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First Published in 2019 by Flugschriften
Pittsburgh and New York
https://flugschriften.com/

Flugschriften rekindles the long tradition of 16th-century pamphlets – or ‘flying writings’ – giving heterodox, experimental, challenging writings a pair of wings with which to find like-minded readers. Flugschriften publishes short, sharp shocks to the system–whether this be the political system, literary system, academic system, or human nervous system.


Cover image: “Motions of a manager using a drill press. (First time he touched a drill press for 25 years)” from the Frank B. Gilbreth Motion Study Photographs Collection (1913-1917).
Layout and Visual Design: Felipe Mancheno
The proclaimed “birth of reason” has occurred many times. Among the most well-rehearsed is the tale of triumph whereby *logos* replaces *mythos*. It is said to have occurred when the withdrawal of the gods interrupts the mythological, clearing way for the birth of both politics and philosophy. The comparative mythologist Jean-Pierre Vernant believes that rational thought was handed “its identity papers” in the sixth century BCE in the Greek cities of Asia Minor (371). And, as the story goes, the great discovery of the Milesian school—whose distinguished faculty included Thales, Anaximander, and Anaximenes—was to ask the metaphysical question: what makes up the world? Their answer was the naturalist *physis* of *arche*-substances. But upon closer examination, it would seem that the real contribution of their cosmology is a sort of rationalism whereby human thought thinks itself, without valorizing the pantheon of a particular human past. As quickly as Vernant introduces this idea, however, he refutes it: the West has no monopoly on reason.
Its thought is not the only rational tradition, and the birth of Greek philosophy does not hail the dawn of the mind (372). So to say: the so-called Greek miracle does not mark the birth of the human mind, but instead represents “social and mental structures peculiar to the Greek city,” the traces of which still subsist in contemporary rationalism (130).

Just as the Ionian Greeks adopted a naturalistic philosophy, with mechanistic and instrumentalist interpretations of the cosmos, modern mechanized production embodies a mode of thought. The mechanization of the last two centuries is “the end product of a rationalistic view of the world,” according to art historian, turned historian of technology, Siegfried Giedion, in his now-classic 1948 book, Mechanization Takes Command (31). What is at stake in this narrative of historical continuity is not so much a calling into account of any particular rationalist—say, that of Descartes, Leibniz, or Spinoza. Rather, the intention is to follow the line of reason through various layers of society. In other words, it is preferable to remain critical of rationalism without recourse to Max Weber’s “rationalization thesis,” which is based on a criticism of calculation that relies on expertise, depersonalization, and control (29-35).

The itinerant path of mechanization is a long one.
Aristotle’s *Mechanica* undertakes a practical examination of the lever, the pulley, and the balance in relation to problems of bodies in motion. For thousands of years, the most sophisticated technology was built from the “simple machines” of the screw, the wedge, the wheel, the axle, the lever, and the pulley as powered by water, vacuum, or air pressure (as documented by Heron of Alexandria). Even when interest for technical manuals in Italy peaked in the late sixteenth century, technological obsessions remained tied to devotion, fascination, and whimsy; including automaton angels, clock-work Christs (“muttering, blinking, grimacing on the cross”), as well as a whole menagerie of mechanical fluttering animals, musical theaters, and companies of soldiers (Riskin, 18). In spite of the enduring attention paid to mechanization, it is not until the eighteenth century that attempts were made to mechanize production at any grand scale.

The first phase of mechanization is an exercise in gesture. It replaces the versatile motions of the human hand with a mechanical movement (Giedion, 46-47). The pushing, pulling, and pressing of the hand is substituted by endless rotation. The second phase introduces mechanical means for standardization and interchangeability (47-50). Full mechanization thus arrives when human movement is not just substituted but removed; creating full automation’s continuous production; where humans only look on as “watcher and tester” (77). As such, a new spatial-temporal form takes root, as the tempo of the machines creates an inhuman rhythm (77) - both space and time are dictated by the technical capacities of the machinery rather than its human operator - the first instance of this appears
IN OLIVER EVANS’S AUTOMATIC FLOUR MILL IN 1783 BUT IT TAKES WELL OVER A CENTURY TO REACH ITS APEX WITH MEAT PROCESSING AND THE AUTOMOBILE ASSEMBLY LINE - INTERVENING MOMENTS INCLUDE BISCUIT MANUFACTURING BY THE BRITISH NAVY IN 1833 SPINNING MACHINES AND THE EXPLOSION OF MECHANIZATION IN AMERICAN STARTING IN THE 1860S.

Line Production

There are two ways in which the rational line finds expression in mechanization to become “line production” (the first name for what would later come be called the assembly line).

First, the railroad reassembles itself, folding the skeletal structure of the rail line into an enclosed space, to become the factory. Train tracks are reconfigured into the elevated rail system of hooks on rollers, used first in meat-processing plants, and then introducing continuous movement into other areas of production. Over the course of his book, Giedion tracks how this form of continuous movement also extended to agriculture, food, and commodities, as well as furniture (the barber’s chair or sleeping car), and machines used in the home (the vacuum, dishwasher, garbage disposal, refrigeration, and the bath).

Second, scientific management elevates rational organization of the line to the general logic of full mechanization. Most accounts of scientific management focus on the practicality of Frederick Winslow Taylor, whose pragmatic focus on identifying “clearly defined laws, rules, and principles” of efficiency lead to a new understanding of time-space (7). Armed with a stopwatch, Taylor’s “minute study” of gestures, to constitute a new principle of efficiency, uses the micro in a way that mirrors
the recent Marginal Revolution in economics. (The same principle that would establish microeconomics as an independent realm of inquiry [79]). More broadly, Taylor conceives of the factory as a self-contained organism, which functions as a virtual diagram, one that could be applied to any variety of industries—steel mills, weaponry, concrete construction, ball-bearing production, and so on. As such, scientific management was the principal force in establishing the reign of clock-time.

Often overshadowed in these historical summaries is the work of Frank B. and Lilian Gilbreth, who were interested in a different form of efficiency: the economy of motion, rather than the economy of time. Critical here is their invention of a “motion recorder,” the Chronocyclegraph, which was designed to make visible the otherwise indiscernible gestures of experts as they perform their tasks. The Gilbreths’ interest in capturing bodies in motion extends the photographic line of sight established by Eadweard Muybridge, Ottomar Anschütz, Étienne-Jules Marey, and Georges Demenÿ (taken up later by the likes of Harold Edgerton, Man Ray, and Henri Cartier-Bresson). Unique to the Gilbreths is their use of photographic abstraction. By attaching an electric light to the appendage of someone performing a timed motion, they could then capture movement as photographic traces. Over the course of a long exposure, the moving body turns into nothing but a blur, while a fluid white line of motion remained in focus.
Frank B. Gilbreth Motion Study, from The Kheel Center for Labor-Management Documentation and Archives. (On the left) From image verso: “Left hand of drill press operator ‘Positioning after transportation’ (this study resulted in cutting the time in halves).” Chronophotograph of machinist with light showing hand movements. (On the right) From image verso: “Motions of a manager using a drill press. (First time he touched a drill press for 25 years).” Wire model representing movements traced by chronograph.
The point of this abstraction of movement was to establish a rational line that would set the pace of repetitive human interaction in complex mechanic processes, such as those employed to assemble an automobile. For the Gilbreths, the goal was to create a rational representation of movement that could be used to make workers “motion minded.” In the effort to make these representations durable, these functionalist diagrammers translated the movement captured in chronocyclographic images into three-dimensional wire models. Yet these studies were not limited to work. The Gilbreths also sought to capture the trajectories and traces of fencers, bricklayers, pitchers, surgeons, and oyster shuckers: all now comparable, thanks to this new technology, used to identify “points of similarity between their motions” (Gilbreth, 15).

The Gilbreths demonstrate that behind the discourse of “efficiency” lies a whole metaphysics of rationalism whereby the movements of human bodies constitute a system with rules and logic that operates independently from the subjective perspective of the people who are moving. It takes the autonomy of movement to be so absolute that the discourse of speaking subject is barred. Faces blur, along with the bodies themselves, so that the situation of speech is severely limited or banned altogether. All that is left is the movement of the line. But how are we to understand the social significance of this line?

What happens when one follows the rational line to the point where figures fade away, leaving behind traces of the real as movement?
AN EXERCISE IN GESTURE. IT REPLACES THE VERSATILE MOTIONS OF THE HUMAN HAND WITH A MECHANICAL MOVEMENT. FULL MECHANIZATION THUS ARRIVES WHEN HUMAN MOVEMENT IS NOT JUST SUBSTITUTED BUT REMOVED. THE FIRST PHASE OF MECHANIZATION IS AN EXERCISE IN GESTURE. IT REPLACES THE VERSATILE MOTIONS OF THE HUMAN HAND WITH A MECHANICAL MOVEMENT. FULL MECHANIZATION THUS ARRIVES WHEN HUMAN MOVEMENT IS NOT JUST SUBSTITUTED BUT REMOVED.

Frank B. Gilbreth Motion Study, from The Kheel Center for Labor-Management Documentation and Archives. (On the Background) From image verso: “Chronocyclograph of golf champion—Francis Ouimet.”
Another Line

Engineers might hope that the line functions as an index from which they can establish the laws, rules, and principles of proper motion. For them, the purpose of the line is to survey like a captain who scans the night sky, navigating by way of the stars. The Gilbreths’ impulse to construct wire models against a grid background is similar—such three-dimensional modelling affords the rational line a sense of objectivity. But it would be a mistake to imagine that at the end of every line looms a towering building or some other feat of engineering. The Gilbreths’ interest in motion also prefigures the movement captured in Bresson’s *Pickpocket*, which Gilles Deleuze describes as using the hand to make the sense of touch “an object of view in itself.” For both the Gilbreths and Bresson, touch “takes place of the face itself for the purpose of affects”—from the blurred face of the bricklayer to the close-up on the pickpocket’s handiwork—“[and] becomes the mode of construction of a space which is adequate to the decision of the spirit” (*Cinema* 2, 12): a result found in the Gilbreths’ sculptural reconstitution of movement in the space of a model and Bresson’s cinematic capture of the gesture on film, with the hand providing the consistency that holds it all together. In situations where the hand operates in two altogether different senses, it is through the rational line that movement itself becomes an aesthetic figure.

By the 1920s, the rational line leaped across the canvas of abstract art
Adapted from Etienne-Jules Marey, Motion Studies.
Already by 1912, Marcel Duchamp had incorporated the chronophotographic tradition of Marey and others into his “Nude Descending Stairs, No. 2.”

It combined both the photographic and diagrammatic forms in motion across a space outlined in chronographs, such as those of Muybridge and Marey. The integration of movement as an abstract line comes into fruition with the work of Wassily Kandinsky, Joan Miró, and Paul Klee. The emergence of these artists provides the most interesting moments in Giedion’s book, as he seamlessly transitions from detailed histories of technological transformation to brief discussions of aesthetic revolution. Klee sits figuratively beside Frank B. Gilbreth, whereby the former “admits
us into the workshop,” and the latter gives us a guided tour of the factory (Giedion, 109). Alongside a time-motion study of “Girl Folding a Handkerchief”—as part of a line-study of “The Spiral” (1925)—we read the following original text in his Pedagogical Sketchbooks: “Motion here is no longer finite; and the question of direction regains new importance.” Giedion fails, however, to include Klee’s startling conclusion: “This direction determines either a gradual liberation from the center through freer and freer motions, or an increasing dependence on an eventually destructive center. This is the question of life and death; and the decision rests with the small arrow” (Giedion, 111; Klee, 53). Perhaps these are the terms (freedom, destruction, life, death) for thinking what is at stake for the rational line, when it no longer serves the industrial project of the assembly line and spins off to produce something else.

From the Spiral to the Formation of the Black Arrow

For Klee, the line is not just a formal element. Look to the opening section of his Pedagogical Sketchbook, which begins with a single line, “an active line on a walk, moving freely, without goal.” Taking a “walk for a walk’s sake” (16). Editor and translator, Sibyl Moholy-Nagy, explains that the line-in-action is the horizontal beacon that guides Klee (34). She suggests supplementing Klee’s tracing of bone and muscle, the blood stream, waterwheels, watermills, railroad tracks, balances, bullets, and arrows with even more rhythmic experiments in “the vertical extension of bird flight, the horizontal motion of the tides, the circular
(On the top) Eadweard Muybridge, “The Horse in Motion,” 1878. Chronophotographic representation of a horse at a gallop, in part to determine if there was ever a moment when a horse would have all hooves off the ground.

(On the bottom) Étienne-Jules Marey, “Tracings and Notation of the Gallop in Three Times,” 1874. Diagram representing the movements captured by a chronophograph of a horse galloping.
rhythm of tree rings”—examples all familiar to the chronophotographic tradition (34).

**CONSIDER ANEW, THEN, GIEDION’S CONSPICUOUS OMISSION OF KLEE’S CONCLUDING REMARKS ON THE SPIRAL. WE MUST ASK OURSELVES: WHAT IS IT ABOUT SCIENTIFIC MANAGEMENT THAT MAKES IT ALLERGIC TO THINKING THE “FREEDOM AND DESTRUCTION OF THE SPIRAL?”**

French philosopher Gilles Deleuze and Félix Guattari might be a surprising source for thinking rationalism. To the rationalist’s horror, Deleuze rehabilitates both Spinoza and Leibniz by way of materialism. Yet perhaps there is common ground to be found in their philosophy of lines, and Klee’s approach to the line in particular. Consider how Deleuze and Guattari echo Klee when discussing “the refrain,” observing that “what is needed in order to ‘render visible’ or harness the Cosmos is a pure and simple line accompanied by the idea of an object, and nothing more: if you multiply the lines and take the whole object, you get
nothing but a scramble, and visual sound effects” (*A Thousand Plateaus*, 344). To this end, a surprising amount of their vocabulary from *A Thousand Plateaus* overlaps with writing in Klee’s notebooks, published as *Volume 1: The Thinking Eye* and *Volume 2: The Nature of Nature*—the concept, lines, points, planes, poles, the earth, rhythm, movement, stratification, territory, the cosmos, creation, the people, bodies, organs, the dividual, the egg, life.

The relationship between rationalism and the work of Deleuze and Guattari is also plagued by their reputation as irrationalists of a sort. And there are grounds for this interpretation. Deleuze once remarked in an interview that “all societies” are “perforce rational in their mechanisms, their cogs and wheels, their connecting systems, and even by the place they assign to the irrational,” leading him to summarize his remarks in an aphorism: “Reason is always a region cut out of the irrational” (“Capitalism: A Very Special Delirium,” 35-36). Yet this has been misunderstood as some sort of ballad to the incalculable or an embrace of the aberrant (for instance, Brian Massumi’s writing on the superiority of the analog and David Lapoujade’s project of delirious thought). In contrast, there is something about the line of movement that coincides with both the assembly line and the line of Paul Klee that tells us something about the often-elusive Deleuzian concept the line of flight. What if we were to take the line of flight to be a rational line? Moreover, what would it mean for reason itself to take *flight*?
The critical rationalism of Deleuze and Guattari would look unlike the traditional humanist critique of the assembly line. Perhaps Klee’s lines can reverse line production, playing the axiomatic logic of rationalism backwards. There is already a model for this, in the way that Deleuze and Guattari treat Spinoza as Spinoza treated Descartes—using an established method as a starting point only to subvert it. So, while Spinoza appears in parts of A Thousand Plateaus as if he was its patron saint (namely the plateau on becoming), he later gets subverted. This is made obvious in the structure of the two nomadology plateaus when they explicitly repeat the geometric format of Spinoza’s Ethics, which proceeds by way of axioms, propositions, definitions, demonstrations, corollaries, scholia, explanations, lemmata, postulates, prefaces, and appendices:

“AXIOM I. THE WAR MACHINE IS EXTERIOR TO THE STATE APPARATUS,”

“PROPOSITION VI. NOMAD EXISTENCE NECESSARILY IMPLIES THE NUMERICAL ELEMENTS OF A WAR MACHINE” (351; 387).
But there is a third term that Deleuze and Guattari introduce that is not found in Spinoza, *the problem*, as in:

“**Problem II. Is there a way to extricate thought from the state model?**” (374).

With close consideration, the fault line is clear: the axiomatics of rationalism defines capitalism (something already clear in *Anti-Oedipus*), whereas the anti-capitalist war machine proceeds by way of problematic lines (*A Thousand Plateaus*, 461). The image of thought associated with these two models is precisely where issues arise. The irrationalist imagines axiomatics through images of gravity, such as a spinning top, a pendulum, or a perfect circle. Yet the fluid motions depicted by the Gilbreths are not defined by simplicity but fluidity—movement stuck in a loop, continuous, repetitive. It is here that rationalism offers a way out, but only by reconsidering the rationalist sense of “a thought that thinks itself.” The problematic line of flight that challenges line production is not an irrational line. Nor is it a spiral looking to achieve escape velocity. Here, one is reminded of Fernand Deligny’s *lignes d’erre*, “wandering lines” that express the enormous strength of the drifting river, the currents of the ocean, or shifting guerilla encampments. This is how the different rational line in Klee’s black arrow forms: “when a given, or adequate, or actual white . . . receives intensified energies from additive, acting, or futural black” (*Pedagogical Sketchbook*, 57). Stripped of his productivist language, Klee provides an image of thought that results from casting a line to the outside. This outside is not a space to occupy but an event that forces thought into crisis. Or as Daniel W.
Smith says, thought as thinking difference; thinking “that which is absolutely different from thought but which none the less gives itself to thought.” Not a thought that thinks existence but its inverse: “existence forcing itself on thought, forcing itself to be thought, albeit in the form of an intelligible problem or Idea” (85). The abstract rationalism of the black arrow does little to build new temples of reason. Instead, it propels the movement of something else altogether: the idea of critique.

So much for the oft-touted end of critique and the much-celebrated new beginning of post-critical thought. And all for the better! As Deleuze and Guattari themselves warn readers in *What is Philosophy?*, the creative function of philosophy is ruined when it serves commercial professional training (14). The resulting perspective is easily identified, as it sits from a perch high enough for it to speak in the lofty terms of the “universal.” It boasts about the success of the rational line—celebrating the railroad’s opening of the American West, the overhead railways that mechanized slaughterhouses, the assembly line’s numerical triumph over space and time, and the more recent technologies of artificial intelligence and machine learning. In sum, the construction-based approach of post-critical rationality thinks in terms of engineering blueprints used to map the virtual dimensions of the rational in terms of capital projects to be built. Against this form of line production, the black arrow stands as a reminder about the importance of thinking. Their existence is revealed through a shift in perspective, namely, when the rational leads thought to problems rather than solutions. An arrow appears as each vector for disrupting the finely-tuned machinery of the capitalist axiomatic and its propositional logic. Accordingly,
even the engineer’s wrench can become a black arrow—a transformation begins when it is no longer used for making improvements, and is complete when thrown in the gears of the machine. The arrow arrives at its destination with a clamor, its blackness marking the arrival of thought from the outside: thought as problem, thought as sabotage.


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