models of each of the machines analyzed in the original essay, including Kafka's Harrow. Adding an optimistic twist to Carrouges's initial theorization, Szeemann declared that these machines stood for "the omnipotence of eroticism and its negation, for death and immortality, for torture and Disneyland, for fall and resurrection."

After the Second World War, Italy experienced an unprecedented period of economic growth that transformed the country from a mainly rural nation into a major industrial power in a matter of years. This economic upswing, which took place primarily between 1950 and 1963, also precipitated the rapid growth of the Italian middle class and created a general atmosphere of optimism due to the promise of prosperity gained through industrial production. Taking some of this optimism and fascination with technology to heart, Italian artists began to experiment with new forms of motorized and optical research-based art, eventually grouped under the rubric of "programmed art."

The term "**programmed art**" (originally "Arte Programmata") was coined in 1962 by famed Italian author, philosopher, and literary critic Umberto Eco, in a catalogue essay for a show on these new Italian optical and kinetic art movements (staged in the Milan showroom of the Italian computer manufacturer Olivetti). Aside from a few outliers, the show mainly featured works by artists belonging to the two collectives that formed the backbone of these movements, Gruppo N and Gruppo T. Gruppo N, which was formed in Padua and included artists Alberto Biasi, Ennio Chiggio, Giovanni Antonio Costa, Edoardo N. Landi, and Manfredo Massironi, was more explicitly scientifically minded and research-oriented, focusing primarily on the dissection of optical phenomena. In fact, Massironi stated that the members of the group "consider ourselves technicians in the medieval sense, rather than artists." Gruppo T, which was founded in Milan by Giovanni Anceschi, Davide Boriani, Gianni Colombo, Gabriele Devecchi, and later joined by Grazia Varisco, was less strict in its scientific approach. However, they were still principally concerned with creating an active relationship between the viewer and the work of art, largely through the production of kinetic sculptures and environments.

Despite their slightly differing approaches, these groups, along with other prominent, yet unaffiliated artists like Getulio Alviani and Marina Apollonio, sought to codify a thoroughly modern, technological, and perceptually participatory approach to art-making. Eco points out in his essay that this approach, with its mechanically mutating forms and changeable optical experiences, engaged the viewer in a type of "perceptual gymnastics" that asked them to internalize multiple viewpoints at the same time. Tellingly, Eco compares this experience to that of driving a car on the highway—as though programmed art was an attempt to embody a more modern form of perception, one that reflected the frantic, sometimes disorienting pace of life in the machine age.

In 1934, Marcel Duchamp announced the release of *The Green Box,* his collection of ninety-four reproduced notes concerning the conception of his masterwork *The Bride Stripped Bare By Her Bachelors, Even* (1915–23; also known as *The Large Glass*). According to Duchamp, who had positioned himself against what he dubbed "retinal art" or art with primarily visual significance, one needed to study his "Sears Roebuck-like catalog" of notes in order to truly understand this massively complex work containing arcane symbolism and fantastical mechanics. As such, *The Green Box* could be described as the finishing touch on *The Large Glass*—a conceptual blueprint that allowed the public to discern the outlines of the work's non-retinal qualities that had previously been mystifying.

Although it is unlikely that Duchamp actually intended *The Green Box* to act as a literal blueprint for *The Large Glass,* at least three replicas of the work were produced using his notes. The first was made by the Swedish critic, art historian, and former director of the Moderna Museet in Stockholm, **Ulf Linde,** with the help of artist **P.O. Ulvedt** for an exhibition at the museum in 1961 (he later revised the piece, with the assistance of artists Henrik Samuelsson and John Stenborg, in a second version in 1986 with added corrections). The second major reproduction of *The Large Glass* was undertaken by the artist Richard Hamilton for a show at the Tate in 1966. Although both were undertaken with an exhibition in mind, the replicas were both the result of an avid interest in Duchamp's project. In fact, it would seem as if both Hamilton and Linde were attempting to divine and internalize the nature of Duchamp's process by fashioning themselves into gears in the conceptual machine provided by *The Green Box.* In this regard, it seems that both were successful: upon traveling to the exhibitions, Duchamp added his signature to each replica, certifying that they were, in some way, as valid as the original.

The first exhibition of kinetic art, "Le Mouvement," was held in 1955 at Galerie Denise René in Paris, featuring works by Robert Breer, Alexander Calder, Marcel Duchamp, Jean Tinguely, Jesús Rafaël Soto, and Victor Vasarely, amongst others. Soon afterwards, kinetic art spread across the continent, becoming one of the cornerstones of the work produced by artists associated with a range of collectives. The movement also proved to be a cultural force in the US, through the work of pioneering figures like Calder and George Rickey, and important exhibitions at Howard Wise Gallery in New York ("Movement in Art" in 1961 and "On the Move" in 1964), the Walker Art Center in Minneapolis ("Light/Motion/Space" curated by Willoughby Sharp in 1967), and the Museum of Modern Art in New York (Jean Tinguely's self-destructing "Homage to New York" [1960]—in collaboration with Bell Labs engineer Billy Klüver and the artist Robert Rauschenberg—as well as William Seitz's 1965 blockbuster exhibition "The Responsive Eye").

One of the more surprising figures to make a contribution to America's history of kinetic art is **Hans Haacke**. Despite now being known almost exclusively for his confrontational political works, his early pieces were profoundly influenced by the artists associated with the group ZERO and his readings of the work of biologist and systems theorist Ludwig von Bertalanffy. These pieces, which he showed at numerous venues, including Howard Wise Gallery and the Massachusetts Institute of Technology (where he staged an important solo show in 1967), were designed as "systems" constructed with the "explicit intention of having their components physically communicate with each other, and the whole communicate physically with their [*sic*] environment." In other words, they behaved like feedback mechanisms that pointed not only to systems theory, but to the discipline's foundation in cybernetics. Like some of the works by artists in ZERO, they also related to the natural world through their use of elemental forces such as air (*Sphere in Oblique Air Jet* [1964–2011], *Blue Sail* [1964–65]), water vapor (*Condensation Cube* [1963]), and the integration of plant life (*Grass Grows* [1967–69]). However, during the political and social upheavals of 1968, Haacke began to question the validity of his previous practice, noting with frustration after the assassination of Martin Luther King, Jr.: "Art is utterly unsuited as a political tool. No cop will ever be kept from shooting a black by all the light-environments in the world…"

Born Jean André Levy, **Jean Ferry** took the name of his wife, Marcelle "Lila" Ferry, to conceal his Jewish roots during the Nazi occupation of France. Before this, Ferry had been loosely involved in the activities of the Surrealists, mostly as a writer, and had been an actor in Jacques Prévert's agit-prop theater collective, Groupe Octobre. After the war, Ferry made his living as a screenwriter, eventually acquiring approximately fifty film credits to his name. However, his most significant work was as a member of the Collège de Pataphysique (a group devoted to absurdist playwright Alfred Jarry's "science of imaginary solutions," whose members included Marcel Duchamp and Jean Dubuffet) and as a writer of literary criticism. Focusing on genre writers such as Sir Arthur Conan Doyle and Jules Verne, Ferry was also particularly interested in the unclassifiable writings of **Raymond Roussel**—whose eccentric, linguistically complex universe, populated by all manner of strange machinery, he both analyzed and illustrated with schematic diagrams.

A figure almost as impossible to categorize as his writing, Roussel spent his life in pursuit of fame, which eluded him until after his death. This was partly due to the nature of his prose, which was by turns descriptively detailed to the point of absurdity and engaged with hermetic, punning language games. However, both his coded language and the stunningly surreal mechanical inventions that he devised for his books *Impressions of Africa* (1910) and *Locus Solus* (1914) would prove to be extremely influential on later French literature, as well as the near-contemporaneous work of the Surrealists.

However, it wasn't Roussel's writing that initially drew the Surrealist's attention, but a single performance in 1912 of the lavish stage adaptation of his *Impressions of Africa*—which, like all of his endeavors, Roussel funded entirely with his own money—at the Théâtre Antoine in Paris and attended by Francis Picabia, Guillaume Apollinaire, and Marcel Duchamp. While the performance had a profound effect on all three artists, its most significant result, art historically, was the inspiration it provided for Marcel Duchamp's masterpiece *The Bride Stripped Bare By Her Bachelors, Even* (1915–23).

In 1793, soon after the beginning of the French Revolution, the tea broker turned self-appointed peacemaker **James Tilly Matthews** was jailed in Paris after his efforts to cool hostilities between the French and the British left him accused of espionage. After spending three years in French prison camps, he was pronounced a "dangerous lunatic" and released. Matthews returned to England and began a vicious letter-writing campaign accusing British officials of abandoning him in a hostile country. That year, he also accused the Prime Minister of being under a "spell" and acting as the "mere puppet" of a cabal of French spies, after which he was promptly locked away in the Bethlem Royal Hospital (Bedlam), where he remained for eighteen years.

During Matthews's time at the hospital, the institution's chief apothecary, John Haslam, took a keen interest in his case, conducting an exhaustive series of interviews that would result in a book, *Illustrations of Madness* (1810)—the longest psychiatric study of a single patient at the time. In the book, Haslam detailed Matthews's belief that he had come under the influence of a nefarious machine called the Air Loom, which controlled his thoughts and actions through the emission of magnetized fluids and rays that interfaced with a magnet implanted, against his will, in his head. This machine, Matthews claimed, was operated by a gang of spies and criminals lead by a man named "Bill the King," who were a part of a larger plot—stretching across Great Britain, France, and Prussia—to foment international warfare by controlling the minds of high-ranking government officials. In addition to the detailed descriptions that Matthews provided of his paranoiac cosmos, he also produced an ink drawing of the Air Loom and some of its operators. The precisely rendered details of the drawing appear, at first glance, to have the factual heft of an engineering schematic—an enduring testament to the frighteningly real quality of his madness.

Matthews's visions of mind-controlling machines have now become such an emblematic element of schizophrenia that they have taken on the status of a pop cultural cliché. However, his case was the first recorded account of what psychoanalyst Viktor Tausk would term an "influencing machine," in his 1919 essay "On the Origin of the 'Influencing Machine' in Schizophrenia."

In 1919, psychoanalyst Viktor Tausk published his essay "On the Origin of the 'Influencing Machine' in Schizophrenia" based on the case of one of his patients, a former philosophy student named Miss Natalija A. During the brief course of her treatment, Natalija recounted her manipulation by a doppelgänger-like machine that influenced her telepathically and was operated by a jealous former suitor. A student of Freud, Tausk predictably interpreted his patient's symptoms libidinally, suggesting, at least in part, that the fabrication of the imaginary influencing machine developed as a result of a sense of self-estrangement precipitated by a rejection of sexual desire. Interestingly, Tausk also noted that the character of influencing machines tended to be determined by the most advanced technologies of the time, although with the proviso that "all the discoveries of mankind…are regarded as inadequate to explain the marvelous powers of [the influencing machine]." This idea was subsequently fleshed out in a later essay responding to Tausk's study by Freud's colleague Hanns Sachs, who speculated that influencing machines were also a by-product of the alienating effects of the machine age, in which the operators of automated mechanical devices were left "only to play the role of the master-mind in control."

In the same year as the publication of Tausk's essay, the psychiatrist Hans Prinzhorn began a collection of art produced by mental patients—eventually becoming his Museum for Pathological Art. Among the works he gathered were drawings by **Jakob Mohr**, whose images of mysterious, camera-like boxes emanating manipulative electrical currents and hypnotic rays are quintessential illustrations of the influencing machine phenomena. But Mohr was not alone in this regard. The work of Swiss mental patient **Robert Gie,** from around the same period, also indicates the presence of influencing machines. One example, *Untitled (Distributeur d'effluves avec machine centrale et tableau métrique* [Distribution of gases with the central machine and metric table] (1916), seems to depict, as per Sachs's theory, an automated assembly-line configuration in which humans act as mere cogs. In a similar, if slightly less nefarious manner, **Johanna Natalie Wintsch**'s embroidery *Je suis radio* [I am radio] (1924) depicts what she described as the waves of energy that were broadcast from her body and connected her to the numinous energy of the universe. Later, in 1959, Dr. Bruno Bettelheim published a case study about a schizophrenic child he was working with, **Joey**, who believed himself to be a "mechanical boy." In his drawings, Joey portrays himself as a robot, made of electrical components and operated and controlled by machines.

Founded in Paris in 1960, the **Groupe de Recherche d'Art Visuel (GRAV)** was one of a number of optical and kinetic artist groups that surfaced in Europe after the Second World War (including ZERO in Germany, Gruppo N and Gruppo T in Italy, and the Nouvelle Tendance in Yugoslavia). Like these groups, the members of GRAV, including Julio Le Parc, François Morellet, Francisco Sobrino, Joel Stein, Horacio Garcia Rossi, and Yvaral (Jean-Pierre Vasarely), made work that utilized industrial materials, motion, and optical effects in ways that reflected the technological boom of the postwar era. However, in the series of manifestos that the group published between 1961 and 1966, the members of GRAV set themselves apart from their contemporaries by pointedly mounting an attack on what they saw to be an art system that was hopelessly elitist. To this end, they sought to "remove the word art from our vocabularies," abolish the notion of individual artistic genius, cease the creation of unique works, and break their dependence on the art market. Primarily, these goals were subsumed under the broader mandate that members of the group were to "consider the artistic phenomenon in terms of a strictly visual, non-emotional experience located in the plane of physiological perception"—a strategy that they believed would both eliminate any trace of Romanticism from their works and address the viewer in a direct and visceral fashion. A 1963 text, written as a part of their inclusion in the 3rd Paris Biennale, broadcast the stridency of their position, stating:

"Viewers who are aware of their ability to act, and who are tired of so much abuse and mystification can make their own real 'revolution in art.' They will obey the following regulations:
IT IS PROHIBITED NOT TO PARTICIPATE
IT IS PROHIBITED NOT TO TOUCH
IT IS PROHIBITED NOT TO BREAK"

This desire to directly involve the viewer also led the members of GRAV to expand their practices outside of traditional viewing contexts by staging happenings. The most notable instance of this was a day-long event that took place in multiple venues around Paris in the summer of 1966 where small gifts were distributed to morning subway riders and interactive kinetic environments were created on the street, as well as other interventions.

In 1965, mathematician **Georg Nees** mounted an exhibition of his computer-generated work at Stuttgart's Technischen Hochschule Studiengalerie in Germany. Invited there by philosopher Max Bense, it was the first exclusively computer-art-based exhibition in a series of similarly oriented shows that would mark the latter half of the 1960s. This trend for computer art found its philosophical anchor in the theory of information aesthetics, developed by Bense and the engineer and philosopher Abraham A. Moles. They posited that, contrary to the historically subjective forms of artistic evaluation, aesthetic merit could and should be evaluated according to objective systems based in science and mathematics. This theory was first published in an extended, 130-page article at the beginning of the first issue of Galerije Grada's journal *bit international,* a publication produced between 1968 and 1972 in Zagreb, in former Yugoslavia.

Although under-recognized until very recently, Zagreb had been a hotbed for the discussion and exhibition of art that aligned itself with the practice of quasi-objective forms of visual research since 1961. It was then that critic Matko Meštrović, painter Almir Mavignier, and museum director Božidar Bek founded the group **Nouvelle Tendance** (New Tendencies) and staged the first of five eponymously titled exhibitions, which featured the work of collectives like ZERO in Germany, Gruppo N and Gruppo T in Italy, and GRAV in France. However, the height of the Nouvelle Tendance's importance came in 1968–69 when, along with their publication, Galerije Grada organized the 1968 international symposium "Computers and Visual Research," which acted as preparation for the fourth Nouvelle Tendance exhibition in 1969. In both the symposium and the exhibition, the newly visible computer-based art of artists and groups like Nees, Marc Adrian, Petar Milojević, David R. Garrison, Alan Mark France, and the Computer Center Boris Kidrič Institute were discussed and exhibited together for the first time. Sylvia Roubaud, whose work also appears here, was shown in the following Nouvelle Tendance exhibition in 1973.

Paul Sharits was an experimental filmmaker whose work was associated with both Fluxus and structuralist film. An early protégé of the filmmaker Stan Brakhage, whose hand-painted films expressed an interest in film's materiality, Sharits created film works using a variety of methods that could be said to reflect the process of filmmaking itself. One of Sharits's most common filmic techniques was the creation of a stroboscopic effect—also known as a "flicker" effect, derived from Tony Conrad's pioneering structuralist film *The Flicker* (1965). Sharits achieved this by using a combination of rapid editing and the periodic punctuation of exposed frames with a sequence of opaque frames—an optical effect visually reminiscent of the action of the shutter of a motion picture camera.

However, Sharits's interest in structuralist film techniques and effects extended beyond self-referential formal exploration. He intended his films to exert a direct effect on the viewer's consciousness, inducing meditative or trance-like states through use of flashing light, color, and, occasionally, sound. In this way, his use of the flicker technique was perhaps most closely related to earlier investigations by Brion Gysin and Ian Sommerville into the altering effects of light on the brain through their *Dreamachine*—a device that produced a stroboscopic light effect causing trances and closed-eyed hallucinations. However, his *Epileptic Seizure Comparison* (1976)—which juxtaposes archival medical footage of an electrode-wired man in the midst of an epileptic fit with an aggressively flickering, multihued film—presents us with the flipside of his attempts at film-induced transcendence by attempting to mimic (or, perhaps, provoke) the erratic brainwave oscillations that attend an epileptic seizure.

Jeff Koons's work is known for its wry, affectionate engagement with popular cultural forms. Beginning with his exhibition series "Banality" in 1989, Koons began to employ the help of master craftsmen to fabricate what have become increasingly elaborate and luxurious objects resembling items normally considered the hallmarks of bad taste. Cutesy balloon animals, collectable decorative figurines, topiary sculpture, and inflatable pool toys, often rendered larger-than-life, are all crafted under Koons's supervision using the finest materials and the most labor-intensive processes, sometimes over a period of years. The resulting sculptures are sumptuous to the point of perfection but their aura of kitsch creates a pointed sense of aesthetic dissonance that is disconcerting yet possibly taste-changing. For all of their seeming irony, the sculptures exude an undeniable sense of Koons's love for his subjects.

Koons's first exhibition, "The New" (1980; staged in the street-level window of one of the New Museum's earliest locations), contained intimations of his later work approached by way of the Duchampian readymade. It consisted of a collection of showroom-fresh vacuum cleaners, entombed like the bodies of saints in Plexiglas reliquaries lit from below by florescent tubing. Closed off from the world and deprived of their utility, the viewer is left to contemplate the machines' latent anthropomorphic and sexual qualities—which Freud asserted are present in all of our mechanical creations and which Koons has referred to when speaking of his vacuums' "sexual androgyny." Read in terms of a different, though related, register of desire, these glowing, untouched appliances also stand as testaments to consumer culture's cultish and insatiable drive for the new, and as time capsules that display this drive's inevitable byproduct—obsolescence.

The underlying themes of Koons's work were anticipated by the Canadian philosopher Marshall McLuhan in his 1951 book, *The Mechanical Bride.* In a series of texts and appropriated advertising images, McLuhan revealed the link between sexuality and technology as it defined, and continues to define, Western consumer culture.