ANIMATION AND INFORMATION

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Introduction

Each gesture of the hand, swipe of the thumb across a screen, and tap of fingers on a tablet or smartphone keypad is a technique of animation. Pointing and clicking are also animation. If animation today may be described as pervasive and ubiquitous, it is not only due to the proliferation of audiovisual objects spurred by digital technologies. It is true that animated objects are everywhere, propagating and multiplying across scales, ranging from feature-length, digitally animated films to tiny animated cursors, from the operative and instructional animations found online or on screens in buses and subway cars to the plethora of beguiling and perplexing GIF animations, ceaselessly looping like so many Maxwell's demons across platforms. But animation today has even broader vocations and larger ambitions than these recordings of movement. Animation comprises techniques of the body—ways of sitting, standing, reclining, walking, looking, and listening that gravitate toward and revolve around the tactile interface of the screen, tapping, swiping, scrolling, and clicking. Such techniques of the body are techniques of animation, and this animation is an act of processing. But processing what?

The easy answer is that these techniques of animation involve a processing of information. After all, what is all this pointing and clicking, tapping and swiping about, if not the processing of information? Here, the term "animation" adds an interesting wrinkle to the question of information, complicating such an easy answer, reminding us that information is not a simple matter. Information is often thought to be so many data, discrete stuff composed of bits or bytes that can be gathered in packets. Seen in this way, information seems to preexist its processing. As concern about big data attests, however, the act of processing itself turns out to be data. Corporeal techniques of animation are generating data with data. Information in this sense is not solid stuff; it is not merely packets of data or sets of facts. Information is in the "packeting" of data packets and "setting" of sets of facts. It is a process of pursuing some aim through acts of tapping, swiping, scrolling, and so forth. Considered in this manner, information, too, appears performative, profoundly generative. Information concerns form in the making. It is truly in-formative or in-formational, and its generativity or "formativity" connects it with the domain commonly attributed to animation—bringing things to life, breathing life into inanimate forms.

At the same time, considering information in terms of formative action encourages us to complicate the received, overly simplistic definitions of animation. Received definitions of animation are based on an experience of audiovisual recordings, in which a creator or a group of creators appears as the force behind the production of animated objects, akin to a demiurge imparting life to a lifeless set of materials, as if imposing form on them. The upshot of this way of talking about animation is a world of things whose life depends entirely on its masters, which in turn invites an attitude of mastery toward the thingified world. Here, the notion of in-formation, with its formative attitude and generative stance, encourages another take on animation and creativity, reminding us that there is no such thing as a lifeless form to begin with. Form cannot be mastered. Things cannot be put together any old way. Even the most godlike creators must respect the agential quality or "animacy" of things if they are to generate a world (I borrow the concept of animacy from Chen 2012). Techniques of animation, then, are not merely a matter of bringing life to inanimate forms or of imposing form on inanimate matter. Animation enjoins a "coming to life" that is deeper and truer than the act of bringing things to life.

Nonetheless, even though both animation and information are fundamentally generative processes, what makes their coupling in the world of contemporary media so powerful comes of their asymmetry. To couple animation and information is to connect heterogeneous orders or reality. While the coming to life of animation entails activation through bodily acts, information is closer to mental processes. Again, while we commonly think of information in terms of knowledge, that is, acquiring information or mastery of facts and data, such an understanding is deficient with respect to information as well as knowledge. Knowing arises across animation and information, across the processes of "acting" and "thinking." Thinking happens with electrified hands and quicksilver fingers. Swiping, tapping, clicking, and pointing afford so many shocks to thought. Knowing coalesces around the coupling of the two.

What interests me here is how acts of animation and processes of information have been coupled to construct a form of knowledge. The work of Michel Foucault is a source of inspiration, especially in its emphasis on the

power/knowledge relation. Although knowledge is essential to power, power cannot be reduced to knowledge, that is, to mastery over facts, to mere acquisition of data. Foucault thus invites us to think in terms of relations between regimes of power and formations of knowledge, how everyday practices and techniques of the body are entangled with regimes of power.

Yet my point of departure for specific inquiry into the coupling of animation and information is Vannevar Bush's 1945 essay, "As We May Think." The importance of Bush's essay here is twofold. On the one hand, Bush proposes a new device called the "memex" for searching, recording, analyzing, and communicating information. The memex is a concrete machine for coupling animation and information, a technological configuration in which bodily acts of processing give form to thought and vice versa.[1] On the other hand, the lasting influence of Bush's essay does not come of the memex alone, and the memex itself today appears awkward and outdated. Bush took the next step, formulating the abstract machine implicit within the memex—procedures of lateral connection. Ultimately, it was this abstract machine that was translated into contemporary media architectures. Reading Bush's memex together with Foucault's account of knowledge and power opens a path for inquiry into the forms of knowledge coalescing where animation meets information. To avoid reifying the concrete machine of the memex, I propose to begin with "larger" questions of knowledge before returning to "smaller" questions about the bodily practices and everyday techniques of self that yoke animation and information.

As We May Think

In 1945, Vannevar Bush boldly announced a new situation for knowledge that had emerged through "a war in which all have had part" (1979, 36). At the end of the Second World War and the start of the atomic age, Bush had served as the director of the Office of Scientific Research and Development for the United States, coordinating the war efforts of six thousand scientists. His 1945 essay has been widely heralded, especially by the pioneers of hypertext, as the beginning of computer-supported cooperative work of interface theory—condensed into his proposal for a device called the memex to help researchers search, record, analyze, and communicate information. The prophetic dimension of Bush's essay "As We May Think" appeared especially evident in 1995, fifty years after World War II, when the tools of access called for in Bush's essay seemed to have arrived with the advent of the internet and World Wide Web. Indeed, the inventor of the World Wide Web (WWW), Tim Berners-Lee, characterized his vision of a sea of interactive, shared knowledge as one in which computers are memexes whose knowledge base exists in cyberspace rather than microfilm (Simpson et al. 1996, 60).

Although Bush's design for the memex is still hailed for its contribution to the transformation of the ways we access and process knowledge, the memex as such was not the basis for contemporary computers. It was not the concrete design of the memex that was translated into contemporary platforms. Indeed, Berners-Lee's evocation of Bush's *vision* of interactive knowledge serves as a reminder that Bush's legacy derives not so much from the concrete architecture of the memex as from his abstract architecture for knowledge. Bush would characterize this abstract architecture in terms of making lateral connections, which I will discuss in detail below. But to situate this new form of "lateral knowledge," it is crucial to note at the outset how Bush himself highlighted questions about power and knowledge, situating this transformation of knowledge within the history of scientific specialization.

Above all, his essay declares, the war effort spurred the breakdown of disciplinary enclosures, as scientists were enjoined to suspend their professional competitiveness, to enter into effective partnership, to embrace a common cause. In effect, the state of emergency called World War II spurred Bush to challenge the impasses of both the transcendent stance implied in classical forms of knowledge (Cartesianism) and the disciplinary enclosures required by modern forms of knowledge—precisely the terrain Michel Foucault so carefully excavated throughout his career.

Recall how, in *The Order of Things*, across hundreds of pages, Foucault meticulously tracks "classical" forms of knowledges—of life, of language, of labor. Classical knowledge in Foucault's account is a matter of formulating a universal grid of knowledge, exemplified in the table. It insists on a transcendent position over and above the table, which is associated, not incidentally, with the West. At the same time, inspired by the history of sciences, Foucault discovers a shift in paradigm between classical forms of knowledge of the eighteenth century and modern knowledge, especially the "human sciences," which emerged across the nineteenth century to dominate the twentieth. The modern formations styled as human sciences or humanities emerge through a crisis in this universal grid of Western knowledge:

the table, ceasing to be the ground of all possible orders, the matrix of all relations, the form in accordance with which all beings are distributed in their singular individuality, forms no more than a thin surface film for knowledge [. . .] The visible order, with its permanent grid of distinctions, is now only a superficial glitter above an abyss. (Foucault 1989, 273)

Thus, as its transcendent, godlike viewpoint topples, the space of Western knowledge dissolves. A dark abyss opens beneath the once universal order. Modern knowledge, then, must grapple with the abyss, with the impossibility of universal knowledge, but how?

Foucault's account evokes one of the cherished questions of modern philosophy, associated with the death of God and the rise of "Man": How to ground knowledge when there is no longer any recourse to a transcendent point of view? In the history of philosophy, it is the *transcendental* that promises to resolve the crisis, particularly in its Kantian variety. But Foucault does not accept this philosophical solution as such. Indeed, Han-Pile argues that "Foucault's work can be profitably seen as a reinterpretation of Kant's critical project," which "denied the foundationalist ambitions of the Kantian solution" (2016, 87). She writes, "Foucault's archaeological works are best understood as appropriating and rephrasing the Kantian 'how possible' question so as to introduce the notion of 'historical a priori' (itself reinterpreted from Husserl) as a revised answer to this question" (86). Simply put, Foucault radically historicizes the "how possible." He tracks broader transformations in knowledge formations to show how modern disciplines resituate the abyss within the human being, which Foucault glosses as "man," surely aware of the gendered dimension of the received terminology:

This obscure space so readily interpreted as an abyssal region in man's nature, or as a uniquely impregnable fortress in his history, is linked to him in an entirely different way; it is both exterior to him and indispensable to him: in one sense, the shadow cast by man as he emerged in the field of knowledge; in another, the blind stain by which it is possible to know him. (Foucault 1989, 356)

In Foucault's account, then, the transcendental solution associated with the Kantian revolution in philosophy is, in fact, part of a larger situation of modern knowledge that will ground its claims through techniques of disciplinization of human beings. The result is the emergence of modern disciplines, such as political economy, linguistics, and biology, each of which will position the human as the subject and object of knowledge, using the abyss-in-human-nature as a gravitational center around which scholarly inquiry will orbit, falling toward and fleeing from its irresistible pull.

Vannevar Bush, needless to say, does not show much interest in philosophical or historical questions. Yet his line of inquiry is legible alongside Foucault's as a two-pronged attack, both on classical formations and modern formations of knowledge. On the one hand, as accounts of Bush typically stress, he is concerned about information overload, that there is too much knowledge for anyone to master. Bush's references to information overload are one way of indicating, in an entirely unambiguous manner, that the transcendent position of classical or universal knowledge, with its pretense at omniscience and mastery, is no longer possible. On the other hand, for Bush as for Foucault, an abyss opens in modern knowledge. Bush calls it "specialization" instead of "disciplinization." Information overload means that knowledge is divided into specializations, and thus an abyss opens between disciplines. To advance its knowledge, each discipline remains in its own orbit, in its familiar domain.

Bush's concerns recall Foucault's later arguments about how disciplinary knowledge results in the social production of enclosures, that is, disciplinary society. Gilles Deleuze provides a succinct summary of Foucault's argument:

Foucault located the disciplinary societies in the eighteenth and nineteenth centuries; they reach their height at the outset of the twentieth. They initiate the organization of vast spaces of enclosure. The individual never ceases passing from one closed environment to another, each having its own laws: first the family; then the school ("you are no longer in your family"); then the barracks ("you are no longer at school"); then the factory; from time to time the hospital; possibly the prison, the preeminent instance of the enclosed environment. (1997, 177)

Each closed environment has its disciplinary knowledge, its practices and techniques.

The mid-century war machine scrambled all that, as Bush remarks at the outset. Suddenly, scientists were not confined to enclosed specializations within schools, university labs, and industrial labs. Those sites became linked to militarized factories, intelligence gathering, military headquarters, preemptive strikes, and emergency planning. The school, the barrack, the factory, and possibly the prison—these previously enclosed environments were now in something like a network situation.

The postwar dilemma, then, as Bush duly notes, is that of sustaining this network effect while also allowing for specializations: "[. . .] specialization becomes increasingly necessary for progress, and the effort to bridge between disciplines is correspondingly superficial" (1945, 36). In this respect, Bush is again more like the later Foucault, who grapples with complex relations obtaining between paradigms instead of resting content with delineating their differences, as in *The Order of Things*. In his lectures, Foucault would meticulously differentiate juridical, disciplinary, and security mechanisms of power in order to examine their interactions (Foucault 2007, 5–9). Even as Bush signals the profound difference between disciplinary knowledge (specialization) and the networked knowledge that is needed (and already emerging) at his specific historical juncture, he understands that the new form of knowledge will not replace the prior forms in a wholesale manner. The relation between forms of knowledge is of the upmost importance. Indeed, read alongside Foucault, Bush's essay may be said to announce a radical resituating of the modern abyss of knowledge.

Trained as a humanist and writing at a time when disciplinary enclosures had come to dominate the humanities, Foucault was attentive to how the modern opening of an abyss under universal knowledge had produced disciplines whose production of truth circles around an object (the human) that was at the same time the subject of knowledge. Foucault refers to this situation in terms of an "empirico-transcendental doublet" (1989, 347). To avoid slipping into the abyss, each discipline was forced to discipline its human object-subject of inquiry. Each discipline at once internalized and "transcendentalized" the abyss to arrive at its particular abyssal truth.

Looking at the problem of knowledge in the mid-twentieth century, at a time when disciplinary enclosures in the sciences had reached an impasse, Bush could see how the abyss "within" each specialization had mutated into an abyss between disciplines, fields, and specializations. Disciplinization and specialization were losing their purchase. It is at this juncture that Bush proposes something radically different from classical knowledge and modern knowledge. He "describes, among other things, a device, or rather system of devices, that could be used to help researchers search, record, analyze, and communicate information" (49). This system of devices, the memex, was designed to change the nature of intellectual work by providing the architecture for an alternative paradigm of knowledge, to be based on what Bush would dub "lateral connections."

Lateral Connections

What Bush calls lateral connections are fundamentally different from the "horizontal deployments" that for Foucault characterize the classical knowledge of the eighteenth century. The table and the grid are paradigmatic examples of horizontal deployments. Lateral connections are also fundamentally different from the "obscure verticality" that for Foucault characterizes the modern disciplinary knowledge of the nineteenth and early twentieth centuries (1989, 273–274). Obscure verticality arises when knowledge has to constitute itself in depth around an aspect of human activity that retreats and returns—the empirico-transcendental doublet. Human psychology, history, and language are prime examples. For instance, humans at once make history and are made by it; language speaks humans as much as they speak it. Lateral connections, then, must be distinguished from both horizontal deployments and vertical depths. They do not require a universal position from which all things would be visible and knowable, horizontally arrayed on a table or grid. In fact, they acknowledge the impossibility of such a stance. Nor do lateral connections need to constitute themselves in depth, vertically, describing circles endlessly around the obscure, doublet-like something that structures their inquiry. On the contrary, everything is to advance through lateral connections, crossings.

Horizontal deployments do not disappear, even though, as Bush remarks, information overload has made them entirely inadequate to the task of knowledge. The formats of the table and grid, for instance, remain salient in the presentation of databases on the World Wide Web. Nor do vertical depths vanish entirely. Obscure verticality persists today in a variety of guises. On the internet, depth manifests a strange indifference to scale, arrayed across protocols and algorithms, darknets and overlay networks, across formations of surveillance and anonymity. In its indifference to scale, depth comes to feel superficial, incapable of structuring an absent cause, much less a vanishing point. This is where lateral connections come to the fore. Coursing between or across these horizontal deployments and vertical depths—and effectively cutting up and layering the horizontal while forcing the vertical continually to the surface— are lateral connections.

Benjamin Bratton captures something of this situation when he addresses how platforms "compose economies and societies in their own image" (2016, 19) and introduces the order of the Stack to describe platform sovereignty. In his account, it is as if lateral connections resulted in an escalation of sovereign power, that is, legal or juridical mechanisms. Techniques and practices of lateral connection do not, of course, banish horizontal deployments and vertical depths. They repurpose them. They allow for horizontal deployments without a fixed perspective and for

vertical depths exploded across scales, which effect might well be described in terms of stacks or stacking. Yet another question arises, a question about knowledge that cannot be explained by reference to the sovereign power alone. The forms of knowledge characterized as classical (transcendent universal) and modern (empirico-transcendental) are sustained yet radically transformed through their subordination to lateral connections. But what kind of knowledge emerges through lateral connections?

Such a question necessarily summons a two-sided approach. On the one hand, knowledge may be approached more from the conceptual or discursive side, or more precisely, in terms of the problematic arising from and governing its internal and external limits. On the other hand, as highlighted at the outset, knowledge may be approached in terms of techniques or practices. Foucault, for his part, proposed looking at knowledge in terms of an assemblage of statements and visibilities, that is, in terms of discursive regularities and architectural dispositions. An act of confession, for instance, cannot be attributed entirely to discursive regularities. It also entails an architectural disposition, the confessional. While Foucault's account of the panopticon is widely discussed, it is less often remarked how he understands confession in relation to a concrete kind of furniture, the confessional, which arrays visibility and obscurity in a specific manner to produce self-knowledge.

The furniture in Bush's account of knowledge based on lateral connections is, of course, the memex. What does this set of devices called the memex do, concretely? In effect, it couples processes of information with techniques of animation. It couples a manner of thinking with a way of doing. On the one hand, it enables a certain manner of thinking that Bush characterizes as associative. Although the memex stores information in the form of discrete packets of data or sets of facts, the knowledge potential of the memex lies not in data storage but in associative thinking. Associations are not in facts or data, packets or sets. Associations do not preexist their enactment. They presume dissociation as their "ground." Such thinking is a process of taking-on-form, and data follow from a process of in-forming. On the other hand, there are the affordances of the device or devices that comprise a diverse set of activities, such as tapping, scrolling, and scanning, not to mention sitting, looking, leaning, and reading—techniques of animation through which something comes to life. The memex is a concrete machine that yokes doing and thinking.

By now, however, it should be evident that the importance of this ingenious and somewhat ungainly device lies not primarily in its engineering. Its contributions come of its abstract machine—a way of knowing characterized in terms of lateral connections. It is impossible to say which comes first, the concrete machine or abstract machine. Bush discovered the abstract machine of lateral connections while he concretely elaborated his design for the memex. Simondon described this paradoxical process in terms of concretization or concrescence: as the device is more and more concretely realized, it takes on greater abstractness, allowing a greater margin for indetermination (2017, 50). Similarly, as Bush works out his design for the memex, he begins to speak of it conceptually, describing its abstract machine. Knowledge, then, is not in the device. A form of knowledge coalesces around the machinic oscillation between concreteness and abstractness, which arises as a manner of coupled processes of thinking and techniques of doing.

Bush characterizes this knowledge in two registers, echoes of the underlying disjunction between doing and thinking. Conceptually, it is a matter of lateral connections. Performatively, it is a matter of pathmaking.

Bush provides this example of pathmaking:

> The owner of the memex, let us say, is interested in the origin and properties of the bow and arrow. [. . .] Thus he goes, building a trail of many items. Occasionally he inserts a comment of his own, either linking it into the main trail or joining it by a side trail to a particular item. [. . .] thus he builds a trail of his interest through the maze of materials available to him. (42–43)

The memex and its descendant, the hyperlink, may thus be characterized performatively in terms of pathmaking, in which the process of making lateral connections takes ontological priority over scientific principles (reasoning) and technologies (toolmaking). Reason and tools remain important, yet their importance is in relation to pathmaking, whose lateral connections have the potential to put heterogeneous orders of complexity into relation.

An Ecology of Pathfinding

But how does the performative implementation of lateral connections transform horizontal deployments and vertical depths, and thus the form of knowledge?

With the rousing conclusion to his brief essay, which speaks of the elevation of man through an overcoming of the limitations of his memory, it seems as if Bush has fallen into the cliché of a transcendent position despite his forays

into laterality, as if the memex were a Cartesian device. He quickly adds, however, "His excursions may be more enjoyable if he can reacquire the privilege of forgetting the manifold things he does not need to have immediately at hand, with the assurance that he can find them again if they prove important"(44). Suddenly, universal knowledge falls away, dropping blissfully into obscure depths. His comments betray something of the confusion that arises when Bush sustains classical and modern formations even as he subordinates both to lateral connections. He gestures toward a perspective on horizontal deployments that emerges through enjoyment, and then enjoyment blacks out, swooning unconsciously across scales. Horizons turn into excursions, and depths turn into gradations implying complex encounters.

Similarly, Bush evokes the human construction of a "well-supplied house" only to discover that the model of the house, which implies closed environments and by extension disciplinary knowledge, will not do. Nor will the model of modern warfare, which is horizontal deployment pushed to its logical conclusion to reveal its conditions of impossibility. In what might seem an odd twist, the essay ends with images of encompassing and growing and then of life. Yet this ending is not so strange in light of his transformation of horizons into excursions and depths into encounters. Bush is implicitly turning toward an ecological model of knowledge. Information does not preexist the human encounter with it as so many data that can be arrayed in tables and grids. Nor is there a preexisting unity, even in the form of a horizon. Instead, excursions and encounters entail a process of generation, through which the whole emerges. The whole grows out of the act of making lateral connections. Still, we should not conclude that acts of processing are sui generis, making something out of nothing. The "nothing" out of which something emerges implies a nondimensional and hence nonlocalizable kernel—akin to what Raymond Ruyer calls a "thematic" (1946, 16), or what Deleuze calls a "problematic," "the ensemble of the problem and its conditions" (1994, 177).

Bush's evocation of an ecological understanding of knowledge, resonant with the biological or life sciences, would reverberate through later accounts of the World Wide Web and the internet that drew inspiration from "As We May Think." The biological metaphors were gradually amplified. A record of a symposium held fifty years later to commemorate Bush's essay, for instance, gathering such luminaries as Douglas Engelbart and Tim Berners-Lee, notes how biological metaphors dominated the days of discussion (Simpson et al. 1996, 54).

These later echoes of an implicit ecological understanding are all the more interesting because Bush's essay sidelines biology from the outset. At the start of his essay, he remarks that "for the biologists, and particularly the medical scientists, [. . .] their war work has hardly required them to leave the old paths. Many have been able to carry on their wartime research in their familiar peacetime laboratories" (36). In his opinion, what we today think of as life sciences remained within their closed and domesticated environments. In contrast, the physicists, and Bush is surely thinking of nuclear physicists, were forced out of their domestic enclosures. Needless to say, his gesture is a wager or gambit: something is at stake or at risk. With the end of World War II came the threat of full-scale nuclear war and the possibility of extinction of the human species (Bush uses the term "race experience" to refer to the human race or humanity). While in 1945 the possibility of human extinction was broached primarily in terms of direct causalities due to the use of nuclear weapons, it was already clear that the same weapons ran the risk of destroying the planetary biosphere that allows human beings to flourish. In other words, when Bush brackets the life sciences and focuses on physics, it is for pragmatic reasons that are not intended to introduce a divide between biological and physical sciences. On the contrary, Bush's passage through physics instead of biology to develop an ecological model of knowledge allows for a different spin on ecology, and by extension, the life sciences.

Bush's way of imagining the ecology of lateral connections eschews biological paradigms centered on organisms in favor of thinking through pathways, tracks, trails. As such, he avoids the pitfall of imagining ecology in a simplistic manner, as a surrounding environment, a preexisting lifeworld. An ecology is not reducible to resources or conditions afforded by the environment or to the actions of organisms on a preexisting environment. Organisms and environments emerge together to form biomes or ecologies due to a flux or cascade of energy that brings into relation diverse components across heterogeneous orders of complexity—a sort of equilibrium away from equilibrium, with dephasings of a metastable state. Because Bush's model of the path is closer to physical ecology or ecophysics, he does not introduce a divide between humans and nonhuman actors or actants. Put another way, Bush's conceptual vision of lateral connections allows for a performative way of knowing—pathmaking. Pathmaking, in effect, echoes the bodily techniques of animation. As techniques of animation are coordinated or coupled with associative thinking to produce a form of knowing, they are at the same time subordinated to that form of knowing. Echoing techniques of animation, pathmaking is not about bringing something inanimate to life; it is about putting things in relation, among them beings with the potential to act, as actors or actants.

Reading Bush's essay in this manner brings forth a nonbiological image of ecological relations, or more precisely, a nonbiocentric image, which some may find objectionable or simply foolish. Of what use is ecological thinking, if energy transfers are not organized around or predicated upon nonhuman organisms? Bush's stance may at the same time appear resolutely anthropocentric in its emphasis on knowledge produced by and for human beings for the sake

of human progress, regardless of the environmental consequences. While it is true that Bush is not an environmentalist in any usual sense of the term, he is not for all that anthropocentric. The anthropocentrism implicit in both classical and modern modes of knowing—that of the godlike universal master or of the perverse, alienated, self-governing subject—no longer enjoys the same priority or efficacy. The pathfinder prevails. When later commentators construe Bush in more biological and environmental terms, they play up the oceanic, with figures like the sea of information, figures that are more in keeping with a vision of cybernetics, that is, steering, governing, guiding. A pathfinder, however, is not exactly a steersman or pilot, even if others follow.

By the same token, a pathfinder is not a toolmaker. Indeed, the memex is not exactly a tool. It is a set of devices. Even Bush's invention or innovation is an assemblage of tools instead of a Promethean creation. Where toolmaking often implies a problem with a solution as well as a principle of efficient reason, Bush underscores associations and associative thinking, evoking a principle of sufficient reason. The pathfinder who thinks through associations and makes lateral connections is content to satisfy certain criteria instead of striving to optimize. The result is an abstract machine. This abstract machine is surely why the memex lent itself so readily to translation of all kinds. Another example relevant to toolmaking occurs near the end of the essay, when Bush asks, "Must we always transform to mechanical movements in order to proceed from one electrical phenomenon to another?" (43). At stake is the process of transforming electromagnetic vibrations in our environment into mechanical vibrations within media devices for recording and transmitting, whose mechanical vibrations are then transformed back into electrical form for the brain via the senses. His remarks are frequently construed prophetically, as if Bush had foreseen the need for electrical implants to replace mechanical interfaces with computers—the ability to act on the media environment directly with our minds. But this is the toolmaker's reading—a technological problem with a technological solution. The pathmaker or pathfinder will attend to the associations. What is at stake for Bush in this passage is not the efficiency or optimization of energy transfers but rather what kinds of associations generated through energy transfers may be satisfactory.

Something of Bush's tendency toward pathfinding registers in the symposium held fifty years after "As We May Think." It registers, however, more as an impasse than an opening. Even as they acknowledge the inspiration they have drawn from Bush, Douglas Engelbart and his colleagues, for example, complain that Bush had placed too great an emphasis on the individual. What is needed, in their opinion, are groups, collaborations. If Bush speaks largely in terms of individuals making paths, however, it is not because he endorses individualism. Indeed, his essay avoids procedures of methodological individualism in which the integrity of the individual is both the origin and the goal. Paths are collective in their very nature. When you are hiking alone in the wilderness, if you are on a path, you are connected to other people. It is in this sense that there is no such thing as wilderness, or frontiers for that matter, in Bush's account. If you find a path, you are making a collective. You are a collective in the making. The pathfinder is neither a rugged individualist nor a member of an established group. Pathfinding is collectivity in the making.

Self-Animation

Read alongside Foucault's discussions of power/knowledge, Bush's account has the potential to shift our understanding of the pervasiveness and ubiquity of animation in the internet era, for it allows us to approach the "new situation for knowledge" by way of bodily techniques of animation descended from the memex—acts of swiping, scrolling, tapping, clicking, and so forth. The memex is a concrete machine that couples a way of doing with a manner of thinking—specifically, bodily techniques of animation are coupled with associative thinking (in-formation). The result is a form of knowing that at once coordinates and subordinates body techniques and a manner of thinking. The new form of knowing thus retains and echoes these components. Conceptually, it echoes associative thinking in the form of lateral connections. Performatively, it retains the bodily techniques of animation in the form of pathmaking or pathfinding. Thus, the concrete machine (memex) generates an abstract machine, in this case, a knowledge formation based on the coupling of pathmaking and lateral connections. Instead of a conclusion, I would like to offer a sketch of something that runs across these registers, going from bodily techniques of animation to performative tactics of pathfinding, which opens this form of knowing into truth-effects and thus power. I will call that something "self-animation."

Reading Bush with Foucault makes it possible to consider the memex in a manner analogous to Foucault's account of the furniture of confession, the confessional. The confessional, through its play of invisibility and obscurity, provides the furniture for a mode of knowing that arises between priest or pastor and one of his flock, situating them in a power relation that affects authority and obedience. The confessional enjoins you to invent a deep, dark truth to speak and to structure your self-knowledge around it. As Rey Chow so beautifully demonstrates, this truth emerges in

the gap between those who govern and those who are governed, because those who govern cannot know (2020, 64–65). In the case of the confessional, it is because the priest cannot know what is in the confessant's heart that the confessant is compelled to speak, and indeed, is enjoined to go on speaking, even if it means digging so deep to find sins as to invent them.

The furniture of the memex, its abstract machine, charges you with a different task, that of finding a way, a way that also becomes your way. If this abstract machine is heir to the confessional, its inheritance lies in the moment of "discovery" when self-truth is invented. You are not just finding *a* way; you are finding *your* way. Yet this way that is yours does not well up within you. While you have a feeling of looking for something that is out there, it does not exist ready-made. Bodily techniques of animation—swiping, scrolling, or tapping, for example—do not merely bring preexisting facts or data to life, which become your facts. Your "inner" truth arises when and where the "outer" path is found. The popularity of online worlds and quests echoes and amplifies this process. But with the abstract machine of pathfinding, self-truth so clearly comes from without that it is impossible for you to lay claim to a deep, dark, inner truth. This is how online knowledge so readily takes hold of you, even to the point of obsessive pursuit. There is a process of self-animation, through which "your path" is being brought to life for you even as you make your way. So it is that you come to life online, self-animating.

But who or what is the sovereign that cannot know when it comes to the memex and its posterity, the Web and internet? As mentioned previously, Bratton ascribes sovereignty to the Stack. Others ascribe sovereign power to protocols or to algorithms. But the Foucauldian question—of the sovereign that "cannot know"—is rarely addressed in media studies. Is it because algorithms cannot know what we are seeking or what path we will take that we feel compelled to continue our pathfinding? What enjoins us to make our way? How does a way of knowing become entangled with regimes of power?

Two responses prove equally important here. The first comes from Baudrillard (1994), who noted how the power of the sovereign consumer lay in not deciding, in letting someone else decide for them. It is thus the consumer who does not know (or pretends not to know) and places the burden of speaking the truth and shaping identity on media systems. Of the internet we ask, as we once did of television: tell me what I like; tell what I am like. Baudrillard's sovereign "not knowing" is the flipside of accounts of media ascribing sovereign power to networks or stacks, to protocols or algorithms, which would take on the role of the "supposed subject of knowledge," to evoke Lacan's account of transference (1977, 232). The internet, then, is a ubiquitous and pervasive transference machine for telling us not only what we like but also what we are like. In the era of the prosumer, in which the productivity of consumption is always on display, a twist is added: show me how to make (and remake) myself.

The second response comes from Adam Nocek's (2021) account of governance by design, which runs counter to Bratton's account of the Stack, taking a trajectory complementary to theories of algorithmic governmentality (Rouvroy and Berns 2013). Rouvroy and Berns signal a shift in statistical knowledge, arguing that "algorithmic governmentality departs from the conventional origin of statistical information" (165). Because statistical information expressly introduced debate into the process of decision-making, it tentatively allowed for a terrain of struggle related to the average or the norm. But the "new opportunities for statistical aggregation, analysis and correlation afforded by big data are taking us away from traditional statistical perspectives focused on the average man" (165). They lead to "a certain type of (a)normative or (a)political rationality" that serves "to model, anticipate and pre-emptively affect possible behaviors" (173). Two features especially trouble Rouvroy and Berns: (1) becoming one's own profile, automatically attributed and evolving in real time, and (2) statistical practice developing *as though* our consent were given (173). Both features conspire to assure that we do not know ourselves.

It should also be noted that algorithmic practices cannot know us. Even if they do not ask for our consent, they cannot know if we do consent. It is in this gap that power/knowledge operates and a potential terrain of struggle opens. This is precisely the terrain Adam Nocek seeks in his account of molecular animation.

Nocek discovers a *dispositif* or apparatus that fuses popular media consumption with scientific modes of knowledge production (2021, 276). As scientists strive to make microscopic dimensions or molecular domains visible, they draw on conventions of popular media forms of animation. The result is an infusion of scientific certainty into forms of "relative movement." What was invisible (the relational), once visualized, seems calculable. Interestingly enough, however, Nocek does not situate this relational calculation within networks, protocols, algorithms, or statistics, for that matter. He situates it within design, arguing that design has become a site of governmentality for structuring of possible actions of self and others. Governmentality has become a "designing agent or force" (314), which radically alters "our basic assumptions about what design is, who the designer is, and for whom design is intended" (312). Put another way, even though design is calculated to structure our interactions, it does not know them, because it cannot know the relation of self to self. It only acts on interactions between self and others. This is how design becomes a terrain of struggle. The same is true of big data: even though statistics invite us to become our profile, it does not have our consent, precisely because it cannot know the relation of self to self.

In sum, if we adopt a Foucauldian perspective on the relation between techniques of knowing in the age of the internet (lateral connections) and power (modes of governmentality), we find that knowledge and power are today connected across the interval where media, by design, do not have our consent because they cannot know our self-relation. Although, as Rouvroy and Berns insist, algorithmic governance today may entail adhesion to "a normativity as immanent as life itself" (2013, 173), it cannot know life itself. This capture of life itself is how practices of self-relation associated with lateral connections and associative thinking turn into self-animation, where self comes to life online.

Self-animation encourages a combination of self-fashioning and self-erasure—which incites camouflage in the place of governance. With a nod to Judith Butler (1997), self-fashioning might initially be glossed in terms of "excitable bodies." But the excitable body is combined with an erasable body. The result is an emphasis on reset, on multiple worldlines and multiple futures. A dance of many veils arises in the interval where big data cannot know our relations any more than we can. Self-animation happens where we feel big data poised to capture what we make of ourselves, preemptively, before we even know ourselves, hence our preemptive self-erasure through technics of camouflage.

Self-animation, then, is not first and foremost about self-discovery, self-reliance, or self-governance. It is about self-reset. It deploys masks, beards, makeup, Loomies, cloaks, piercings, snapcams, tattoos, and other forms of lure and bedazzlement calculated to address whoever or whatever is paying attention without our consent but without knowing us. Self-animation is more geared toward evasion than toward behaving properly for an invisible yet almighty watchful eye. Pouring out your life story has more in common with a sea cucumber vomiting its stomach to elude capture than it does with confessing.

If we return to Bush's essay with such tactics in mind, his manner of coordinating horizontal deployments and vertical depths under the aegis of lateral connections takes on new meaning. Regimes of (self-) animation do not constitute a radical break with classical and modern modes of knowledge. The prior modes might be said to be transplanted; they are subordinated to the new mode even as they are coordinated with it. Despite his engagement with a new situation for knowledge, Bush is not an epochal thinker who relies on a logic of historical rupture. Techniques of (self-) animation would amount to nothing without the reverberation of the transcendent subject of universal knowledge, now transformed into a sense of autonomy, in conjunction with the vertical obscurity of the empirico-transcendental doublet, translated onto the surface, where dirty little secrets turn out to be guises and masks, avatars adopted to play a part in a drama of authorship and evasion. The task before us, then, is that of formulating practices of self and modes of knowledge that do not simply mobilize prior formations of power and knowledge in a bid to avoid a genuine reckoning with the loss of universal mastery and the flattening of psychology. Taking seriously the differences between horizontal, vertical, and lateral ways of knowing is the point of departure. We then begin to see how techniques of (self-) animation arise where a terrain of struggle opens between lateral connections and new regimes of governmentality. In the 1980s, Foucault characterized the terrain of struggle in terms of rejecting what you are, that is, refusing the identity attributed to you: "Maybe the target nowadays is not to discover what we are, but to refuse what we are" (1982, 216). Today, the terrain has changed: responses to the incitement to self-animate may well be met with a refusal to act lively, manifested both in slow movements and playing dead.

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[1] For Bush's article in its original context in LIFE Magazine, including an image of the memex and of "a scientist of the future" wearing a "cyclops camera," see this link to the September 10, 1945 issue (article begins on page 112).