

Understanding Machines: A History of Canadian Mechanology

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ABSTRACT

Background *The paradigms of cybernetics and media theory developed in the postwar era in response to new developments in technology and science. At their margins, an intellectual movement called “mechanology,” or the science of machines, also attempted to apprehend such changes.*

Analysis *The article uses the archival material of two major figures of mechanology, Canadians John Hart and Jean Le Moyné, to examine the overlooked contribution of mechanology to post-war debates on technology and culture. It contrasts the theories, concepts, and epistemologies of mechanology with both cybernetics and media theory.*

Conclusion and implications *The article reveals some of the reasons behind mechanology’s inability to establish itself as new field, and shows how the concept of “the machine” lost ground in the postwar era.*

Keywords *Cybernetics; John Hart; Jacques Lafitte; Jean Le Moyné; Mechanology; Media theory*

RÉSUMÉ

Contexte *La cybernétique et la théorie médiatique se sont développées au sortir de la Seconde Guerre mondiale en réaction aux avancées technologiques et scientifiques. En marge de ces paradigmes, un mouvement intellectuel nommé la « mécanologie », ou la science des machines, a aussi cherché à comprendre ces bouleversements.*

Analyse *Cet article analyse les documents d’archives des Canadiens John Hart et Jean Le Moyné et explore la contribution méconnue de la mécanologie aux débats sur la technologie et la culture dans la période d’après-guerre. L’article compare les théories, concepts et épistémologies de la mécanologie, de la cybernétique et de la théorie médiatique.*

Conclusion et implications *L’article expose quelques facteurs expliquant l’échec de la mécanologie et démontre comment le concept de machine a perdu son caractère signifiant.*

Mots clés *Cybernétique; John Hart; Jacques Lafitte; Jean Le Moyné; Mécanologie; Théories médiatiques*

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Introduction

Between 1965 and 1985, a group of Canadian researchers together with an international network of collaborators experimented with several forms of artistic and intellectual inquiry into “the machine” as an object of knowledge. Their goal was the foundation of “mechanology,” a general science of machines. The Canadian mechanologists formed a rather loosely structured network with computer science professor John Hart from the University of Western Ontario and Québec essayist Jean Le Moyne as its central actors. Mirroring the disparity of their contributors, the various projects intellectuals developed under the umbrella of mechanology were heterogeneous. These included creative writing, documentary films, radio broadcasts, translations, academic presentations, and the development of computer interfaces, all for the purpose of advancing “mechanology.” With a grant from the Canada Council (now the Canada Council for the Arts), John Hart inaugurated the “Mechanology Centre” in the small town of Zurich, Ontario. With the same grant, he also founded the Mechanology Press with the purpose of translating texts in the philosophy of technology that he saw as foundational to mechanology—including Jacques Lafitte’s (1932) *Réflexions sur la science des machines* and Gilbert Simondon’s (1958) *Du mode d’existence des objets techniques*—into English. Hart’s plan for the centre built upon exchanges with local artists, such as Greg Curnoe (1970) and Murray Favro, dating back to 1969, which resulted in the creation of materials for an exhibition on “inventions and perpetual motion machines” as well as a computer art project. Le Moyne, for his part, was involved in a range of creative projects beginning in the 1960s. He developed a film project about machines with the National Film Board of Canada, and strove to complete a larger literary-philosophical project called “Itinéraire mécanologique” (mechanological itinerary), a proposed three-volume work that would span the breadth of his interest in technology (Le Moyne 1982). Le Moyne and Hart also collaborated to organize two international colloquia on mechanology that took place in Paris at the Canadian Cultural Centre in 1971 and 1976.

Not quite a school of thought in the traditional sense, the group’s attempts to revive mechanology as a new discipline dedicated to the study of machines and their interactions with society achieved only limited success. Many of their ambitious projects failed to take off or received little attention from either the public or the academic community. Even so, the significance of recovering mechanology lies not merely in the originality of the theories and ideas articulated by its contributors, but particularly in the ways the project of mechanology can be understood in relation to the dominant intellectual paradigms of the time: American cybernetics and the Toronto School of Communication. Mechanology developed at the junction of these two celebrated and much-publicized intellectual movements, and strove to find its place in their shadows. In a short piece written after Le Moyne’s death, John Hart (1998) retrospectively situated mechanology next to both McLuhan’s ideas about communication and Norbert Wiener’s cybernetics. Hart was explicit in his belief that mechanology was different from the two other paradigms despite sharing common interests; he asserted that mechanology was meant to be its own field of study. Mechanology shared cybernetics’ interest in the machine as an object of inquiry, but did not address any of its interest

for information or communication systems. As for Canadian media theory, mechanology shared the same insights into unifying technology and culture in the promotion of a renewed humanism, though it failed to acknowledge the rise of media as the central locus on which to ground a reformulation of humanities.

Mechanology: Background and emergence

“*Mécanologie*,” or the science of machines, was first proposed by French engineer Jacques Lafitte (1932) in his short book *Réflexions sur la science des machines* (hereinafter *Reflections*, 1980)¹. Beginning in 1905, Lafitte dedicated several years of his career to surveying theories about machines and reflecting on their role in society. His hope was to systematize a general science of machines that would solve the “problem of the very existence of machines” (Lafitte, 1980, p. 33). In taking up the topic of machines, *Reflections* broke with the anti-industrialism that dominated French philosophical thought in the early-to-mid-twentieth century (Guchet, 2010); instead the book was an enthusiastic plea to integrate machines into the social sciences. For Lafitte (1980), machines and tools were emancipatory devices rather than apparatuses of alienation. To achieve this, Lafitte’s definition of “machine” was quite expansive: by machine, he meant any human-made creation and included the most basic tools and architectural constructions. Philosopher of technology Gilbert Simondon later considered the inclusion of architectural forms, such as bridges, roads, and houses, as machines to be the true genius of Lafitte’s work (Simondon & Chateau, 2005).

In *Reflections*, Lafitte (1980) advanced two noteworthy propositions.² First, he elaborated a taxonomy of machines and argued that machines had evolved from simple to more complex individuals, in the same manner as biological species. Lafitte divided machines into three general classes based on their internal complexity: passive, active, and reflex machines. Passive machines were those with no inner mechanisms, such as roads and bowls; active machines were powered by an external source of energy, such as hand-tools and transportation engines; while reflex machines were those with the capacity to modify their behaviour according to external factors. The second contribution of the book was to advocate for the institution of *mécanologie* as a discipline of the social sciences. Lafitte (1980) specified that it should become “one part, and an extremely important one, of sociology” (p. 109). Mechanology was intended to provide a moral and philosophical education about machines to engineers and humanists alike.

The term “mechanology” was used infrequently in both French and English in the early twentieth century. For this reason, it was a perfect way to label something that would break from other traditions, which was exactly Lafitte’s goal. In French, machine sciences were usually designated with the terms *mécanisme* (rooted in Cartesian philosophy) or *mécanique* and *machinisme* (rooted in the traditions of engineering and scientific management). In English, technical discourses about machines were often designated with the word “mechanics.” A rare occurrence of the term “mechanology” in English can be found in Thomas De Quincey’s (1863) work, where it designates “the science of style in rhetoric.”³ In French, the term *mécanologie* was at times used to name a branch of engineering (Terquem & Gerono, 1861), but this usage remained marginal. In *Reflections*, Lafitte (1980) situated the contribution of mechanology in relation to these other ways of studying machines. He viewed mechanology as the over-

arching field that presided over two others: the art of constructing machines and mechanography. The art of constructing machines regrouped the knowledge and various techniques required for the concrete construction of machines. This field was organized by professional guilds (engineers, artisans, architects), and dealt empirically with machinery and mechanics. The second field of knowledge, which Lafitte called mechanography, was that of the many descriptive sciences about machines. This body of knowledge included the history of technology, as well as archaeology and ethnography, since their main concern was recovering technical artefacts in human culture. Mechanology itself, a third field of study, would be concerned with determining the general laws behind the emergence of machines. Mechanology would be, in Lafitte's view, a normative science. In this, it differed from most nineteenth-century sciences of machines, which were devoted in many ways to the diffusion of technical knowledge, from the mechanics of American engineers to the kinematics of German technologists.

On the occasion of *Reflections*' re-edition in 1972, Jacques Guillerme observed that the book was itself a testimony to the thematic importance of mechanization in French thought during the interwar period. During the same period that Lafitte prepared *Reflections*, several German, American, and French scholars also attempted to situate the role and place of machines in society. In the United States, Lewis Mumford's (2010) work revealed the concerns many had about the rise of ever-more technologically dependent societies. In Europe, critics from the Marxist tradition such as Jean Nihon (1929) emphasized the new regimes of power initiated by the factory system. Later in the century, Siegfried Giedion (1948) observed how mechanization had had cultural impacts on design, architecture, and the arts. While these works differ in many ways with their approaches to mechanization, they share a common interest in posing diagnostics about the impacts of modern machines onto culture.

French audiences mostly ignored *Reflections* at the time of its publication in 1932.⁴ However, it caught the attention of a few prominent figures in the Catholic humanism movement, notably Marcel Moré, Emmanuel Mounier, and Simone Weil (Moré 1967, Guillerme 1973). The Catholic humanists with whom Lafitte was affiliated positioned themselves in direct conversation with the Marxist critique of industry developing at the time, but expanding it to include what Mounier saw as a more complete recognition of humanity's spiritual aspect (Rauch, 1972). In particular, Mounier saw in Lafitte a way to reintegrate machines into a system of beliefs; in other words, to reconcile Catholicism with modernity. Indeed, Lafitte (1980) intended for mechanology to be a part of a general education, enabling engineers, scientists, and an enlightened public to acquire a moral sensitivity that would guide both the construction and usage of machines.

Emmanuel Mounier, who gave Lafitte the limited notoriety he was able to acquire, was widely read in the French-speaking world in the 1940s and 1950s. Jean Le Moyne, who had been trained as a theologian, knew of Mounier's work quite well. Le Moyne, a celebrated essayist in Quebec, had been part of a left-leaning group of young French Canadians, along with Pierre Elliott Trudeau and the publisher Claude Hurtubise, seeking to make their views about modernity circulate through their literary journal, *La Relève* (Thibault & Hayward, 2014; Quesnel 2015). This group formed in the 1930s in the wake of social Catholicism in France and was inspired by the works of Emmanuel

Mounier and others, such as Jacques Maritain. Incidentally, it was through Mounier's citation of Lafitte that Le Moyne became aware of *Reflections* in the 1960s, and subsequently, of mechanology altogether.

Le Moyne's collaborator from Ontario, John Hart, came to Lafitte through a similar, yet slightly more serendipitous path. An engineer by training, Hart was hired in the mid-1960s as one of the first instructors in the Department of Computer Science at the University of Western Ontario (UWO) (now Western University).⁵ As an English-speaker, he knew relatively little about intellectual life in the French-speaking world. It was during a stay in the province of Quebec at UWO's French summer school in 1965 that he read about Lafitte in a book review about Mounier published in a local newspaper. Intrigued, Hart contacted the author of the review who put him in touch with Le Moyne. Captivated by Lafitte's ideas, Hart commissioned a rough translation of *Reflections* in the years that followed, which he informally shared with the members of a seminar he organized at UWO on philosophy and systems theory. Years later, John Hart (1978) described Lafitte as a "true primitive" (p. 7), as he found the short book worthy of a "paradigmatic revolution," (p. 7) using Thomas Kuhn's expression.

Hart and Le Moyne took Jacques Lafitte's invitation in *Reflections* to create a "mechanology" to heart. In the years following their initial contact in March 1966, the two became unparalleled, and unlikely enthusiasts for reviving the mechanology outlined by Lafitte. At the time, Le Moyne and Hart were not only working in different provinces but also in different professional contexts. Le Moyne was a research assistant at the National Film Board of Canada while Hart was an academic in a discipline, computer science, which had little to do with French philosophy. Even so, their collaboration was fruitful on many levels. For Jean Le Moyne, John Hart provided access to the academic institutions and to the emerging field of computer engineering, which would be essential for the re-enactment of mechanology. To Hart, Le Moyne provided his knowledge of philosophy and personal connections with the French intellectual elites. Over the course of two decades, the two succeeded in consolidating an international network of like-minded scholars that included filmmakers, artists, historians, and philosophers of science and technology.

Their endeavour was quite ambitious: it included several literary, scholarly, and film projects, some of which have already been discussed briefly here. Certainly the height of Le Moyne and Hart's collaboration and Canadian mechanology was the March 1971 colloquium on mechanology at the Canadian Cultural Centre in Paris. The event was put together explicitly as an homage to the memory and work of Lafitte, whose writings were unfamiliar to many attendees. The colloquium attracted some of the leading voices in the philosophy of technology in Europe: scholars Georges Canguilhem, Suzanne Delorme, Jean Fourastié, Georges Friedmann, and Gilbert Simondon attended the event; the United Nations Educational, Scientific, and Cultural Organization (UNESCO) sent a delegate; and Canada's Prime Minister Pierre-Elliott Trudeau relayed a telegram to the attendees on the first morning of the colloquium. Discussions ranged from kinematic engines to machinic reveries and computers. The general objective of the colloquium's organizers was to establish the foundations for

such a new field in the social sciences dedicated to machines, the one envisioned by Lafitte (1980). Rather than a “science” in the disciplinary meaning of the term, and expanding the reach of *logos*, Hart and Le Moyne came to understand mechano-*logy* as any “discourse about machines as such” (Les Cahiers du Centre Culturel Canadien, 1971, p. 7, authors’ translation).

Hart and Le Moyne’s attempt to revive mechanology, however, encountered resistance. Gilbert Simondon (1989) himself, for example, used the vocabulary of machines with explicit care. In fact, he did not embrace the overarching meaning of mechanology and argued that the concept of “machine” did not “apply to all technical objects” (p. 159, authors’ translation). Simondon preferred *technologie* to *mécanologie* and *objet technique* to *machine*. A number of participants at the 1971 colloquium also voiced their concern about the limitations of the label “mechanology.” The introductory remarks by the deputy general director of UNESCO stressed that the “term ‘machine’ and hence the term ‘mechanology’ can evoke in the minds of many these mechanisms ... with static elements, like the carcass of a building, or dynamic ones, such as the engine” (Les Cahiers du Centre Culturel Canadien, 1971, p. 1, authors’ translation). He added that computing and nuclear technology invited everyone to broaden the meaning of the term machine. The conference ended on a similar note of ambivalence: the closing discussion, a roundtable entitled “The Machines in Society” became the stage for a discussion of the very name of the colloquium. Only Jean Fourastié seemed to find “mechanology” appropriate, arguing that it was “in French at least ... a lovely word.” (Les Cahiers du Centre Culturel Canadien, 1971, p. 81, authors’ translation). Many indeed wondered if *technologie*, a term that was already well-established in France and designated the field of study of technics, was not a more suitable name for it.

This reluctance to use the label mechanology, and indirectly the uncertainty around the relevance of the intellectual project to revive it, affected Le Moyne deeply. Back from Paris, he confessed to a friend that he felt “mechanologically dour ... it is as if the machine is truly cursed” (Le Moyne Fonds, Vol. 1, File 73, authors’ translation) and later described the 1971 colloquium in Paris as a “pitiful machinic council” (Le Moyne Fonds, Vol. 2, File 8, authors’ translation). This perceived curse did not seem to apply just to mechanology, but to other intellectual endeavours centred on the machine as well; this is what Ronan Le Roux (2009) calls the “impossible constitution of a general science of machine” in the postwar era. With the rise of high technology and computing, most intellectual projects concerned exclusively with the study of machines risked being outdated. Following World War II, the very label “machine” was falling into intellectual disgrace, as exemplified by the Museum of Modern Art’s (MOMA’s) 1968 exhibition title: “The Machine as Seen at the End of the Mechanical Age.” The machine as a thing, but also as a discursive concept, was becoming a relic of the passing industrial era. There was a growing schism between the concept of machine, on the one hand, and technology and media, on the other. As Bruce Clarke and Linda Henderson (2002) put it, the twentieth century was the stage for the long transition from energy to information, and mechanology was anachronistically trying to gain momentum precisely during one of the most visible moments of this transition.

Cybernetics and mechanology

When the Canadians began reviving mechanology around 1966, cybernetics was already a well-known field. To be exact, it had also lost most of its lustre by then. Discontent with the extent of the field was already palpable among the participants of the tenth Macy conference in 1953 (Hayles, 1999). Philippe Breton (1984) noted that the very word “cybernetics” became “unvoiceable” (p. 155) in the late 1950s in France thanks to “journalistic excess” (p. 161, authors’ translation) and the utopian nature of the paradigm.

Thus, the attempt to re-establish mechanology by Hart and Le Moyne in the 1960s ultimately followed not just the rise of cybernetics but its decay. And it was not for a lack of awareness about cybernetics’ reception on the part of the mechanologists. Both Hart’s and Le Moyne’s archives reveal that the two men had engaged extensively with cybernetics at different points in their careers. Le Moyne was hired as research assistant and commentator for a radio series called *La cybernétique et nous* produced by Radio-Canada in 1967. The show’s aim was to situate cybernetics for French-Canadian audiences in relation to recent developments in technology. Hart’s engagement with cybernetics was equally intimate. He had been interested in artificial intelligence and automata since the early 1960s and had coordinated a regular faculty seminar on cybernetics and general systems with members of the philosophy and psychology departments at the UWO. Thus, both Le Moyne and Hart had a clear grasp of what cybernetics was.

The complicated relationship between mechanology and cybernetics speaks to the interest Le Moyne and Hart showed in cybernetics, as well as their belief that it provided an insufficient framework for addressing the philosophical issues they saw confronting society. While Hart’s critique was an implied differentiation from cybernetics found in his elaboration of mechanology, Le Moyne was explicit about the limitations he saw in Norbert Wiener’s science. Writing to his friend Claude Hurtubise, Le Moyne declared, “my cybernetic fervour has never been strong enough. In fact, Wiener and others have been nothing else than roads quickly travelled in my quest towards machines ... Only a few very short fragments could be useable” (Hurtubise Fonds, Vol. 1, File 15, authors’ translation). Rather than affiliate with the last wave of cybernetics research, the Canadian mechanologists instead aligned themselves with the philosophy of technology, most notably the work of Gilbert Simondon, who had remained critical of cybernetics, and very precisely of the concept of homeostasis (Simondon 1965).

By positioning their work in this way, the pair broke with the consensus among French cyberneticists who saw a precursor to cybernetics in Jacques Lafitte’s writings. The positive reception that Wiener’s ideas received in France had indeed renewed the interest in the conceptual approaches to the machine, including Lafitte’s mostly forgotten (and out-of-print) writings.⁶ Emmanuel Mounier, who had been a supporter of Lafitte’s book when it first appeared in 1932, commissioned three studies on “thinking machines” for an issue of *Esprit* in 1950. In one of these studies, Georges Théodule Guilbaud (1950) celebrated Lafitte’s *Reflections* as an anticipation of cybernetics. It was Lafitte’s discussion of the third class of machines, the “reflex machines,” that struck a

chord with the cyberneticists. Lafitte's definition of a reflex machine—he considered them still rare at the time of writing *Reflections*—was not at all estranged from what cyberneticists later considered to be automatic machines. Lafitte (1980) wrote

I consider as reflex machines the most complicated machines which are observed in the mechanological series; which enjoy the remarkable property of seeing their functioning being modified according to the indications which they perceive themselves, of determined variations in certain of their relations with the milieu which surrounds them, which owe this property to the existence in their organization of organs or of systems of differentiated organs, more or less developed, which permit them to perceive these variations and to transmit their effects to their fundamental transforming system. (p. 50)

In this passage, Lafitte was anticipating two key aspects of cybernetics: self-organizing systems and homeostasis. In his own view, reflex machines differed from passive and active ones because of their capacity to multiply interactions with their milieu and their tendency to seek stabilization. He also identified the machine as an entity within a system.

Christopher Johnson (2015) argues that positioning Lafitte as a precursor was a strategy used by proponents of cybernetics to situate past French scholarship in relation to the field. It was as part of this process of naturalizing cybernetics that Lafitte was rehabilitated, he who had resolved to put aside his intellectual endeavours and returned to his work as an engineer. Indeed, he had been “disheartened” (Le Roux, 2009, p. 26) by the lack of enthusiasm about *Reflections* in the 1930s. Yet encouraged by the effervescence of cybernetics and concomitant renewed interest in his work, Lafitte delved back into his research in the early 1950s. He was invited to speak at the *Cercle d'études cybernétiques* and from 1957 to 1963, he published three new essays on machines for the Belgian journal *Industrie*. In these articles, he strengthened the relationship between social and mechanological structures, discussing the work of Pierre Teilhard de Chardin on the noosphere. In an essay titled “The Stone Axe and Automatic Civilization,” Lafitte (1957) evaluated cybernetics as both a science to understand machines (mechanography) and a body of technical knowledge to build feedback machines (the art of constructing machines). He considered cybernetics to be the “fully developed confirmation” of his early writings on “reflex machines” (p. 613, authors' translation), but parted with cyberneticists on their belief in the promise of an autonomous “mechanized government,” which he considered to be as “exaggerated” as it was “confused” (p. 615, authors' translation).

Why then, after discovering the work of Lafitte in 1965, did Le Moyne and Hart not identify cybernetics as a paradigmatic ally? Why attempt to create yet another science of machines when cybernetics was already dominating the headlines as *the* general science of machines? The Canadian mechanologists seemed committed to offering something that cybernetics could not. In retrospect, mechanology diverged from cybernetics in several important ways. First, they differed on their definitions of the concept of “machine.” Second, they differed on the significance given to communication, systems, and interactions. Finally, they differed on their position regarding humanism.

The most obvious rupture between cybernetics and mechanology was the respective definitions of the notion of “machine.” In cybernetic terms, the “machine” referred to computing devices and other complex calculative systems. So much is clear from reading Wiener’s (1965) *Cybernetics*, where he qualifies machines with vocabulary from the field of computing: the “memory machine” (p. xv), the “communication-engineering machine” (p. 43), the “learning and self-reproducing machine” (p. 169), the game-playing machines (p. 170), and so on. Unlike Lafitte, who developed a comprehensive definition of the machine in order to encompass the most primitive human constructions, Wiener had computing technologies in mind as he was writing about machines. The distinction between energy and information is explicit in Wiener’s (1949) writings at the time. Written in 1949, the introduction to an unpublished essay titled “The Machine Age” exemplifies how Wiener discriminates between the “power machine” from the industrial era and the “new machine” of his time:

By this time the public is well aware that a new age of machines is upon us based on the computing machine, and not on the power machine. The tendency of these new machines is to replace human judgment on all levels but a fairly high one, rather than to replace human energy and power by machine energy and power. It is already clear that this new replacement will have a profound influence upon our lives, but it is not clear to the man of the street what this influence will be. (Wiener Papers, 1949)

It is as if Wiener clung to the term “machine” in a sort of linguistic hysteresis, naming a new reality with an obsolete word. This is quite different from the way that the concept of the machine was taken up by the mechanologists. For them, the meaning of the discursive concept of machine was flexible enough to include all human-made artefacts.

Wiener’s favouring of information over energy contributes to the second major difference between mechanology and cybernetics, namely the importance given to information and communication. In addition to its interest in computing machines, cybernetics was about identifying informational patterns within systems. Cybernetics aimed to be a “universal science” (Geoffrey Bowker, quoted in Hayles, 1999, p. 96), turning flows of information into a metaphysical organizing principle for all systems, regardless of whether those systems were biological, mechanical, or a mix of both. In Wiener’s (1965) famous formulation of the new science, cybernetics was the “science of control and communication in the animal and the machine” (p. 11). The emphasis on communication and control, two processes, is obviously stressed in this definition. From the standpoint of cybernetics theory, the biological and the technological did not need to be distinguished, as long as the operations, through communication, were bound to the system’s goals.

Conversely, the Canadian mechanologists’ view of communication was rather instrumental: machines were material objects that could be represented through discourse. In mechanology, communication mostly served a didactic function. Technical education led by moral values was a central aim of mechanology and machines could be fully explained through communication (visual, textual, audiovisual, poetic, and so on). Of course, the fact that Lafitte wrote *Reflections* (1980) in the first decades of

the twentieth century, a period more clearly influenced by the notion of energy than that of communication may help explain this sharp contrast with cybernetics.

Finally, mechanology and cybernetics diverged from each other regarding the normative function of their projects, and especially on the question of humanism. Cybernetics was not a humanist project. The informational model within cybernetic theory was based on an ontological equivalence between all entities interacting in a system, a view that negated specificity for biological beings. Peter Galison (1994) argued that this concatenation of man and machine in a unified system of thought stemmed from the historical context of a developing approach to warfare that dealt with humans as merely parts in a larger military machine. "By 1950," he wrote, "Wiener had globalized his claim: under the gaze of scientific inquiry, human intentionality did not differ from the self-regulation of machines, full stop" (p. 251). In short, animals and humans could be analyzed exactly in the same manner as machines. N. Katherine Hayles (1999) also noted how Wiener's self-proclaimed humanist values were always "in tension" (p. 86) with the way cybernetics as a social project was betrayed by the necessity of this equivalence.

Mechanology, on the other hand, was expressly humanist. When Wiener (1965) wrote that the contributors to cybernetics "stand in a moral position that is, to say the least, not very comfortable" (p. 28), he meant that the machines they developed could be used for either good or evil, and that designers have little control over which direction human cultures might take them. If he was far from optimistic, it is because he had Nagasaki and Hiroshima in mind. The mechanologists were conscious of this paradox, but instead of leaving it in the hands of future users or designers, they took it to heart to steer machines into the realm of morality. Mechanology aimed at instilling a moral engagement with machines. It was, to use the term Le Moyne borrowed from Catholic intellectual Jacques Maritain (1966), at the service of an "integral humanism." Such an integral humanism was one way to reconcile technology and faith, according to Maritain:

Technique is good, machinery is good. We ought to express our disapproval of the diehard spirit that seeks to suppress machinery and technical processes. But if machinery and technical processes are not controlled and firmly subjugated to the well-being of the person, that is to say, fully and vigorously subordinated to his true ends and made the instruments of moral asceticism, mankind is irretrievably and literally lost. (p. 52)

Reflections was a similar attempt to reconcile science and technology on the one hand with culture and religion on the other. At the time Lafitte wrote it, several Catholic political and intellectual movements in France (Sillonism, personalism, etc.) were directly addressing the question of scientific and technological advancements in the hope of modernizing Catholicism. For Lafitte (1980), this question was translated into one simple argument: he argued that machines should not be feared since they were extensions of man, an expression that would later be popularized by Marshall McLuhan. "Machines?" he asks, "extension of man, integrating man himself, extensions of social structures, integrating them. They are, at any time, identical to us. They are us; they are beautiful like us, and ugly, like us. To shape them, to build them, is to build ourselves" (p. 119). Such a rehabilitation of machines as part of the genesis of human nature was, for Lafitte, a humanist argument. The agency of humans over ma-

chines in this view came with moral responsibilities. This is where technological humanism became pedagogical in the hands of Hart and Le Moyne: Le Moyne repeatedly mentioned that the more one learned about machines (and this went as far as knowing their basic internal functions), the less one would fear them. In retrospect, while cybernetics erased the line between man and machine in order to elevate information processes and interactions among systems above all else, mechanology also erased the line between man and machine, but to help find humanity *in* machines.

Mechanology and media studies

At the time of the first contact between Le Moyne and Hart in 1965, the concept of “machine” was giving way to new keywords, like “technology” and “media.” The working definition of the machine provided by Lafitte (1980) as any human-made artefact could have theoretically encompassed modern technologies and new media as well. However, the Canadian mechanologists refused to abandon the term in favour of emergent keywords. This inflexibility led Hart and Le Moyne to struggle as they explained the relevance of the term “machine.” Le Moyne (1982) lamented at the end of his career that he had decided to stop mentioning machines entirely. “At their evocation (which may be too easy for me), people blanch, they turn green,” he wrote. “So much so that it is easier for me to speak of God (another folly of mine) than it is of machines ... which is certainly saying something” (p. 43, authors’ translation). As they witnessed the fading lustre of both mechanology and cybernetics, the Canadian mechanologists could have teamed up with the rising star of Canada’s scholarly world, Marshall McLuhan. Once again, it was not for a lack of awareness of McLuhan and his work.

In the same manner as Wiener, McLuhan had achieved academic visibility; he was Canada’s “intellectual comet” (Kattan, 1965) and was widely known across Canada and around the world. For the mechanologists, McLuhan was not even a distant star. The interpersonal networks of Le Moyne and Hart frequently overlapped with those of McLuhan. The list of missed connections and close calls is long. McLuhan (1962) won the Governor General’s nonfiction literary award for *Gutenberg Galaxy* the year after Le Moyne (1961) won the same prize for *Convergences*. McLuhan visited the National Film Board of Canada in Montréal in 1964 as a keynote speaker when Le Moyne was working there. In an interview with the CBC in the 1960s, pianist Glenn Gould described Le Moyne as an inspiration (McFarlane, 2002), a statement he made while also corresponding with McLuhan. HMH, the publication house owned by Le Moyne’s close friend Claude Hurtubise, published the French translation of *Understanding Media* (McLuhan, 1994) in 1968. Mechanology collaborators André Belleau and Guy Allard were also actively disseminating the work of McLuhan in Montréal universities in the 1960s (Belleau Papers, File a15). McLuhan was also one of the first North American scholars to refer to the work of Jacques Laffite, as is detailed later. Finally, Prime Minister of Canada Pierre-Elliott Trudeau could have acted as a procurer for a meeting between Le Moyne and McLuhan, had one of them expressed the desire to arrange it. The correspondence between McLuhan and Trudeau (which began in 1968 and continued through the 1970s) brought the two to discuss media, politics, and technology. During all these years, Le Moyne was working directly at the prime minister’s office as a speechwriter while sharing his work on mechanology with Trudeau, a long-time acquaintance. McLuhan’s con-

version to Catholicism had also brought him to know and disseminate the work of Jesuit philosophers, Walter Ong and Theilhard de Chardin for instance, a network equally known by the mechanologists.⁷

In all, it must have been a small world in Canada for those with an interest in the philosophy of technology, and it is intriguing that the material from Hart's, Le Moyne's, and McLuhan's archives does not testify to a rapprochement among the men. Was it McLuhan's controversial persona that was the cause of Hart and Le Moyne's reluctance to reach out to him? Or was the conceptual gap between machine theory and media theory so great that they could not see the possible connections? Yet, on this last point, McLuhan's (1994) media theory was equally a machine theory. The very first chapter of *Understanding Media* scaffolds the now-famous argument that the medium is the message on a reflection about machines, not media: "Many people would be disposed to say that it was not the machine, but what one did with the *machine*, that was its meaning or message" (p. 7, emphasis added). McLuhan's definition of media, of course, was quite broad: he uses the word "media" for all human-made technologies, including wheels and clothing, and this was considered intellectual avant-garde at the time of its publication. To explain this broader perspective on the concept of media, McLuhan resorted, just like Lafitte before him, to the metaphor of the "extension of man." The question of extension was "so important," as Theall (1971) noted, that "it forms the subtitle of *Understanding Media*" (p. 123).

Marshall McLuhan's (1994) *Understanding Media*, published in 1964, sits on the historical fault line between machine and media. It can even be argued that, at first, McLuhan was not committed to using media as a central concept in his work. The title *Understanding Media* came up in a 1958 letter McLuhan wrote to Harry Skornia, the head of the U.S.-based National Association of Educational Broadcasters, as he was planning to submit a research grant proposal. McLuhan wrote, "Oh, yes, for [the] title, how about: UNDERSTANDING MEDIA." He added, concerning his overall presentation of the research project:

Not knowing the make-up of the grants committee, I quite naturally have played it neutral. With your encouragement, then, to make a stronger case, how about such slants as these: The classroom as we have long known it is a by-product of the book form of codified information ... You see, on one hand I have no doubt at all about our being able to train teachers and students in the language of the media. (McLuhan Fonds, Vol. 36, File 84)

The committee from the U.S. Department of Health, Education and Welfare overseeing the grant adjudication was named the "Advisory Committee on New Educational Media." The catchy *Understanding Media* may have only been a way to "play it neutral," in McLuhan's words, and to cast his research in the vocabulary of the granting agency. The research grant was approved in 1959. In the years that followed, however, it was really "outerings," "exteriorisations," and "extensions" of human faculties that formed the core of McLuhan's (1962, 1994) interest as he was preparing both *Gutenberg Galaxy* and *Understanding Media*. In his correspondence, McLuhan (1987) referred to his new research centre in Toronto as the "Centre for the Study of the Extension of Man" (p. 291). The centre would end up being named the Centre for Culture and Technology. Prior to

its publication in 1964, McLuhan (1987) referred in his correspondence to *Understanding Media* as his “book on the extensions of man” (p. 289).

When he began formalizing the idea of technology as extension, McLuhan was trying to find out more about its genesis and circulation in scientific literature. In a letter dated February 27, 1962, to his friend Walter Ong, McLuhan (1987) wrote, “Have you encountered the work of Edward T. Hall? He says he got the idea of our technologies as outerings of sense and function from Buckminster Fuller. I got it from nobody. But now I find it the core of Wm Blake” (p. 287). McLuhan (1987) later appropriated the expression as the subtitle of *Understanding Media*, which became a commercial success and made it widely popular. But even Hall or Buckminster Fuller were not the first to articulate this idea: the metaphor of tools and machines as extensions of human organs was common, almost ubiquitous, in writings about human technology, and especially in writings about tools (see for instance, Alsberg, 1970). Reading the passage from Lafitte’s (1980) *Reflections* about machines as extensions of man some years after the notion’s popularization by McLuhan could have pressed Le Moynes and Hart to look further into media theory as a sympathetic paradigm to situate their project. Lafitte’s broad reading of the machines as extensions of man matched McLuhan’s broad understanding of media. Lafitte’s mechanology was a media theory as much as McLuhan’s media theory was a mechanology. Yet the mechanologists (deliberately or not) did not make that connection.

If the mechanologists had looked closely at who in the English-speaking academic world had mentioned Lafitte when they were putting together the colloquium to honour the engineer, they may have been surprised, if not shocked, to notice that among the most famous writers to cite Lafitte was Marshall McLuhan (1962). The story of this citation is rather serendipitous, just as Hart and Le Moynes’s meeting had been. As was mentioned earlier, the 1950 *Esprit* issue on thinking machines includes an essay by Georges-Théodule Guilbaud (1950) and praises Lafitte as a precursor to cybernetics. Guilbaud expanded his 1950 *Esprit* essay into a short educational book about cybernetics (1954), which was translated into English and published by Criterion books in 1959 under the title *What is Cybernetics?* As McLuhan (1962) prepared the manuscript for *Gutenberg Galaxy*, he read Guilbaud’s (1959) book on cybernetics and quoted a long passage describing Lafitte’s mechanology. Concurring with Lafitte’s invitation to create a science dedicated to the study of machines, McLuhan (1962) concluded that “it will seem more and more strange to us why men have chosen to know so little about matters about which they have done so much” (pp. 154–155). And indeed, the way McLuhan positioned the role of his Centre for Culture and Technology was, in a way, the concretization of a research field within the social sciences dedicated to studying technology. Other than this quote, however, there is no evidence that McLuhan pursued his inquiry into Lafitte’s work any further. The trajectory of this quote is yet another indication of the proximity between mechanology and media theory, and of the close circuits within which ideas about technology and culture were circulating in the academic world at the time.

One last, and perhaps the most important, point of convergence between mechanology and McLuhan’s media studies was humanism, understood this time not

as a philosophical proposition about human rationality, but as a literary practice. McLuhan was a literature scholar particularly interested in the transition from one system of communication to the next; from orality to literacy, print to electronic, etc. McLuhan (1962) described our electronic era as a “post-literate” one (p. 2). And media literacy for him meant challenging the very foundation of humanism: the dominance of the written text.

In a similar way, the Canadian mechanologists turned to everything but text to channel their pedagogy about the machine. Hart and Le Moyne operated largely outside scholarly canons. Le Moyne envisioned working with radio, television, and films in order to educate the public about technology. He argued explicitly that traditional humanism had only been available in literary form and that it was time for humanists to embrace new media (Thibault & Hayward, 2014).

Similarly, Hart privileged the collecting of “oral histories” when it came to analyzing machines in rural Canada. He also argued that informatics and computing needed to go beyond writing to achieve true intercultural interactions. Reporting on experiments he conducted on the UWO campus with computer-assisted learning in Indigenous communities, Hart was fully conscious of the Western bias for the computer and its entanglement with writing, even referring to Jacques Derrida’s *Grammatology* (Hart, Kidd & Hahanni, 1975). He wrote how the team needed to read-just the content of the program: “Since Native communication is primarily oral and graphic, and the acceptance of the roman alphabet is far from universal, the lessons were prepared on a specially designed terminal which emphasized native language and style in spoken questions and graphical displays” (Hart, Kidd, & Nahanni, 1975, p. 386). While their primary concern was the machine, the mechanologists made much use of the new media available to them.

Conclusion

Mechanology did not turn out to be as successful as its instigators had hoped, and fell into oblivion. The lack of standard scholarly publications by the Canadian mechanologists can in part explain why they remained on the margins of recognized intellectual paradigms such as cybernetics and media studies; and also why so little is recorded about them in Canadian intellectual history. However, the significance of mechanology resides in their resistance to methodological conventions and their willingness to experiment with media without ever claiming to be media scholars. More generally even, Hart and Le Moyne positioned their work as the inheritors of a tradition that worked by crossing the divide between philosophy and the applied sciences, a divide that has not been filled since.

Part of the failure of mechanology can be explained by a number of institutional resistances. The NFB refused to fund Le Moyne’s film projects in the late 1960s. Hart’s translations did not receive the necessary support from established presses. Over the 1970s, the pace of their collaboration slowed down considerably, perhaps a response to their disappointment with the way that mechanology had been received in Canada and elsewhere. It became harder to convince institutions about the pertinence of the endeavour. In 1972, Le Moyne wrote to a collaborator at McGill University, Henri Jones, confessing how the “mechanological situation” was far from “bright” at the moment:

It is not that Hart, Allard and myself are not trying to break through, but we still run into the same fundamental obstacles: iron curtains between disciplines; the impossibility of lodging mechanology in one of the traditional boxes of knowledge; cultural resistance. We care about the future of our endeavour. (Le Moyne Fonds, Vol. 1, File 24, authors' translation)

The failures for the Canadian mechanologists added up over the years. Later on, Hart attempted to rekindle the project on his own while Le Moyne was working in the Office of the Prime Minister. The most visible fruit of his efforts came from his dialogue with local artists. These included some early experiments with computer-based art as well as the appearance of mechanological themes in the installations of Murray Favro beginning around 1970 (Fleming, 1970). Hart later applied to the Canada Council for a grant to support the creation of the Mechanology Centre in Zurich, Ontario. However, the Mechanology Centre was unable to sustain itself despite initial interest from the people of the small town where Hart had decided to base his work. Eventually, momentum for that project was lost and the final report about the Mechanology Centre written by John Hart (1978) only elusively hints at the existence of the centre beyond a postal box and letterhead. The projected *Cahiers de la mécanique* would be abandoned soon after. A small run of Lafitte's (1980) translation of *Reflections* appeared, leaving unpublished the draft translation of Simondon's *Du mode d'existence des objets techniques*. Le Moyne and Hart met again throughout the early 1980s, but only as old friends, not collaborators.

There are a number of individual and contextual factors that resulted in the mechanologists' relative obscurity compared to cybernetics and media studies, not the least of which are the different personalities each author had and the institutional contexts they worked within. Le Moyne's relatively dour character and career as a successful bureaucrat in combination with Hart's quixotic interest in technology and history stands in stark contrast to McLuhan's and Wiener's public personas. Yet the reasons for the fate of mechanology is likely also a consequence of the theoretical frameworks that it built upon. While Le Moyne took the failure of mechanology as one that was both personal and intellectual in nature, he never recognized that the intellectual climate surrounding his "beloved machines" had shifted. The difficulties Hart and Le Moyne faced in attempting to make mechanology relevant highlights an interesting intellectual moment when a rupture between an older technical imaginary made of machines from the industrial past, and a new one built around media and technology, was taking shape.

The failure of mechanology when compared to the success of cybernetics and media studies is illuminating because of the way it throws into relief the conceptual and institutional divisions that defined that period. The history of mechanology equally shows the dynamism of the intellectual context in Canada and the role of Canadian intellectuals on the international scene. Despite having faced a multitude of resistances, and despite never earning the sort of fame that historiographies have built around the Toronto School and cybernetics, mechanology's location in the margins of the two giants was fully acknowledged by its proponents. It was perhaps from the margins that they could see most vividly what was their specific contribution, but it was also that position at the margins that made them be just close enough.

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Notes

1. The first edition of *Réflexions sur la science des machines* was published in 1932 by the Cahiers de la nouvelle journée. A second edition was published in 1972 by Vrin, Paris, at the initiative of Jacques Guillaume. An English translation of the 1932 original French work was commissioned by John Hart and completed in 1969; a short print run of the translation, titled *Reflections on the Science of Machines*, was carried out in 1980 under the Mechanology Press publishing company, founded by Hart to publish the translations he was seeking to complete. For the purpose of this article, the authors are quoting from the 1980 English translation.
2. See Carl Mitcham (1994), Giovanni Carrozzini (2009), and Xavier Guchet (2010) for more detailed analyses of Lafitte's contribution to the philosophy of technology.
3. This meaning is also attached to the word "technology" when it means the techniques of discourse (or rhetoric) rather than discourse on techniques.
4. The Cahiers de la nouvelle journée, where the first edition of *Réflexions sur la science des machines* (1932) was published, was a small Catholic-leaning press. It was part of a tightly interwoven network of publications that had become the political and intellectual vehicles for some of the new Catholic movements emerging and strengthening in France during the interwar period. The Cahiers de la nouvelle journée published over 50 publications on different topics in the period between 1924 and 1945 (Mayer, 1966). Its editors, Edmond Bloud and Francisque Gay, were advocates of the work by Catholic leftists, especially those identifying with Sillonism: Maurice Blondel, Lucien Laberthonnière, and Paul Archambault, to name a few.
5. After a brief stint working as programmer for the National Research Council in the 1950s (University of Toronto Computing Centre), Hart joined the faculty at the UWO and was given the mandate to mount an academic program for the new computer science department in 1965. In particular, he was motivated to take this position by the prospect of being able to shape what the new discipline of computer science could become, particularly the possibilities of using computers as learning aids (Hart, Kidd & McHardy, 1976; Hart, 1977). In the 1970s, for example, Hart helped create the Computer Braille Facility at Western, and later on, the Audio Tactile Network, both projects that developed technology for the visually impaired. Alongside his interests in the burgeoning world of computers and automata, which comprised most of his research during the 1960s, Hart also became interested in exploring philosophical frameworks that could help computer scientists and engineers better understand their work and its relationship to society.
6. The intellectual community in France was particularly receptive to Wiener's ideas: *Cybernetics* was first published with the help of a Parisian press, Hermann & Cie; interested academics formed a study circle, the Cercle d'études cybernétiques, as early as 1950 and held several meetings; and finally, French publishers produced a large number of publications popularizing cybernetics (Johnson, 2015).

7. On McLuhan and theology, in particular, see Jonathan Sterne (2011).

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