
Thresholds

Issue 39

Inertia

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Introduction

Adam Fulton Johnson

Thinking Hard about a Difficult Concept

Inertia is the tendency for a mass to remain in a constant and uniform state of motion until acted upon by an external force.

Inertia is motion. Inertia is also rest.

Inertia, in and through the mass of a body, is the resistance to change.

We talk about inertia as if we understand it – but what are we observing when we see inertia? Unhindered motion? Freedom? Absolute stability? A fundamental “desire” in an object? It is an explanation unlike any other: as an essential principle or law, inertia is present in every object but arguably never witnessed – the observer sees only motion, or the lack thereof, and this is merely a collection of forces acting in specific ways. And yet, science has named it.

Thresholds 39, “Inertia,” is not a book-closing treatise on the concept that lends its name to this issue. Each article contained herein approaches the theme of “inertia” from a unique angle. If themed journals, in some quarters, seek unity in the various articles included, this is not the case in *Thresholds* 39. Readers will likely sense friction between respective interpretations of “inertia.” Indeed, one could argue that this issue, itself, lacks inertia: every article swerves into different lines of thought, offering reinterpretations of artwork, making unusual connections between people and ideas, and veering off into speculative, even contentious areas of reasoning. Articles range in historical focus, method, and disciplinary standpoint. What brings the following texts together is not “inertia” as a comprehensive theme; the concept itself is conflicted and multiple. While “inertia” is hard to get a handle on, this difficulty is, in fact, productive: every article in this issue of *Thresholds* makes valuable contributions to the project and process of thinking.

In the academy, “critical” thinking means confounding and questioning typical modes of thought. But to qualify thinking as “critical” implies that the mind has a tendency toward inertia. On the contrary, I suggest that thinking

does not inherently move toward stasis. Thoughts can be described as linear, but what is logical for one person is not always straightforward for another. By the same token, what is an interruption of thought for one may be productive and revelatory for another. If we accept that intuitions, belief systems, and logical processes are partially shared but by no means universal, what narratives are we trying to disrupt when we think “critically”? When is the interruption of thought or action most productive? And when is it best to ride the wave and see where you end up?

“We are fickle beings that defy modeling,” writes **Joseph E. Taylor III** in the essay that immediately follows. Our past, then, also eludes absolute documentation; history can be aptly conveyed through metaphors such as “inertia,” but Taylor reminds us that all metaphors break down. Thinking about slippery, unfixable ideas is difficult, Taylor writes, but “that is why I love history and the inertia metaphor. Both are instructive, but the stories we tell about them resist sloppy thinking and lazy writing.” Taylor’s essay is an important meditation on the concept of inertia and its relation to metaphor, and in this way also serves as a contemplative introduction to the articles that follow.

Writing on Albert Einstein, his theory of relativity and the letters he wrote to his lovers, **Jimena Canales** draws a connection to the correspondence of the physicist and his use of signals and communication systems as metaphors to explain his work. Overviewing the response to Einstein’s theory and the view that his suggested proof was overly reliant on signaling, Canales shows that this interpretation can be witnessed in Einstein’s personal correspondence. Einstein’s letters track his movements, his emotions, and the evolution of his thought for the contemporary reader as much as they conveyed messages to their original recipients.

In a joint interview by **Pamela Karimi, Benjamin Matteson, and Anna Dempsey**, filmmaker and artist **Bruce Checefsky** discusses his re-creation of several films by the Polish-Jewish filmmakers Stefan and Franciszka Themerson. Because little evidence of these films remains, Checefsky’s re-creations rummage through sentiment and history, “forcing the past against a wall of the present” to attempt to do justice to both the “lost” films and the situations that caused their disappearance during the Second World War.

An essay by **Daniel Cardoso Llach** centers on the architect and media mogul Nicholas Negroponte, who recon-

ceptualized the role of the architect through information technologies, facilitating streamlined design choices based on actual, lived experiences and the desires of inhabitants. For Llach, Negroponte saw authenticity in those human desires that were expressed in isolation from the expectations of others. It was in this authenticity that Negroponte found an essential humanism that informed his ideas on architecture, though ultimately he could not realize any universal design process. However, Llach follows this logic to the present, a trail that suggests Negroponte's work as genesis of today's tendency to place faith in digital analyses of "the natural" in architecture and new media discourse.

Ana María León examines the artist-spectator relationship in the work of the Brazilian artist Lygia Clark. León analyzes Clark's participant-centric works, which restricted or enclosed the body in some way, as reactions to an oppressive military regime in 1960s Brazil. Clark's early work used masks and goggles to create introspective environments for participants, endowing them with the agency to escape the constrictions of an authoritarian government. While Clark's work can be read as acquiescing to "traditional oppositions of passive spectatorship and active participation," León argues that blurring this dichotomy, following Jacques Rancière, gives a richer indication of the oppressive political situation from which Clark's art arose. The artist's introspective headgear, when modeled for an audience of her compatriots, also evoked the censorship of political speech and police oppression of 1960s Brazil and thereby "activated" spectators.

Caroline O. Fowler offers a reflection on an artwork that confuses the notion of completeness. A hazy watercolor seems to be a work-in-progress, but the artist's signature indicates it was considered a finished work. Fowler explains the reason for the initial confusion: the artist, Abraham Bloemaert, left no traces of cultivation, humanity, or history in this work, despite the convention of indicating human culture in even the most pristine, naturalistic seventeenth-century Dutch landscapes. Fowler shows that Bloemaert's watercolor, instead of depicting a designated place, expresses force or movement, recasting the medium as an exploration of an object's extension in space – a stylistic move wherein it is possible that "standing mountains move like clouds."

A sunken forest, a letter, a contest between experienced archivist-historians, and the ordering of the documented past – all such elements are folded into an article by

Edward Eigen, in which the author searches for the lost forest of Scicy, which legend has placed at the foot of the famous Mont-Saint-Michel. Sometimes surrounded by the sea, sometimes by a slippery sandbar, Mont-Saint-Michel, in Eigen's work, represents the center of gravity around which the forces of time are etched, eroded, and left to fade away. Touching on philosophies of history and the tools one uses to approach the past, Eigen's study of the histories of Mont-Saint-Michel and previous searches for the lost forest offer an exploration of the sorts of meaning and truths that can be found in mere traces of the past.

Clapperton Mavhunga's article on the developmental discourse on Africa uncovers the fiction of the Western "hero," as the author points to the similarities between the former jungle-tamer character and the modern aid worker, who "reveals" an Africa in need of saving. Mavhunga's assessment interrupts typical "progressive" Western thinking about Africa, and rightly calls out the cyclical problems of infantilization, the brain-drain, and the promotion of Euro-American technology as a miracle cure to Africa's perceived helplessness. Trying out new strategies of thinking about African development, Mavhunga advocates for a new emphasis on *African* mobility and ingenuity, rather than continuing the myth of a Western, technological remedy.

Reviving the line as a way of thinking about three-dimensional space in architectural practice, **Parke MacDowell** and **Diana Tomova** (as macedowell.tomova) experiment with robotic technology to reconfigure the line for use in contemporary building without any nostalgic trappings. Their project underscores an important sentiment in architectural design: ideas should motivate the development of tools and technology in the realization of design projects, rather than the other way around. By retooling a robot in tandem with their design, the young designers move toward this maxim.

Design propositions are also put forth by **Sarah Hirschman** and **Lisa Pauli**, two recent MIT graduates. Their culminating thesis projects are meant to serve as representations of the productive disruptions, creative thinking, and polemical attitudes of some of MIT's architecture students. Proposing a national archive to house the biological data for all citizens, Hirschman's *Biobank for America* neatly turns the question of medical privacy and "biopower" on its head. Pauli explores the potential of an alternative source of nuclear power, thorium (Th), instead of uranium and, in placing the safer and more efficient re-

actor in downtown New York City, comments on America's energy needs and highlights the uncomfortably nebulous relationship between necessity and luxury.

Project profiles by **Haseeb Ahmed** and **Bea Camacho** accompany articles. Ahmed's project is a juxtaposition of a once-futuristic object in an "innovative" and forward-looking space that puts stress on the relationship between an ideological claim about the future and the realization of that projected time. In two separate project snapshots, Camacho actively transforms (but does not erase) her body's legibility as human in a given space: in one she is seen braiding herself beneath carpet, in another the artist has knitted herself into a womb-like membrane.

The following thirteen works are meant to empower different directions of thought. Each offers the reader different puzzles, new ways of wondering, and a variety of fields to engage with. But "Inertia" is no riddle. It is merely a suggestion that we stop to ponder the trajectories of the mind – but to do so discriminately. Don't overthink it.

APT!

Joseph E. Taylor III

Lovejoy: *That is a false analogy!*

Lisa: *No, it's not. It's apt. Apt!*¹

Heraclitus's observation that one "cannot step twice into the same river" has produced an amazingly resilient analogy. His likening of time to a river has persisted so well that Jacques Barzun's argument that history, "like a vast river, propels logs, vegetation, rafts, and debris; it is full of live and dead things, some destined for resurrection; it mingles many waters and holds in solution invisible substances stolen from distant soils," might seem, from a certain angle, like he has plagiarized Marcus Aurelius's remark that "Time is like a rapid river, and a rushing torrent of all that comes and passes. A thing is no sooner well come, but it is past; and then another is borne after it, and this too will be carried away." This staying power has everything to do with the river's metaphorical qualities. It evokes not only the constantly mutating contexts of life but how events take on the quality of mass in motion. The past's temporal momentum is a force that continues to shape life long after the fact. Sir Isaac Newton and modern historians alike perceive inertia. As Lisa Simpson might shout, the analogy is apt.²

That, it turns out, is the easy part. Few of us – excepting perhaps those jaded nineteen-year-olds, infected with terminal ennui, who haunt the back rows of lecture halls – regard the past as utterly dead and irrelevant, that what happened before has no further bearing. We know better. In fact, we cannot avoid the past. We crash into it daily on every scale from the intimate to the global. We hear its echo in tales told by loved ones. It courses our brains as chastening and inspiring homilies when we enter voting booths. And we reflexively invoke historical comparisons all the time, when we shop for food or evaluate products or weigh which neighborhood we should inhabit. Sooner or later even clueless adolescents learn that they must live with the consequences, and even radical individualists admit that none of us quite control our fate. In the end we do not dispute time's first-law-like nature, but its metaphorical contours are another matter. If the past has inertia, if

indeed previous events carry a weight of force that shapes our present and future, then what, analogously, is that force like?

This question is not so easily resolved. The river still has much to recommend it. Water in motion can convey the sense of both collective and particularized mass. Like a river, the past can overwhelm when accumulated events sweep humans up like a flood. A millennium of horrific epidemics took an immense toll on the peoples of Asia, Africa, and Europe, and when their descendants migrated across the Atlantic, they unleashed pathogens upon populations with no similar biological history. The resulting pandemics forever altered the demographic balance of North America.³ A century's worth of federal court decisions on Indian treaty rights reached a tipping point in 1974 when Judge George Boldt ordered Pacific Northwest fishery managers to allocate half of the region's salmon runs to local tribes.⁴ Iron Eyes Cody cried on cue about litterbugs. The acting gig was a way to pay bills, yet the imagery created a confluence of historical streams. A rushing shift in public perceptions about Native Americans converged with long-accumulating concerns about pollution to, through that image, inspire a generation to change their habits of consumption, embrace recycling, and, for good and ill, re-imagine Native Americans as environmental icons.⁵ Each tale resembles a river of events moving across time, slowly or rapidly building until they became irresistible forces.

This is one reason the river is so serviceable. We can perceive it as a whole, yet a single drop can also stand for an individual, its turbulent parts a subset of events. Eddies and surges can represent war and peace, boom and bust, intellectual currents and social movements. The constant mixing of waters can symbolize the dynamic, seemingly chaotic nature of life. In these ways the river serves us, and it is certainly superior to the way scientists and economists reduce events to leading indicators such as jack run returns, heavy machinery orders, or Southern Oscillation intensity that are quantified and modeled to predict past and future. The notion that economies or nature can be truncated and summarized is alien to historians, yet even here we see an assumption of inertia. Scientists and sociologists alike assume that the past operates as if it has mass, motion, and impact. What changes is the way scientific history resembles a train. Events can seem linear; causation is tractable and predictable, as if life were on rails. Unfortunately for those who wish to model events,

the past is not so well behaved. Treating history like a train obscures the disorder, the flat-out messiness that is a core feature of life.

Thus we are drawn to metaphors of motion, but how to convey a physical dimension that is ever only partly controlled or even controllable? In reaction to attempts to model history, Richard White once offered a counter example that tilts inertia toward mayhem. The past, he argued, "is like a rock rolling downhill. It takes a lot of events to get it started, but once started it keeps going. The rock is the contingent past rolling into the future." Like the river, this naturalistic metaphor offers key insights. History is not like a train. We cannot throw time in reverse because no moment was predetermined. The rolling rock reminds us of life's inherent uncertainty. Its bounding, sketchy route means "we cannot possibly recover all the elements that made it that way," and as the rock careens into the present and future, we can almost see it crash through those computer labs like Roald Dahl's giant peach hurtling toward the sea.⁶

Yet the boulder and river analogies miss something basic. We may at times be carried along or run over by forces initiated far in the past and well beyond our control, but in no strict sense are humans mere flotsam or dirt. A distinguishing trait of humanity is how we individually make choices and take actions of our own accord. This is where naturalistic metaphors fail. Willful agency, even when misdirected or incompetently applied, cannot be incorporated into the river and rock metaphors any better than by the train, and without account for that trait any analogy will miss an essential factor in historical analysis. Ultimately every metaphor is incomplete. One might function at a meta scale, another for a brief period or discrete event, but the closer we look the more the past's contingencies vex our art. Willful action, unforeseen accidents, and plain dumb luck have a habit of wrenching the beautiful machinery of theory. We are fickle beings that defy modeling. The drop-let and grain of sand are not particularly effective analogies for the life of anyone other than the perfectly fatalistic.

Which leaves us with a problem. If we agree that inertia is a relevant metaphor but that rivers, boulders, and trains are problematic similes, then is there a better solution? Here I must confess a failure of imagination. I have toyed with bumper cars and freeways because they open possibilities for thinking about agency and the difficulty of comprehending the forces that shape causation. Unfortunately, neither effectively illustrates the inertial properties of the

past. Aside from maybe a case of mild whiplash, there is rarely a lasting legacy once the carny operator kills the flow of electricity to the bumper-car rink, and even the most congested freeway eventually clears, leaving nary a trace of the worst gridlock or crazy driver. The problem is finding a literary device that conveys motion and mass *and* that accommodates a consideration of individual and collective impacts. In other words, the search for the proper simile is a writerly and pedagogical problem.

Authors and teachers alike lean heavily on metaphoric language. It is our truck in trade, our means of communication. This is why, ever since novelist L. P. Hartley first wrote that "the past is a foreign country: they do things differently there," nearly every historian has invoked his phrase at some point to suggest the sense of strangeness that emerges from the study of history.⁷ Used properly, the elegant metaphor enlightens, inspires, and enables the sort of mental connections that carry speaker and audience to new intellectual terrain. Yet the reverse is equally true. A clumsy construction obscures and confuses. The badly mangled simile can stop learning in its tracks. Much is at stake in the metaphors we choose, and this is why a concept such as inertia is worth contemplation. It can convey a key insight about the relevance of the past, yet because it has value our attempts at word play around it create frustration. Perhaps there is a lesson in that irritation.

Many metaphors connote inertial-like properties, but none are quite like the past. I have described how habitat loss and conservation policies enacted long ago propelled Pacific salmon onto evolutionary paths that now prevent us from experiencing the massive runs of the nineteenth century. I have explained how The Great Game and Alfred Nobel's invention of dynamite still haunt the world with each new wave of terrorism. I have traced how Victorian mountaineers' gendered values still inform outdoor sports and environmental values.⁸ Each tale demonstrates the past's continuing relevance. They remind us of how culture, economy, technology, and nature function like physical forces that push and constrain our world, yet none of these histories easily or rightly suggest a rock, river, bumper car, or pretty much anything else. The past is too messy for such art, even as that old standby inertia continues to do its work. Although modern physics has moved beyond its enlightenment roots, historians still find value in certain Newtonian principles.

Time does exhibit inertial-like qualities, yet the quest for the perfect metaphor is a Sisyphean task. The past is

not easily likened to anything else. Moments can be captured. Trends can be analogized, but once the context shifts the metaphor, like even the most elegant theory, breaks down. And that is why I love history and the inertia metaphor. Both are instructive, but the stories we tell about them resist sloppy thinking and lazy writing. There is no easy way to summarize and categorize temporal change. Insisting that the past matters, that its momentum runs through our lives and into the future, is necessarily only the beginning of a sustained and challenging conversation about history.

- 1 "She of Little Faith," *The Simpsons*, dir. Steven Dean Moore (Fox Network, 16 December 2001).
- 2 For "vast" see Jacques Barzun, *Clio and the Doctors* (Chicago: University of Chicago Press, 1993), 89. For "rapid" see Marcus Aurelius, *The Meditations of Marcus Aurelius*, trans. Jeremy Collier (New York: George Routledge and Sons, 1896), 59.
- 3 Alfred W. Crosby Jr., "Virgin Soil Epidemics as a Factor in the Aboriginal Depopulation in America," *William and Mary Quarterly* 3rd ser. 33 (April 1976), 289-99.
- 4 Charles Wilkinson, *Messages from Franks Landing: A Story of Salmon, Treaties, and the Indian Way* (Seattle: University of Washington Press, 2000).
- 5 Shepard Kretch, *The Ecological Indian: Myth and History* (New York: W. W. Norton, 2000).
- 6 Richard White to author, "Re: Anxiety," personal email (9 November 2005); Roald Dahl, *James and the Giant Peach* (New York: Alfred A. Knopf, 1961), 43-46.
- 7 For "different" see L. P. Hartley, *The Go-Between* (1953; New York: New York Review of Books, 2002), 17; also David Lowenthal, *The Past is a Foreign Country* (New York: Cambridge University Press, 1999).
- 8 Joseph E. Taylor III, *Making Salmon: An Environmental History of the Northwest Fisheries Crisis* (Seattle: University of Washington, 1999); idem., "Americans and the Past and Future of Terrorism," for *Voices of Iowa*, WOI-AM, Ames, Iowa, 21 October 2001; idem., *Pilgrims of the Vertical: Yosemite Rock Climbers and Nature at Risk* (Cambridge, Mass.: Harvard University Press, 2010).

A Science of Signals

Einstein, Inertia and the Postal System

Jimena Canales

What do the speed of light and inertia have in common? According to the famous physicist Arthur Eddington, who led the expedition to prove Einstein's Theory of Relativity, they had a lot in common: "[the speed of light] is the speed at which the mass of matter becomes infinite," where "lengths contract to zero" and – most surprisingly – where "clocks stand still."¹ The speed of light "crops up in all kinds of problems whether light is concerned or not," reaching all the way into the concept of inertia. In Einstein's work, the most seemingly ephemeral and fleeting of things – light – could not escape from the grasp of inertial and gravitational forces.

From 1900 onward Einstein became acutely concerned (personally and professionally) with communications media, and, in particular, with their speed. Could love be sent through the mail?, wondered Einstein. Did kisses arrive at their destination?, asked his contemporary, Franz Kafka. How strange, both men remarked as they perused complicated train schedules and jotted down times and places in their notes and letters, that nearly contiguous places were so far apart once all the stops, bureaucrats and customs officers were overcome, while other distant places could be so easily reached. "How on earth did anyone get the idea that people can communicate with one another by letter?" wrote Kafka to his lover in the 1920s. During those same years, Einstein ended a letter expressing a similar concern: "I won't write any more about it, in order not to confuse things even further."²

Einstein's famous 1905 theory of relativity paper dealt centrally with the problem of sending and receiving time signals. As such, it fit within research on time coordination that involved many other scientists.³ But soon after its publication, scientists started to ask how the exchange of "light signals ... through empty space" investigated by Einstein fit with other forms of communication, including those for

determining time but *not limited to them*. Einstein expanded his work from its initial focus on time signaling to signaling in general. In the process, he learned that neither love nor time could travel at speeds faster than that of light.

Einstein often claimed that his theory seemed strange only because in our "everyday life" we did not experience delays in the transmission speed of light signals: "One would have noticed this [relativity theory] long ago, if, for the practical experience of everyday life light did not appear" to be infinitely fast.⁴ But precisely *this* aspect of everyday life was changing apace with the spread of new electromagnetic communication technologies, particularly after World War I. The expansion of electromagnetic communication technologies and their reach into everyday life occurred in exact parallel to the expansion and success of Einstein's theory of relativity. Kafka, who used similar communications system as Einstein and whose obsessive focus on "messengers" and their delays paralleled Einstein's focus on "signals" and their delays, described the radical change he was seeing around him in the 1920s:

Humanity ... in order to eliminate as far as possible the ghostly element between people and to create a natural communication ... has invented the railway, the motor car, the aeroplane. But it's no longer any good, there are evidently inventions being made at the moment of crashing. The opposing side is much calmer and stronger; after the postal service it has invented the telegraph, the telephone, the radiograph. The ghosts won't starve, but we will perish.⁵

From Time Signals to Signals In General

Einstein's 1905 relativity paper was an investigation into the time taken by "a light signal" to reach an observer "through empty space."⁶ It initiated an unprecedented overhaul of physics that had not been seen since the time of Newton. How did an apparently simple account about basic, procedural techniques pertaining to the exchange of "light signals" become so much more? And how did it efface its lowly origins? In 1905 the "light signals" referred to by Einstein were very elementary, especially compared to what they would become in the decades that followed.

Contemporary physicists and even philosophers often understood Einstein's work as a *science of signals* with implications for telecommunication technologies. Descriptions of Einstein's work as a study of light signals abounded during

the period of its emergence. The philosopher and mathematician Alfred North Whitehead, one of the most important thinkers to challenge the theory, called it both “signal-theory” and “message theory.”⁷⁷ The connection of relativity theory to telecommunications science and technology followed three stages. While they first appeared in 1907 as *constitutive*, Einstein later described them in 1910 as *consequential*. Eventually these connections were completely *effaced*, to the point that most historians, physicists and philosophers forgot all about them.

Einstein’s theory flourished in the era of electromagnetic communication technologies and debates over its validity were argued in terms of the possibilities and limitations of long-distance communication. While still working at the Patent Office, which was being flooded with applications for new wireless communications technologies, he corresponded with his colleague Wilhelm Wien to determine if the exchange of light signals described in his relativity paper applied to other forms of information-transfer signals. His letters now described problems in physics in terms of the general scenario of signal sending (“emanation”) and reception (“perception”): “Let A be a point from which electromagnetic influence can emanate, and B a point in which the influence emanating from A be perceived.”⁷⁸ Einstein followed the results of Emil Wiechert, who determined that the velocity of an “optical signal” should always be less than the speed of light. This was true, Einstein claimed, “in any medium.”⁷⁹

Einstein soon started defining “signaling” in physics in the way it was used by the communications industry, and distinguishing the term from previous definitions that included periodic and predetermined signals. Previously, the term “signal” was used frequently in physics to denote both a symbol and a sign, including periodic and predetermined causes, but Einstein increasingly defined it in narrower terms: as a communications signal.

During the second half of the nineteenth century, the famous German scientist Hermann von Helmholtz had urged his followers to consider the world as a system of *signs*; now Einstein urged his colleagues to think of it in terms of *signals*. In 1907, Einstein explained to a colleague that relativity theory was concerned with *communication* signaling – and not with other types of signs or signals:

I now designate the kind of velocity that, according to the theory of relativity, cannot be greater than the velocity of light in a vacuum as “signal

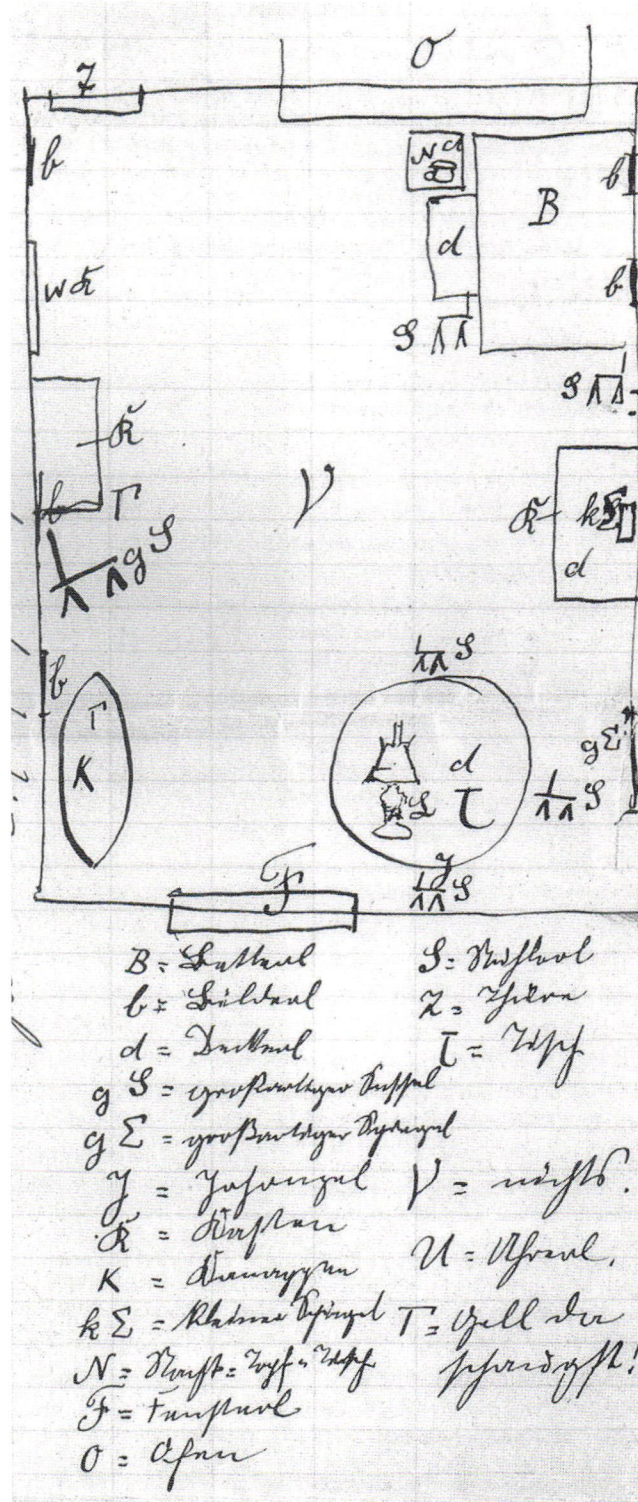


Figure 1. Letter 49: Einstein to Maric [4 February 1907], with a keyed diagram of his lodgings in Bern.

velocity.” This is a velocity which a one-time (not regularly recurring) influence, which is not yet determined by past electrodynamic processes, is propagated; thus, we are dealing here with the propagation of an influence that could, for example, be used for sending an arbitrary signal. The propagation velocity ... in your analysis refers to a periodical process (periodical amplitude change, not an amplitude change of the most general kind.)¹⁰

From that time onward Einstein’s notion of signal was one which could be “arbitrary” and “one-time (not regularly recurring)” of “the most general kind” and which was “not yet determined by past ... processes.” He focused on “the propagation of an influence that could, for example, be used for sending an arbitrary signal,” which was different from “a periodical process.”¹¹

Einstein’s theory of relativity was based on a particular notion of observation-based science, one that considered “observation” in terms of light sent and received, and which contrasts starkly with how it was defined at other historical periods.¹² His descriptions of “simultaneity” explained, with precision, the behavior of rays of light meeting at one source at the same time: “a coincidence at once spatial and temporal on the retina of the observer.”¹³ His work was concerned with a particular form of measurement – one which differed significantly from most micro-metrical measurement techniques employed during the previous century.¹⁴ Measurement, for Einstein, was largely an ascertainment of the departure and arrival of signals.¹⁵

At the same time that Einstein expanded his work from one about time signals to one about general telecommunication signals, he underlined his break from previous interpretations of relativity theory, most notably from those of Hendrik Lorentz, who had developed the famous equations later used by Einstein. “A sufficiently sharpened conception of time was all that was needed to overcome” most of the difficulties plaguing previous interpretations of relativity theory.¹⁶ Einstein reinterpreted the dilation of times predicted by relativity theory as real temporal effects, which were in no respect secondary or apparent in comparison to time in general. Expanding the meaning of the theory of relativity from a narrow one that dealt with clock time and the exchange of time signals to one that involved communication signals in general was necessary

for Einstein’s expansion of the notion of time – from clock time to time in general.

“Signal-theory”

From 1905 to 1907 Einstein’s work changed from being an investigation of time signals to signals in general, but by 1910 Einstein reframed his research in yet another way. Its implications for signaling were described as a “consequence” of a much broader physical theory – and a profoundly counterintuitive one at that. Conditions necessary for sending or receiving signals were what “follows immediately” from his theory – not its starting point. Einstein described the inability “to send signals that would travel faster than light in a vacuum” as a “consequence, as strange as it is interesting” of his theory.¹⁷ Not everyone was convinced that this “consequence” followed necessarily. An audience member in one of Einstein’s lectures protested that “he always comes to perceive the world around us by way of light signals.”¹⁸

“Signal-theory” is what “we will call it,” wrote Whitehead referring to Einstein’s theory of relativity.¹⁹ Whitehead’s reading of Einstein’s theory (and of what he considered to be its main inadequacies) centered intently on its relation to communication technologies. He chastised Einstein for giving an unwonted importance to light signals over others. He agreed that “light signals are very important elements in our lives,” but nonetheless felt “that the signal-theory somewhat exaggerates their position.” Whitehead stressed the role of *other* messaging technologies which he saw around him, reminding readers that “there is the transmission of material bodies, the transmission of sound, the transmission of waves and ripples in the surface of water, the transmission of nerve extension through the body and innumerable other forms which enter into habitual experience.” His verdict and critique of Einstein’s focus was clear: “The transmission of light is only one from among many” alternative ways of sending “physical messages from place to place.”²⁰

Whitehead understood that the most important conclusions of relativity arose because light “was our quickest system of signals.”²¹ Yet, he argued that a “system of signals” should not be elevated to a theory of the universe. In contrast to Einstein, Whitehead stressed the connections of relativity to current technical limitations for signaling, and aimed to develop his own version of relativity in a way which was no longer so intensely dependent on

them. Contemporary technological limitations in signaling speed were the reason why the speed of light appeared as a constant in Einstein's theory. That is why "we are driven to the *convention* that light, as our quickest system of signals, is moving with uniform velocity."²² While Whitehead understood and accepted the radical conclusions of Einstein's theory with all its paradoxes, he nonetheless turned the physicist's argument completely on its head. Einstein started his argument by insisting that the constancy of the speed of light was a universal fact of nature; Whitehead started his by noting that it was, to that day, the quickest way of sending signals. In doing so, he placed the contemporary reality of telecommunication technologies of his era at the origin of our relativistic understanding of time.

Whitehead's account of relativity echoed with the views of many others. "The Einstein rules" were clear: "just giving and receiving signals," explained the American philosopher William Montague, who similarly did not believe that lessons about the transmission of light signal should be extended to a theory of the universe.²³ "Einstein's 'light' is the most wonderful thing in the world," he mocked.²⁴ The French scientist and philosopher Gaston Bachelard, another contemporary of Einstein, remarked on how current determinations of the speed of light, something so directly tied to wireless communications, emerged as much more. Instead of being a "reality found through experiment" it was "affirmed by a rule": "In effect, in Relativity, the speed of light does not appear as a reality that was found through experiment, but rather as a reality affirmed by a rule."²⁵ The philosopher DeWitt H. Parker limited the significance of the theory of relativity to a science of messages, claiming that "relativity theory gives an absolutely correct picture with regard to the messages...."²⁶

The physicist Sir Oliver Lodge, who made important contributions to the science of telegraphy (including wireless) became a strong critic of the philosophical underpinnings of relativity. In particular, he criticized Einstein's focus on light waves in terms of their potential for information transfer. "The mere reception of information," he argued, was given too much importance in Einstein's work: "It is true that these waves are among our methods of receiving and conveying information; but too much attention may be paid to the mere reception of information."²⁷ Reception of an event, according to Lodge, should not be confused with the event itself, and he proceeded to criticize those who "speak as if the duration of the event

could be extended by merely delaying the reception of the news at its end."²⁸ Einstein's position, wrote Lodge, led to an absurd result: "as if we could prolong a man's life by evading the tidings of his death; and might be entitled to say, without absurdity, that a man who died at seventy had lived seventy-one years and a lot of miles, if we had travelled so far that a messenger took a year to reach us."²⁹ A few years earlier, in 1917, Kafka wrote the story "The Great Wall of China," which described a similar situation. Because of the long transmission time of messages across the great nation, "in our villages, emperors long since dead are set on the throne."

Although many other commentators followed Whitehead, Lodge, and others in investigating the theory's relation to signaling technologies, many of them did not consider that aspect of Einstein's work as limiting. After World War I, the theory's connection to communication technologies continued to be mentioned periodically by both scientists and philosophers, but (for the most part) these connections were increasingly deemed to be *consequential* rather than *constitutive*. Eventually, they slipped into the background until they largely became invisible.

Even scientists like Eddington, who stressed the most theoretical and cosmic aspects of relativity theory over the most mundane, employed the language of communications technology in order to explain and understand it. Eddington described Einstein's views of time in terms of information and noise. "The phrase *true time* is a 'meaningless noise,'" he explained.³⁰ He confronted head-on the prickly accusation of the preponderant importance given by Einstein to signaling speed of light effects, answering the "objection" that "is sometimes raised to the extravagantly important part taken by light-signals and light-propagation in Einstein's discussion of space and time."³¹ He explained how nothing "capable of being used as a *signal* can travel faster than 299,796 kilometers a second."³² The theory of relativity perfectly explained "the consequences of being able to transmit messages concerning events" from one place to another.³³ The world described by Einstein was the way it was, explained the astronomer, because "signaling is only possible" in certain conditions and not in others.³⁴

Yet Eddington followed Einstein himself in *effacing* the theory's relation to media technologies while, paradoxically, he used them as illustrative examples. He included his statements about "wireless messages" only in a footnote to

the published lecture, and not in the lecture proper. While Whitehead had criticized the extension of a science of light signals to a general science of the universe, Eddington welcomed this extension by introducing some additional examples.

The assessment of relativity theory by Louis de Broglie, the famous scientist who contributed to the development of quantum mechanics, was almost exclusively in terms of telecommunications. This point of view perhaps came naturally to de Broglie, who, upon entering the army during World War I, worked in the wireless military service unit that used the Eiffel tower for military wireless transmission under General Gustave-Auguste Ferrié who collaborated with Marconi since in 1899 and who in 1908 placed new antennas on the tower to increase the range of radiotelegraphic transmission from 400 km to 6,000 km. De Broglie framed Einstein's contribution as proving the "absence of signals which travel at infinite speed" and realizing "the fact that no signal can travel with a speed greater than that of light in a void."³⁵

The philosopher Hans Reichenbach also explained Einstein's theory by reference to signaling technologies: "Einstein's relativity of simultaneity is closely associated with the assumption that light is the fastest signal."³⁶ It would not hold in a world with "no upper limit for the speed of signals."³⁷ He also used the example of the telephone to illustrate how we could grow "accustomed" to the reality described by Einstein. "If a telephone connection with the planet Mars were established," he explained, "we would have to wait a quarter of an hour for the answer to our questions." If our communication technologies functioned in that way then "the relativity of simultaneity would become as trivial a matter as the time difference between the standard times of different time zones today."³⁸ His description of the Michelson-Morley experiment illustrated just how heavily he relied on theories of communication, while he nonetheless *effaced* these constitutive connections to communications technology. He went as far as describing the Michelson-Morley experiment as a telecommunications machine, that is, as an experiment about the speed of "signals." Reichenbach argued that "the assumption that light is the fastest signal" was "an idea which could not be conceived before the negative outcome of such experiments as that of Michelson."³⁹ He also echoed Einstein's own view that his theory was only difficult to understand because the enormous speed of light made it seem instantaneous: "Human beings, in whose daily expe-

riences the effects of the speed of light would be noticeably different from those of an infinite velocity, would become accustomed to the relativity of simultaneity and regard ... [it] as necessary and self-evident."⁴⁰

Effacing Communications Technology

Yet Reichenbach's reliance on communication technologies to understand and explain Einstein's theory was similarly relegated. His comprehensive philosophical understanding of "experiment" did not include a role for technology, let alone contemporary and especially commercial technologies. Einstein's work emerged from "an empiricism which recognizes only sense perception and the analytic principles of logic as sources of knowledge." In this general view, there was no place for media like the "telephone," which he, ironically, used to explain the theory.⁴¹

For many scientists, the constancy of the speed of light – one of the central and most mystifying claims of Einstein's theory – was a mere technological fact related to current limitations in telecommunication technologies. Many considered that the value of the speed of light, often expressed in kilometers per second and stated in formulas simply as c , was so technical and so lacking in elegance (it did not even come close to being a nice round number or integer) that it was unfit to parade as a universal absolute.

Einstein disagreed. Even up to the last years of his life, Einstein combated critics by stressing how the seeming arbitrariness of the number c could be eliminated. If the unit of seconds from the relativity equations was replaced by "the time in which light travels 1 cm" it could be made to equal one.⁴² Once the arbitrariness in the number c was made to disappear, the constancy of the speed of light appeared much more natural, logical, necessary and universal. But either recalculated to equal 1 (by replacing the unit of seconds with the time taken by light to travel 1 cm) or in its traditional (yet messier) kilometers per second format, the speed of light was what it was in the first decades of the century: the speed of the fastest communication technologies of the era.

A Universe of Signals

When Einstein famously said that "we cannot telegraph into the past," this often-repeated sentence was considered to have profound metaphysical and cosmological consequences.⁴³ But this statement was also a simple comment about a practical limitation of the communications technologies of his era.

Einstein, by reference to signals, and their path and their reach, overhauled concepts of time and space. By reference to them, he recalculated the shape and size of the universe; understood gravitational forces; determined the relation between cause and effect; and differentiated the past from the present and future.

In Einstein's universe all actions had to be carried by a signal. He forcefully criticized Newton's theory because of its reliance on the concept of "action at a distance," a phrase that increasingly referred to Newton's uncritical notion of bodies (such as planets) acting on each other without offering any explanation for how actions were actually carried from one body to the other. Newton's universe was replete with actions at a distance. The mass of the sun, for example, mysteriously acted on the earth and produced its orbit. In the Newtonian universe the attraction between any two bodies was simply proportionate to their masses and to the square of the distance between them. Newton was not concerned with how these forces propagated or what sustained them. How, Einstein argued instead, were these forces transmitted exactly and at what speed? In "Einstein's theory," explained Lorentz, "gravitation itself does not spread instantaneously, but with a velocity ... that may be compared to that of light."⁴⁴

One of the most revolutionary assertions of Einstein was that the universe was essentially curved. The idea that the shortest path between two points was not, as in Euclidean geometry, a straight line was directly connected to the universe's curved shape. How could a curve be the shortest path between two points? If the shortest path was defined as that travelled by an *electromagnetic signal* in the presence of a gravitational field, the result was indeed a curve. In Einstein's universe the distant and the close did not match with the faraway and contiguous. Kafka, at about the same time as Einstein, described places that, although next door to each other, were far since they could never be reached by a messenger.

Einstein and many of his interlocutors defined the relation between cause and effect in terms of signaling. Before Einstein's theory appeared, explained Paul Langevin, scientists thought that signaling could be instantaneous, that "a string to ring a bell ... permitted instantaneous signaling."⁴⁵ But even this "causal" effect took time to occur. The pulling of the string and the ringing of the bell were not simultaneous: "causality, whatever its nature, cannot propagate itself with a velocity greater than that of light. There should not exist a messenger or a signal that

can travel at speeds greater than three hundred thousand kilometers per second."⁴⁶

As Einstein developed his work from one initially about clock signals to signals in general, he increasingly started to understand the difference between the past and the future in terms of signaling possibilities. He defined the past as the time of signal *emission* if compared against the time of *reception*. And the future was the time of *reception* if compared to the time of *emission*. There were no cases where a "signal would have arrived at its goal before being emitted: The effect would precede the cause."⁴⁷ Eddington, similarly, explained that the past was only really past if it "would be possible for us to have already received a wireless message announcing its occurrence."⁴⁸

Wires, Wireless and Radio

Einstein's twentieth century world differed from the eighteenth century world of Newton in one essential respect: technologies of communication were radically different. Carriers of communication were no longer people and postal letters, but rather electromagnetic technologies: telegraph, telephone and radio.⁴⁹ As a consequence, communication was no longer connected to transportation networks and eventually outpaced them greatly. In the postal era, people and information travelled in vehicles; in the electromagnetic era, they did not. The rules of communication were radically new and these new rules were exactly the same ones that Einstein described and ascribed to the entire universe. The world of horse-drawn carriages and post was one where geography mapped onto territory; the world of steam, rail and telegraphy and was one which surpassed geographical obstacles through the exploitation of natural resources and cheap labor; the world of telegraph, telephone and wireless was Einstein's universe. In 1928 the poet and critic Paul Valéry described how telecommunications reached even the interior of private homes, in what seemed a veritable "reality home-delivery service." Valéry asked, "I don't know if a philosopher has ever dreamt of a *société pour la distribution de la Réalité Sensible à domicile*."⁵⁰

Light signaling technologies before the nineteenth century were mainly optical, and connected to the semaphore, which was used mostly for military purposes. By the middle of the nineteenth century a light signal referred as well to the signal of an electric telegraph. Along with telegraphy, the last decades of the nineteenth century were marked with the possibility of at least another type of

electromagnetic transmission. Like the semaphore, it was optical and based on the transmission of light, but unlike the semaphore, the signal could not be seen with the naked eye. Like telegraphy, it involved electricity, but unlike telegraphy, transmission occurred wirelessly. Like X-rays, it was able to penetrate and cross bones, walls and all sorts of obstructions.

In 1887, the German physicist Heinrich Hertz saw an electric spark jump in a coil of wire when he passed electricity through another close-by coil. In 1894, Guglielmo Marconi transmitted dots and dashes across his garden. Around 1900, telegraph and telephone conversations only occurred for urgent business affairs. Until 1903 most wireless applications were still military.⁵¹ In 1905, when Einstein published his famous paper, wireless transmission could only be used for the transmission of simple signals to a few highly specific places. Long-distance communications were mostly carried out through the post, although telegraph networks continued to expand. In 1907, a decade after the Bell telephone patents expired, Einstein could telephone some of his friends. Wireless transfer of voice occurred experimentally a few years later. Wireless time sending service became regular in Paris after 1910. When World War I broke out in 1914, research into wireless increased, creating a new demand for triode vacuum tubes (previously manufactured mainly in the U.S.).⁵² After 1914, Einstein used the telegraph for personal business and telephone calls started becoming more frequent.⁵³ By 1915, telegrams started to be sent by telephone wires, eliminating the need for telegraphy to remain an autonomous system.⁵⁴ By the year 1920 the use of the telephone had won over the telegraph to the point that Einstein had a telephone installed in his house.⁵⁵ Broadcast radio gained momentum after those years.

Post

In his early years, Einstein's own experience of signal transmissions was through correspondence and the postal system. At the turn of the century, he had to spend significant amounts of time away from his lover Mileva Marić, sending her letters that circulated in a similar postal system to the one used by Kafka to reach his lover, Milena Jesenská. After a period of silence, Einstein wrote to Marić: "Three days have passed without my having received a letter, and as many nights. But I am so firmly convinced that you wouldn't let me wait so long, that I definitely believe that the letter got lost," blaming the "negligent postal

service." Information transfer was at mercy of the post: "All this I have already written, but who knows whether you received it."⁵⁶ For Einstein "they [letters] must substitute for wifery, parents, friends and company, and they can do it, too."⁵⁷ But further separation from Marić made Einstein painfully aware of the limitations of the postal system. In addition to the delay of transmission, messages could cross: "But our correspondence, dear sweetheart, seems to be under an evil spell, seeing that you had not received my letter at the time you mailed yours. This is the 3d one I am sending you."⁵⁸ Fears of meddling in their relationship by others intervening with the postal system led Marić to send a "registered letter" out of fears that Einstein's parents would "take away a letter."⁵⁹ At times the messages did cross, and at least once Marić wondered what happened to her letter: "Did it indeed get lost or did something else happen to it?"⁶⁰ Einstein was so aware of the postal system that he compared himself to a postal package. When he did not know where he was going to live while in Zurich he wrote: "Thus I, poor postal parcel, must wait until I get enlightened about the place of my destination."⁶¹

In 1901 Einstein compared his spatial distance from Marić to the "astronomical distances" they were both studying as physicists. He remarked how only a "huge imagination" could overcome these distances – ever painfully aware of the limitations of communication technology of his era. For Einstein and Marić, who had studied and worked together in Zurich, the challenge of being together again was connected to their goal of finishing "their" work on relative motion: "How happy and proud I will be when the two of us together will have brought our work on the relative motion to a victorious conclusion!"⁶² In the same letter to Marić, Einstein explained that he was "working very eagerly on an electrodynamics of moving bodies, which promises to become a capital paper."⁶³

The postal system enabled Einstein's romantic relationships. Einstein initially believed that "love" could be sent and received through the post. After receiving a letter from Marić, he wrote: "Thank you very much for your little letter and the true love that's in it."⁶⁴ Letters, nonetheless, were not a perfect substitute for a person. Einstein remarked on the evident differences between writing to and being with someone: "Writing is stupid. Sunday I am going to kiss you orally."⁶⁵ Yet Einstein started to understand that his love for her was strengthened with distance: "You can't imagine how tenderly I think of you whenever we're

not together, even though I am always such a mean fellow when I am with you.”⁶⁶

By the time he was living with Marić as his wife, but having a long-distance affair with his cousin Elsa, Einstein continued to have doubts about compensating for distances by letter-writing. Letter-writing provided only a “miserable surrogate of reality.”⁶⁷ By the time he separated from his wife and was free to marry his lover, Einstein had become painfully aware that he preferred love at a distance. Vacillating on his promises to marry Elsa, he argued that “a little bit of distance in our external life will be sufficient to protect what has made life so wonderful for us now from becoming banal and becoming pale.”⁶⁸

During the first decade of the twentieth century, writers at a distance from each other communicated what they were seeing by sending drawings or photographs through the post. In 1912 the first successful telegraphic transmission of photographs from two distant European cities had taken place, but these technologies were only used for emergency “wanted” persons. Television was decades away.

Einstein repeatedly expressed a desire to see across distances: “If only I could peep through the keyhole!” he wrote to Marić from Milan. He also repeatedly wrote about the difficulties in sending images and photographs across long distances, which he did through post. In September 1900 after their time apart was nearly coming to an end, Einstein sent Marić a drawing of his foot: “I am finally sending you the sketch of my gigantic little foot ... since you have such a huge imagination and are used to astronomical distances, I believe that the accompanying work of art will suffice!”⁶⁹ Imagination was the only way to complement the deficiencies of the postal system for the transmission of images, and it was grossly imperfect. In a 1901 letter to Marić, Einstein asked, “Why don’t you make me a drawing of it [her figure], a really beautiful one!” Einstein’s desire to see across distances intensified after the birth of his daughter Lieserl while he was still away: “I love her so much and I do not even know her yet! Couldn’t she be photographed once you are totally healthy again?... When you feel a little bit better, you must make a drawing of her.”⁷⁰ To Marić, he sent a sketch of his room so that she could see what it was like [Figure 1].

To satisfy his lover Elsa while away, his only option was to send her a photograph of him by post as some sort of substitute: “I will try to find a picture of myself for you. I would prefer to come in person, but....”⁷¹ The photograph sent “did not arrive” and “then the Prague photographer



wrote to me, but the letter – did not arrive. This puts an end to my credulousness.”⁷² When his son received a photograph of his father in the post after a long period of not being able to see him, he wrote to his father: “It is good that photography has been invented these days, since thus at least we get to see you.”⁷³

During the first decade of the twentieth century, Einstein repeatedly wrote with frustration (and at least one time, regarding a possible reproach from his father, with satisfaction) about the inability to hear distant voices. While he wanted to be with Marić, he did not want to see his father, who did not approve of his girlfriend, and was already preparing a sermon against her: “Papa has now also written me a sermonizing letter for the time being, but he promised me that the main thing will follow orally.”⁷⁴ When commenting with undisguised excitement about when his friend Maurice Solovine was going to arrive, he explained: “Solovine is not yet within hearing distance, but he is bound to come soon.”⁷⁵ During those years letters appeared secondary to speech, which for the most part was still attached to a person’s body.

In the age of telephone and telegraph, Einstein continued to use the postal system, but he considered its advantages less in terms of the transmission of letters or people, than of goods *without* people. During his involvement with Elsa almost a decade after his relativity paper, the post and its delays took even more significance, but the significance was now different. Both text and voice could be sent through the telegraph and telephone. By then, Einstein no longer despaired about the difference between hearing and writing, but about being able to eat her cooking, which she was, fortunately, able to send by post. He became addicted to goose cracklings that his lover sent in the mail: “How good they are! Just now I have one in my beak and think with delight of the dear cook who, on top of her exciting undertakings, also has the heart and mind for a thing like this.” But they further rubbed in the limitations of long-distance relationships, between letters, food, and flesh. “You pinch me with your letters but stroke me with goose cracklings,” he despaired.⁷⁶ One sad day in Zurich “all that arrived was the cover box with a few great-smelling grease stains.” Einstein lost his patience: “But if I could seize that scoundrel of a postal worker by the scruff of his neck!”⁷⁷

Einstein’s confidence in the postal system started to falter a few years before World War I broke out and declined sharply thereafter. By 1915 “the question of time” was not one that could be solved by exchanging letters. When

the difference between his view of relativity and that of Hendrik Lorentz, who had developed the basic relativity equations used by Einstein, was reaching a point of crisis, Einstein was clear that the disagreements could not be solved through the post: “Finally, as far as the question of *time* is concerned, we are scarcely going to be able to debate this effectively by letter. I shall be glad to come to Holland.”⁷⁸ The “question of time” was in fact not resolved through correspondence. In 1920, when trying to solve a practical issue pertaining to him getting his violin from Elsa, he gave up discussing it by letter: “I won’t write any more about it, in order not to confuse things even further.”⁷⁹

During these same years, Kafka wrote “written kisses don’t reach their destination,” revealing that he was noticing some of the same aspects of communication technologies that Einstein was. In the face of electromagnetic alternatives, postal communication appeared much more secondary than the telegraph and telephone.

Kafka even asked where the strange idea that people could communicate by letter had come from.⁸⁰ The emergence of this idea *as a question* was unthinkable in the era of post – communication between people through correspondence was taken for granted. But in the same letter Kafka described emerging alternatives: “the telegraph, the telephone, the radiograph.” In the face of alternative electromagnetic communication, the concept of communicating through texts started to emerge as quite strange. At the same time, the word “media” started to gain more and more currency. Einstein had titled his famous relativity theory paper “on the electrodynamics of moving bodies,” but soon the physicist Hermann Weyl, one of the theory’s first popularizers, found it more fitting to refer to it as a work on the “electrodynamics of moving *media*.”⁸¹

Einstein’s Rules of Traffic

In the early years of the century train travel was the preferred means for bringing two people in contact with each other physically. Einstein’s early letters were riddled with meeting times, often in railways stations: “We’ll meet Monday at 6 o’clock at the tower,” he wrote to Marić. Perhaps he meant under a clock tower?⁸² Train travel had a particular significance for Einstein and his lovers, first with Marić, then with Elsa, and for a brief period for the three of them. He feared an encounter between the wife and his “friend” simultaneously in the same train station. When he started to have an affair with his cousin Elsa,

train stations and train speed became even more important: "Now I can't even pick you up at the train station and take you into my arms," he lamented to her, because "my wife is returning a few hours before you to make a last attempt at preventing the divorce."⁸³ At a railway station in Berlin Einstein bid goodbye to his marriage and family: "The last battle has been fought. Yesterday my wife left for good with the children. I was at the railway station and gave them a last kiss. I cried yesterday, bawled like a little boy yesterday afternoon and yesterday evening after they had gone."⁸⁴

Railway stations were the place where two people previously separated by a distance could see and hear each other. Meeting, seeing and hearing were linked; vision, voices and people were all connected through railway technologies.

Shortly after Hertz's discovery, scientists were quick to notice that the transmission occurring wirelessly from one electric coil to another did *not* follow the same rules under which transportation technologies operated to carry texts, people and goods in the post and other vehicles. To explore the differences, from 1911 onward Einstein frequently turned to examples of moving vehicles, cabinets or boxes containing an atom or a person inside, that sometimes had windows and sometimes did not, which sometimes moved up and other times down, or forwards or backwards, accelerated or at constant speeds. Einstein's claim in his General Theory of Relativity that there was no difference between gravitation and acceleration was illustrated by explaining that the effect of being pushed to the floor when an elevator ascended was of the same nature as the effect of being pushed to the ground everyday by the earth's gravitational pull. When Einstein completed his general theory he described something similar to an elevator, but which was literally an experiment with a "man in a spacious chest resembling a room" hooked to a string which could raise or lower it. Lorentz, describing Einstein's theory in 1919, framed one of Einstein's contributions as "The Earth as a Moving Car." Lorentz agreed with Einstein: "we may compare the earth with such a moving vehicle," explaining how "everyone knows that a person may be sitting in any kind of a vehicle without noticing its progress, so long as the movement does not vary in direction or speed."⁸⁵

But when Einstein turned to the study of moving vehicles to expand his theory of relativity from a special to a general case, the rules for understanding the move-

ment of these vehicles were radically different than they had been before the advent of competing electromagnetic forms of communication. When Einstein's "rules" were directly applied to transportation vehicles such as automobiles, certain results appeared absurd. William Montague mockingly compared "the world of Einstein to a country ruled by a Mad Dictator. The Dictator besides being mad is passionately fond of motoring. He drives everywhere, and always at the tremendous speed of 186,000."⁸⁶ The country of the Mad Dictator had strange rules: "If any speedometer fails to record the Dictator's speed as constant relative to the citizen's own speed, no matter what that may be, it is known to be wrong and is immediately confiscated."⁸⁷ In this world, a world that, "when unequals are added to equals the results are equal" and "if two and two were put together in such a manner they might make four ... the law called for only three."⁸⁸ Montague did not accept Einstein's theory; he nonetheless successfully explained just how absurd it would look when applied to a universe of mail (vehicles) rather than to the one of electricity.

Einstein's universe stood in stark contrast to an earlier one, where communications were carried out between people and written texts, and which relied on transportation technologies that fell under the general rubric of "the post." The post-post epoch was characterized instead by field physics that contrasted with previous action-at-a-distance theories of the universe and of gravitation. Additionally, it was a world where the carriers of communication were no longer people and written texts, but electromagnetic: telegraph, telephone and radio.

Conclusion

What does Einstein's private life and his science have to do with each other? Einstein, in many of his writings, claimed that they had very little to do with each other. For example, in his autobiography he explained, "The essential in the being of a man of my type lies precisely in *what* he thinks and *how* he thinks, not in what he does or suffers."⁸⁹ Yet Einstein's thoughts, deeds and feelings were conducted through media in a manner not wholly dissimilar and sometimes directly connected to the transmission of light through space. They too could not escape inertial forces. A concern with sending and receiving affected equally Einstein's thoughts, deeds, and sufferings.

Describing a life in terms of "thinking, doing and suffering," Einstein nonetheless asked us to focus only on the first element. For the most part, historians and philoso-

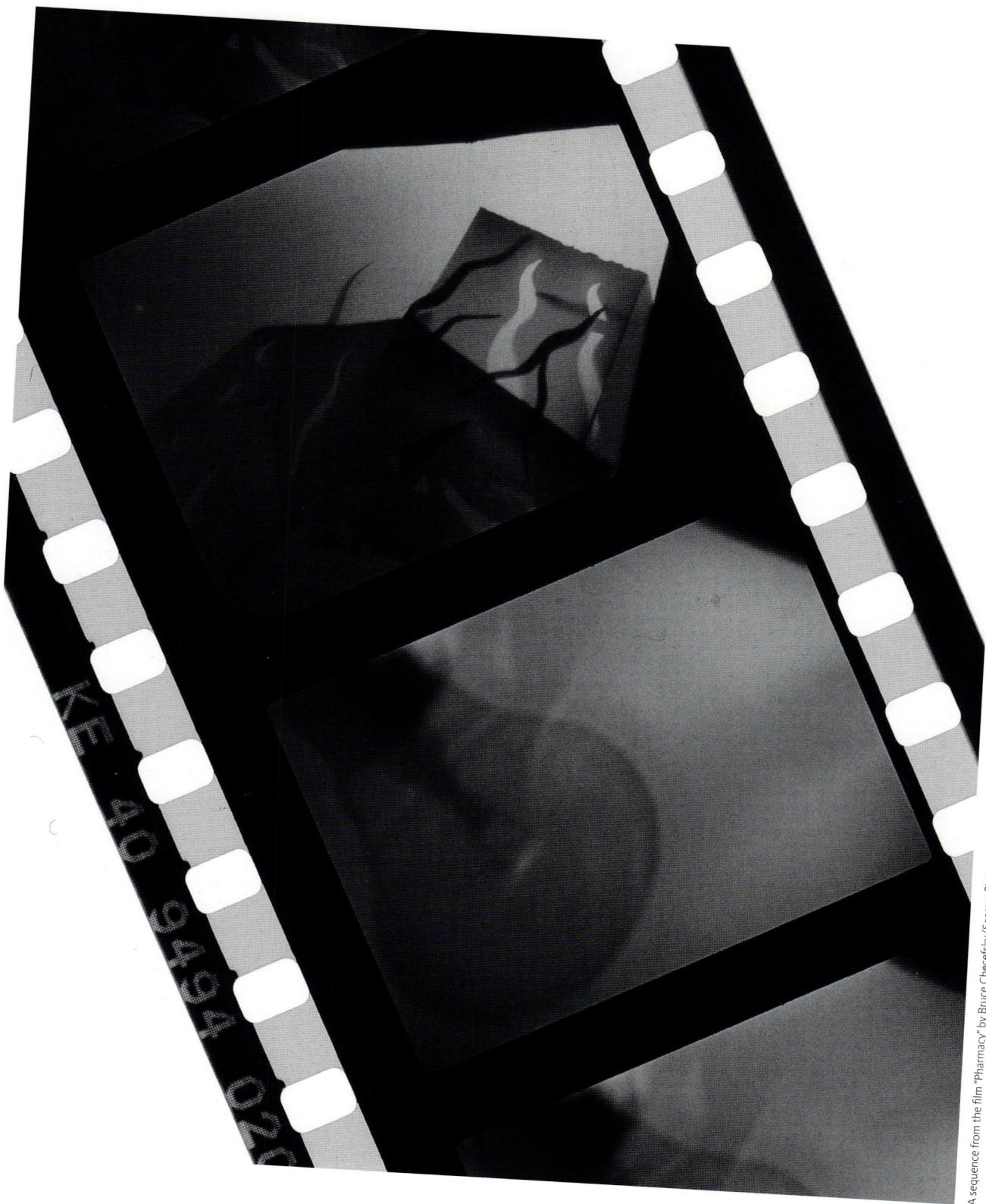
phers – until recently – seemed to agree with him, at the same time they have lamented and despaired about how difficult it is to analyze “thinking.”

To overcome evident difficulties in analyzing “thinking,” the philosopher Hans Reichenbach proposed one very popular solution: analyze it as it “ought” to be rather than as it really was. “What epistemology intends is to construct thinking processes in a way in which they ought to occur,” he proposed. Reichenbach invited philosophers to study the “context of justification” where scientific theories were tested, instead of trying to tackle the obscure “context of discovery” of the mind’s labyrinths. The legacy of Reichenbach, and the logical empiricist school of which it formed part, described a world divided in two. By “replacing the real intermediary links” between the starting-point of knowledge and its final result with a “rational reconstruction” of those links, the internal structure of knowledge could be studied. In his rational reconstruction of Einstein’s work, Reichenbach felt justified to efface its connections to media technologies at the very same time that he used those technologies to understand Einstein’s work. A focus on the relation of Einstein’s work to the communication technologies of his era leads us to a radical alternative that denies the neat divisions outlined by Reichenbach.

In the summer of 1901 Einstein received a letter from Marić, saying “There is a train that passes Mettmensstatten at 7:56 A.M.... Would you like to take this journey with me, sweetheart? Oh, if only I could have you once more, just exactly to my heart’s desire, my dear sweet love! If you knew how I loved you.” A few years later, Einstein would write down the famous lines of his relativity paper, “That train arrives here at 7 o’clock.”⁹⁰ Writing these lines, he was – despite himself – thinking, doing and suffering at the same time.

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- 2 Einstein to Elsa Einstein, Leyden, Saturday [22 May 1920], Albert Einstein Archives, Online and at the Hebrew University of Jerusalem, Israel.
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- 54 Siegert, *Relays: Literature as an Epoch of the Postal System*, 189.
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- 56 Einstein to Marić, Schaffhausen, 28 November 1901.
- 57 Einstein to Marić, Schaffhausen, 28 November 1901.
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- 59 Einstein to Marić, Milan, 30 August 1900 or 6 September.
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- 61 Einstein to Marić, Milan, 10 October 1899.
- 62 Einstein to Marić, Milan, 27 March 1901.
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- 64 Einstein to Marić, Melchtal, 27 March 1901.
- 65 Einstein to Marić, Winterthur, c. second half of May 1901.
- 66 Einstein to Marić, Bern, 28 June 1902 or later.
- 67 Einstein to Elsa, Zurich, 16 October 1913.
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- 71 Einstein to Elsa, Zurich, c. 14 March 1913.
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- 76 Einstein to Elsa, Zurich, 2 December 1913.
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- 78 Einstein to Lorentz, Berlin 25 January 1915.
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A sequence from the film "Pharmacy" by Bruce Checcofsky (Seesaw Pictures, 2000).

Reactivating the “Lost” Treasures of the European Avant-garde

A Conversation with Artist and
Filmmaker Bruce Checefsky

Anna Dempsey,
Benjamin Matteson,
and Pamela Karimi

*Bruce Checefsky, the director of the Reinberger Galleries at the Cleveland Institute of Art, is an internationally known photographer and filmmaker whose works are part of the permanent collections of MOMA, Whitney Museum of American Art, The Getty Research Center, Japan’s Museum of Modern Art, and the British Film and Video Collection, among others. Checefsky’s innovative approach using archival documents to reconstruct “lost” avant-garde films triggered the idea of this informative conversation, which took place in July 2010 between Checefsky and Anna Dempsey, Benjamin Matteson, and Pamela Karimi. Although addressing Checefsky’s broad artistic views, this conversation chiefly concerns his 2001 reproduction of the 1930 avant-garde film, *Apteka (Pharmacy)* by Polish artists Stefan and Franciszka Themerson.*

DEMPSEY/MATTESON/KARIMI

For all of your films—beginning with *Pharmacy* (2001), based on Stefan and Franciszka Themersons’ *Apteka* (1930)—you have undertaken extensive archival research that has contributed to your success in complexly addressing a wide range of issues in this series of works reengaging the remnants of early European avant-garde film. Your use of pharmaceutical glass implements,

pills, and papers in *Pharmacy* could be explained largely by the simple biographical fact that Stefan was the son of a doctor and consequently acquainted with the equipment of a typical pharmacy. Your choice of these objects, which allowed you to investigate the formal interconnections between shape, material and transparency, is ideally suited to the filmic manipulation of light that Stefan and Franciszka Themerson intended to explore through the photogram technique.¹ However, a more complex reading of the Themersons’ choice of subject matter for their first film is also suggested by aspects of the contemporaneous socio-political milieu of Poland. By 1930, euphoria accompanying the post-WWI return to political sovereignty in Poland had almost certainly been extinguished by the subsequent challenges of governing an independent Polish state and developing a distinctive, coherent Polish national identity. In fact, by the time the Themersons began making their first film in 1930, democracy had given way to rule by an authoritarian regime, aggressive neighboring states again threatened from both east and west, and the economy of the country was deeply distressed. The state of affairs was even likened to “sickness” by the authoritarian Piłsudski regime, which took as its motto “Sanacja” or “Healing.”² In the research for your project, did you find evidence that suggested the Themersons’ selected subject matter was informed by their views on cinematic forms such as light, time, and the photogram? Is it possible that the arrangement and rearrangement of form ties into broader sociological and societal concerns? Or should we assume that the Themersons were simply grappling with a belief articulated years later by Theodor Adorno, i.e., that art was autonomous and “functionless.” And that it was the “social antithesis of society” and thus powerless to effect change?³

CHECEFSKY

Avant-garde cinema typically rejects traditional plot interest, suspense, and human characters, and depends on the shock of visual representation; the literary intertexts are usually well hidden. *Apteka*, with its pharmaceutical glass implements, pills, and papers may very well have been a cinematic metaphor for Poland’s “recovery.” Poland was faced with extensive war damage and a ravaged economy following World War I. These circumstances, combined with the commonly held opinion that the problem in Poland was due in large part to Jewish separatism, provided a unique political and cultural environment for the Themersons, whose personal attachment to the Jewish community was very strong. Stefan Themerson, born 1910, was the son of Mieczysław Themerson, a physician, social reformer and aspiring writer

of Jewish descent. His mother, Ludwika Smulewicz, was also Jewish by ancestry. Franciszka was born in 1907 in Warsaw. Her father, Jacob Weinles, was a well-known painter of large-scale, tragic-heroic scenes from the life of the Jewish community, and surely saw his role as political; her mother was the pianist Lucja Kaufman. Her sister also became an artist.

Poland implemented a policy of “ethnic pressure,” during the 1920s. Non-Polish minorities were subjected to discrimination with the intention to encourage them to emigrate. The Jews in Poland were not exempt from this treatment. Clearly, the Themersons would have witnessed firsthand various degrees of insularity while living in Warsaw although there is no evidence that they were subjected to such treatment.

The Themersons were interested in the modulation of light in a darkened room perhaps more than any overtly political statement. They could have easily chosen other types of objects as they did in *Moment Musical* (1933), their first sound film, a three-minute commercial in which photograms of light-pierced jewelry, porcelain and glass were animated to music by Ravel. But the fact remains that they chose instead pharmaceutical objects from Stefan’s father’s medical practice, an interesting choice given Piłsudski regime and its motto “Sanacja.” It’s possible that Stefan and Franciszka were unaware of the subtle connection between the two, but in my opinion, there’s enough peripheral evidence to suggest otherwise. They were young, impressionable artists with a distinct knack for parsing the subtleties of language; “pharmacy” and “healing” suggest similar outcomes, whereas the former may be viewed as the empirical end of the political argument, the latter as moral.

The tense sociopolitical climate may have influenced the Themersons’ decision to work with cameraless photography, or photograms, although evidence of Stefan’s interest dates back to 1927, when he was still a student in high school. In *The Urge to Create Visions*, Stefan explains:

The strange thing about a photogram is that the essence of it isn’t in it, it is in your eye. Either you see it or you don’t. And, even when you can recognize in it the meek, humble objects that have created it – a comb, a flask, a leaf, a tea-strainer, it is not a representation of any comb, or flasks, or leaves, or tea-strainers, it is what it is, its reality is its own.⁴

The photogram is a notion of order distinct from reality; it

is a representation, an image of an image. It is in fact one of the clearest examples of the category of sign that semiologists have called deictics; the photogram denies the photograph its sign and, in doing so, casts a shadow, a proof of existence, as an equivalent of the object it represents, the indexation of the tale. This semiological property made it an object of deep interest to Stefan and Franciszka.

In contrast to Theodor Adorno, who believed that art was powerless to effect political change, the Themersons believed that a new “order” in art could affect public discourse. Because the photogram is a material proof of the process of visualization, it indexes the perceptual ways we make sense of the world.

DEMPSEY/MATTESON/KARIMI

The following passage from a 1977 letter written by Stefan Themerson indicates that in the beginning of his career he had little exposure to non-Polish film production:

... (It [a journal the Themersons were instrumental in publishing] was called “art film”—stupid name but the reason was to separate ourselves from “commercial” film!). I enclose a copy of *f.a.* from which it becomes obvious that we didn’t see any “avant-garde” films until 1937, when we brought some of them for a screening in Warsaw. (With the exception of 2 films by Len Lye, which we saw in London in 1936.) I remember that Antoni Borman, administrator of *Wiadomości Literackie*, when I asked for his help in connection with the screening, said: “what’s that, a whim of a millionaire?” No, there were no millions of any sort. No grants either. No, nothing.⁵

Based on this commentary we may conclude that the Themersons’ films were considerably original. Did they end up inspiring other filmmakers in Poland and elsewhere in Europe? For example, Dada artists?

CHECEFSKY

The abstraction in the Themersons’ work has been analyzed primarily in stylistic terms, as in *Apteka*, where a succession of moving photograms is comparable to poetry. On the other hand, an early photogram by Stefan from 1928 shows a bare foot with powder sprinkled around the edges of the paper to resemble the cosmos, the “Great Nebula in Andromeda,” perhaps implying the birth of conscious-

ness. He uses the term “lyrical” to describe a certain type of image with circular patterns, and the “sky filled with cosmic heroes.” In this sense, the Themersons explored philosophical and artistic ideas in order to develop a photographic and filmic language that was original.

They inspired other Polish filmmakers interested in experimenting, but, by the 1930s, the artistic structure was changed by a new social realism. Artists and filmmakers were encouraged to seek subject matter from anti-fascism in the face of mounting social problems and rising militarism in Europe.

After visiting Paris in 1936 and 1937, and meeting Moholy-Nagy, John Grierson, Len Lye and other experimental filmmakers, the Themersons moved to Paris in 1938 to join the cadre of international writers, filmmakers and artists. As Stefan explains it, they went to Paris because they believed it to be “a sort of Mecca” for artists.

Their move to Paris did not mitigate the importance of their work for the later development of film in Poland. One only has to compare the Themersons’ 1937 *The Adventures of a Good Citizen* – a social satire on Polish society – with Roman Polanski’s 1958 *Two Men and a Wardrobe*. In this fifth and last of the Themersons’ pre-war films, and the only one that has survived, we see a man sitting at a desk who overhears one of only two sentences uttered throughout the film: “there won’t be a hole in the sky if you walk backwards.” He walks backwards out of his office and down the street where protestors accuse him of subversive behavior: “Walking backwards is wrong!” Polanski’s earliest surviving film, made while still a student at the Film School in Łódź, pays homage to the Themersons’ earlier satire. In Polanski’s film, two men retrieve a wardrobe from the sea, carry it through a Polish landscapes where everyone they encounter refuses to look inside, and end up at the Baltic, where the wardrobe is walked back into the sea.

In *The Art of the Short Fiction Film: A Shot by Shot Study of Nine Modern Classics*, Richard Raskin offers an interesting interpretation of Polanski’s work that is consistent with the Themersons’ underlying narrative in *The Adventures of a Good Citizen*:

It is possible to see *Two Men and A Wardrobe* in relation to Polanski’s Jewish origins, which set him apart from the rest of Polish society, most dramatically during the Nazi occupation. In 1939,

the six-year-old boy and the rest of his family “had to wear strange white armbands with the Star [of David] stenciled on them in blue. I was told it meant we were Jewish.”⁶

At least symbolically, Polanski attempts to resuscitate the Themersons and save them from drowning in Poland, only later forced to return their coffin-like wardrobe back to the sea by a conformist society unwilling to accept their “otherness,” and, by propinquity, his “otherness,” most notably experienced in the Krakow ghetto during the Nazi occupation.

DEMPSEY/MATTESON/KARIMI

The Themersons’ apparent commitment to the autonomy of film as a medium and the transparency of the photogram as a form of representation could be taken as arguing against an explicitly political message in the construction of films.⁷ However, the Themersons were clearly in contact with the politically engaged wing of the Polish avant-garde. By 1930 the Polish constructivist avant-garde had split. On the one hand, there were groups committed to formalistic, autonomous art. On the other, some groups believed that artists should take political positions. Of those who did believe in art as a political platform, many were committed to communism (specifically social utopia). The Themersons’ second film project, *Europa*, based on a text by Anatol Stern that had already been published with photomontages by Mieczysław Szczuka and Teresa Żarnowerówna, could be an example of the Themersons’ own political commitment. Given that Stern, Szczuka and Żarnowerówna were actively committed to propagating a politically engaged avant-garde in Poland, do you see indications of this political project in *Europa*?

CHECEFSKY

Mieczysław Szczuka’s typographical design for Stern’s “Europa” includes a photomontage of a tall (possibly 18-story) apartment building shown from an oblique angle with windows on each side; a boxer in a fighting stance without an opponent positioned near the center of the building; a double-sided warning arrow pointed in opposite corners of the graphic layout; and a female figure, holding a child, perched on the roof, presumably Mary Magdalene with baby Jesus. The pose is similar, in many ways, to the pagan goddesses Isis holding the baby Horus, a symbol of rebirth. Szczuka’s decision to position the figures atop the



building was not arbitrary, indicating that he intended to imply symbolic meaning with the juxtaposition, possibly Poland's rebirth after World War I.

In 1973, Josef Robakowski asked Stefan for a list of montages from his film *Europa*, and among the documents was a "boxer fighting without an opponent", probably referring to Szczuka's photomontage.

Teresa Żarnowerówna's design for the cover of Stern's "Europa" following Szczuka's tragic death in 1927 is listed in *The Urge to Create Visions* among the various fragments from the film *Europa*.⁸ Her works made after 1924, characterized by rigorous geometrical position, a formal concept of Polish Constructivism, and a series of influential propaganda posters made during the election campaign of 1928 may have had some influence on the Themersons. Nevertheless, while they were aware of artists groups affiliated with Polish Constructivism, they were unaffiliated with them.

Of course the question of influence is not as black and white as group membership. In a letter to film director Piotr Zarębski from April 14, 1988, Stefan responds to the remaking of *Europa* by suggesting it was better to create a "study essay" because a reconstruction "is never the original (even when it is better than the original), and is always exposed to attacks."⁹ He later comments on the relationship of Anatol Stern's poem to his film *Europa*, implying a difference between the remake and film adaptation by saying, "Stern's poem was not the "inspiration" for the script. Stern's poem was the script, because it was written in the style of a script."¹⁰ Stefan's *Europa* was, in a sense, a film adaptation; it was a rereading of a prior text (Anatol Stern's poem), involved structural repetition, and used the concept of translation. Translations constitute the afterlife of an original text; the translator becomes a willing collaborator to another writer/filmmaker suggesting, of course, through



collaboration, that Stefan sympathized with Anatol Stern and the politically engaged avant-garde.

Among the comments in the letter to Zarębski, Stefan also suggested that *Europa* was both a formal and symbolic film contradicting his earlier statements that only “sophisticated people searched for symbolism” and that he was more interested in “simple visual syntax of cinematographic poetry:”

All the previous shots were the visualization of formal statements. Now follow exclamatory visual statements! The revolt of biology against Europe propped up by dogma! From a crack between paving stones springs a blade of grass! We see it grow! We see how the roots move in the crack and pry up the paving stones!¹¹

The moving of the paving stones by the force of nature, a blade of grass, in the Themersons’ film is analogous to Szczuka’s decision to position the figures atop the building in his photomontage, implying similar symbolic meaning.

DEMPSEY/MATTESON/KARIMI

The continuous appearance of the hand and the prominence of the touch in *Apteka*, trigger the contrast between the virtuality of the cinematic objects (i.e., those that are visible, but not touchable) and the sensuality of the real things enmeshed in everyday practices. Is the artist yearning to suppress the status of the fine arts and traditional craftsmanship in favor of cinematic representation?

CHECEFSKY

The image of a hand, with fingers outstretched across a field of various sized pharmaceutical pills, was one of a

very few surviving film stills from *Apteka*. The hand was an important visual element not only for its symbolic reference to the “hand of God” but, as you suggest, there is certain sensuality to the film when we see it flash across the screen in a brief succession of images, first as a positive image, then a negative of itself, in what Stefan describes as the photomontage-plus-time phenomena:

There is another sort of editing which people accept in poetry but don't accept in film. The sort of editing where pictures are put together not one beside the other, like in a photomontage, but one after another – in a “temporal collage.” ... The syntactical relation of images to images is not the same as that of words to words.¹²

Later in the essay, he uses a highly ironic example of an ordinary motion picture to make his point:

Hitler kissing a child refers to the same factual occurrence to which the verbal statement “Hitler is kissing a child” does. A collage made of an image of Hitler + child + bouquet of flowers – does not. It does not refer to authenticity. It is an “abstract” picture composed of “real” images.¹³

I did not use the original film still in my remake, but rather recreated the sequence using a professional animator from Holland to trace the movements of the hand based on sketches I developed while researching the film project. We filmed in an animation studio in Budapest during the remake of *Apteka*. The animator was directed to move her fingers through a mound of pills spread across a sheet of glass within the focal plane of the camera much like Stefan described in *The Urge to Create Visions*.

The hand serves a secondary purpose to underscore the “primitive” or hand-made quality of the Themersons' film. In an interesting way, combined with the pharmaceutical accessories, a byproduct of his father's profession as a physician, it's not hard to imagine that for the Stefan, *Apteka* was a kind of family portrait, the first home movie of its kind in Poland.

DEMPSEY/MATTESON/KARIMI

Some believe that following the Sovietization of Eastern Europe many avant-garde films were “disappeared” because

politicians wanted to diminish their poignant potential to move people. As to the fate of the Themersons' films, we have Stefan's own report concerning the disappearance of the last copies in his possession:

Apart from the negatives and copies that were before the war in Warsaw, I had one copy of each film in Paris and I deposited those at the beginning of 1940 with Mr. Witkiewicz at “Vitfer” film laboratory. After the war I heard from Mr. Witkiewicz, that the Germans took away all the films they found on the premises. Later Mr. Witkiewicz died and I wasn't able to find more precise information. Quite recently I asked Mr. S. Laks in Paris—he is connected with the successors of “Vitfer” laboratories—and I heard from him, that, so far as he knew, the films were not there.¹⁴

Stefan Themerson's account suggests that even the accidental loss of the films could imply something political. Poor management here reminds us of the extent to which political power took control of the archive or of what was valued (i.e., the ascendancy of the Western viewpoint over that of the East after World War II)? In *Archive Fever*, Derrida reminds us that “there is no political power without control of the archive, if not of memory.... Effective democratization can always be measured by ... the access to the archive, its constitution, and its interpretation.”¹⁵ Can we assume a place for the story of the disappearance of *Apteka* in Derrida's interpretation, or is something else implied?

CHECEFSKY

While many avant-garde films were “disappeared” for political gain, the fact that they no longer exist only reinforces their importance through a type of reversed loss aversion, where the loss, “disappeared,” is twice as powerful, psychologically, as finding it.

The archive of *Apteka* is also the origins of its own missing history. Your question also raises interesting issues about the “missing,” as in disappearance (for political gain through acts of evil), the narrative “story” of the missing (as told by the non-missing), and whether a remake of the missing underscores the “disappearance of the archive” enough to alter the story of its own missing, the story of its origins.

I've been told that a copy of *Apteka* might be found

somewhere in Poland. I cannot verify the rumor, nor can anyone I've talked to confirm the story, which brings us back to the archive of *Apteka*, and the "appearance" of the disappeared. There's a strong correlation between Derrida's interpretation and the disappearance of *Apteka*.

Derrida deals with a feverish – *malade*, or sick – search for origins in *Archive Fever*, not only with archives of evil but evil itself. In many ways, *Apteka* was an archive, an expression of a certain political and historical Polish *maladie* during the 1920s with rising social problems and anti-Semitism, until its disappearance or, as some have suggested, its destruction by the Nazis, its death. The archive of the disappeared *Apteka* is the text of the dead; the remake gives speech to silence.

DEMPSEY/MATTESON/KARIMI

In his 1945 letter to the Polish film director Aleksander Ford, Stefan Themerson makes the following comment regarding the period in the early 1940s during which he and Franciszka returned to making films in the UK, "While we were working on these films we realized, even more clearly than before, that the 'fever' of film has left us probably forever."¹⁶ Through your engagement with their works, you have certainly helped make the Themersons' films "last forever." You use archival documents to rethink the meaning of identity, history, memory, and loss. Whether using actual physical archival material (i.e., collections of found and anonymous films and scripts) or imagined narratives, your work is a way to learn about the past through its material remains, or what Foucault calls the "archeology of knowledge." In her article "Asgar Jorn's Avant-Garde Archives," the art historian Claire Gilman claims that Jorn's appropriations (apparent through both his paintings and his publications), have created "memory tableaux" that "do not provide intimate access to past moments." She adds that Jorn's archeological exploration into past concepts recalls Foucault's archeological method:

The function of enunciative analysis is not to awaken texts from their present sleep, and, by reciting the marks still legible on their surface, to rediscover the flash of their birth; on the contrary, its function is to follow them through their sleep, or rather to take up the related themes of sleep, oblivion, and lost origin, and to discover what mode of existence may characterize statements, independently of their enunciation, in the density of time in which they are

preserved, in which they are reactivated, and used, in which they are also—but this was not their original destiny—forgotten, and possibly even destroyed.¹⁷

The inertial effect of forces discovered in the archive may be revealed best in transformations of subjectivity. In other words, the "forces" we encounter in the archive possess a special capacity to induce us both to recycle the past and to construct new frameworks. What is the ultimate outcome of your "reactivation" of the past?

CHECEFSKY

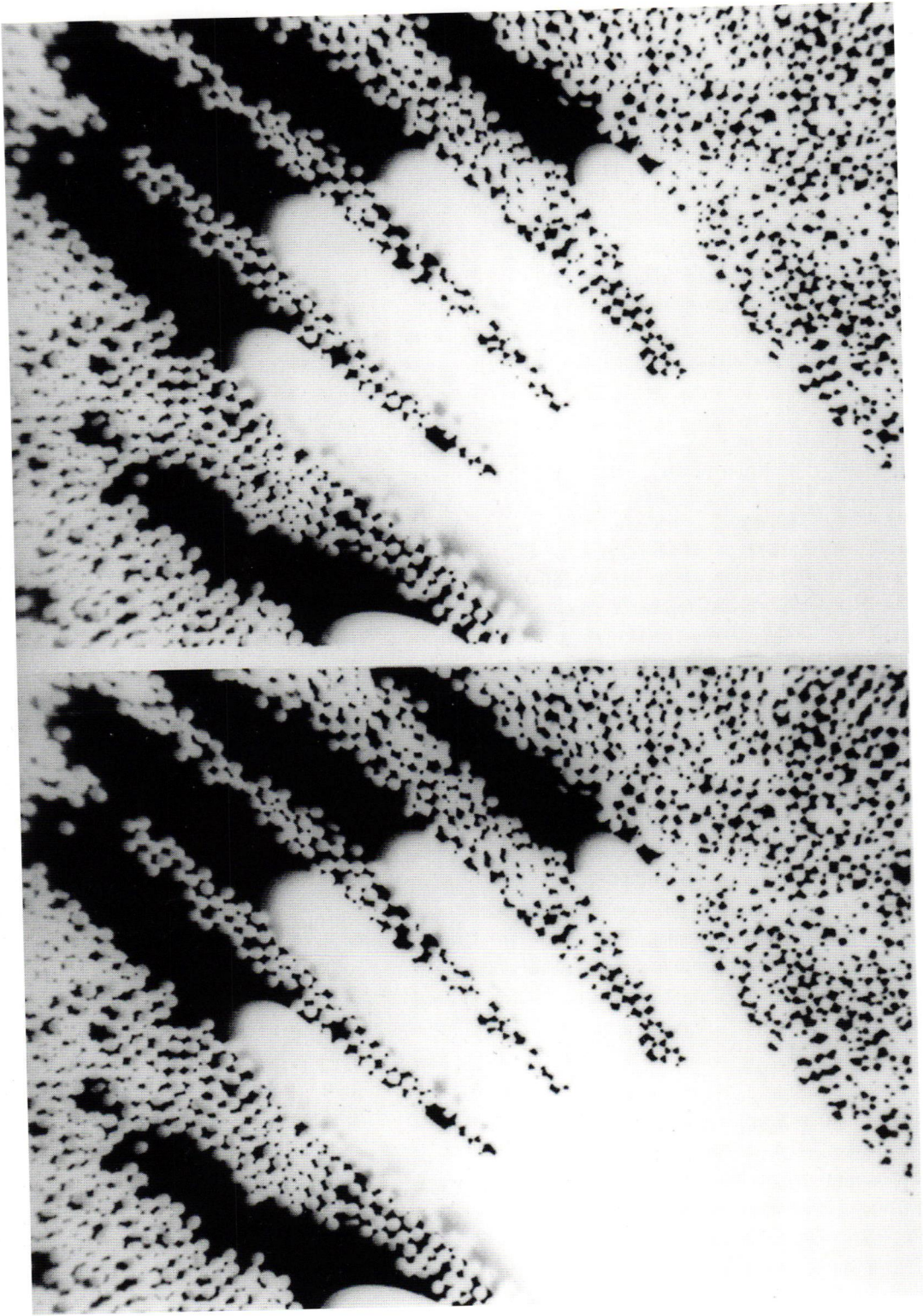
In some ways, a "reactivation" of the past is undesirable. Why would you want Nazis parading around Warsaw in 2010? There's nothing desirable about that scenario (although the presence of Neo-Nazis in Poland, and other countries, suggests that the past has, in fact, been reactivated). I prefer to think of my practices as activating the "past-present" by forcing the past against a wall of the present: it is accelerated; the past moves faster than the present. However, an acceleration of history can also result in a radical rupture with the past.

The transformation of subjectivity is constructed in the symbolic, according to Julia Kristeva, which suggests there's a conceptual shift in meaning during the archeological process. The "inertial" effect is moderated by the archive; it leaves measurable traces.

In "Theses on the Philosophy of History," Walter Benjamin suggests "every image of the past that is not recognized by the present as one of its own concerns threatens to disappear irretrievably."¹⁸ Simply put, activating the historical archive is at the center of intellectual inquiry and social transformation. Benjamin also suggests, "to articulate the past historically does not mean to recognize it 'as it really was' (Ranke). It means to seize hold of a memory as it flashes up at a moment of danger."¹⁹ Recycling history, in the sense that I use historical artifacts in many of my films, or create simulations of history, suggests that even in the trace, or absence of history, there is a type of "dark matter" worth discovering.

DEMPSEY/MATTESON/KARIMI

You not only draw on archival material but produce them as well, and in doing so, you underscore what Hal Foster describes as "the nature of all archival materials as found yet constructed, factual, yet fictive, public yet private." Your



A still from "Pharmacy" (Seesaw Pictures, 2000).

A sequence from "Pharmacy" (Seesaw Pictures, 2001).



archival investigations and collecting practices thus make you a perfect match for Hal Foster's portrayal of "artist-as-archivist" or one who is "drawn to unfulfilled beginnings or incomplete projects ... that might offer points of departure again."²⁰ Can you elaborate on this aspect of your career?

CHECEFSKY

Foster's description of "artist-as-archivist" has three main points: pre-production, assemblage, and the encounter, all of which are an important part of my working process. However, I'm most drawn to the pre-production, the research. I work closely with film professionals on production and postproduction (but not for directing, which I always do). The "encounter" usually remains the same from film to film. Most works can be seen at international film festivals, museums, and galleries. Since I work almost exclusively in 35mm, I discourage the projection of my films in digital format although unfortunately it's sometimes necessary.

My short films take several years to produce, and I am always working on more than one at any given time. They require extensive, almost obsessive, research to uncover the facts and materials, and more importantly, the unraveling of a life story of the original filmmaker(s). I am especially interested in the social, political, economic, and personal conditions under which the original film was made. Several of my films were made in the country of their origin, Poland and Hungary, for example, and whenever possible I hire local talent to influence the cultural and contextual grain which plays a decisive role in the films ability to move beyond a stick-figure view of history.

I differ from Foster's portrayal of "artist-as-archivist" in the very idea of the archive impulse itself. While I agree that "archival art is as much reproduction as it is postproduction," concern with the absolute origins is essential for understanding the obscure trace and fulfills a reading of the historical void, "informational dark matter," necessary to create these works. My work is the disappeared, not the "reworked and rechanneled."

I would also add the artist-as-historian paradigm as a way of reading my work, with the notion that research of the archive eventually confronts the historical events.

DEMPSEY/MATTESON/KARIMI

The theme of this issue of *Thresholds* is inertia. If we assume a philosophical interpretation for this rather scientific terminology, we may as well interpret it as a fundamental "desire" in an

object to remain in a constant state of equilibrium. Could the remaking of these lost films be understood as reconstruction of a force still present in the fragments of the original works and related archival documents (scripts, screenplays, reviews, and letters)? Or, are these films rather inert, in a state of rest prior to the moment when your work intervenes as a force that puts the films back in motion? How does your work relate to the primary forces that gave shape to these materials? Is it possible to "reactivate" these primary forces? Or have these forces transformed the original protagonists into new entities, compelling us to rethink how past forms can unleash new frameworks for viewing the present?

CHECEFSKY

The missing or disappeared is, in most cases, the force still present in the fragments of the original works, and, consequently, the fundamental "desire" of this type of archival inertia is where transformation of the underlying narrative is possible. Remaking differs vastly from reconstruction, neither of which is the primary force that gives shape to the materials.

There is an obvious difference between fragments of the original works that represent some partial thought or idea, a piece of the original, and the intact archive of the original. A fragment is open to the possibility of a misinterpretation; the intact archive represents something other than itself. In order to "reactivate" these primary forces, we have to reverse the history that surrounds the fragment. If we reverse the history surrounding the fragment, it can go back in time as a concept, but reversing the history of the fragment alone, it can only be the original of that particular time.

While interpretation of fragments of the original works is paramount to the "remake," one of the most under-theorized cinematic conventions, the afterlife of a lost or destroyed film is a study of its endangerment and death. Reconstruction is the study of its "secret language." The very absence of its missing archive sets the films "back into motion."

DEMPSEY/MATTESON/KARIMI

One can associate your films with the style of the contemporary filmmaker Pierre Huyghe, who probes the capacity of cinema to distort and ultimately shape memory (particularly through his work, *The Third Memory*, in which he reconstructs Sidney Lumet's 1975 film *Dog Day Afternoon*). Can you expand on this association?

CHECEFSKY

The Third Memory tells the story of a bank robbery, first told by Sidney Lumet in *Dog Day Afternoon*, starring Al Pacino. Huyghe explores the memory of the original crime by interviewing John Woytowicz, the person responsible for the crime, creating a second memory with the film's recreation of that crime, and a third memory, an installation that consists of two projections, each showing reconstructions from different angles of the robbery and hostage-taking in the Brooklyn bank.

In a review of *The Third Memory* in a 2000 issue of *Artforum*, contributing editor Daniel Birnbaum discusses the narrative conventions and techniques in Huyghe's installations:

In recent years, artistic appropriations have reached a point where one may question the real point of one art form (the video installation, say) cannibalizing another (the cinema). No doubt, over the course of its evolution, the multiprojection video installation will introduce new forms of narration and viewer participation. Still, why steal from cinema? Perhaps the answer is that video can pose questions to film that film is incapable of putting to itself. This is exactly what Huyghe's *L'ellipse* does, for example, when it makes us aware of the function of the jump cut and inserts the actual distance and the time it really takes to move from one place in the story to the next.²¹

While Pierre Huyghe may probe the capacity of cinema to "distort and ultimately shape memory," by "stealing," according to Birnbaum, my interests in cinema are far more subtle. Firstly, I rarely transfer from one type of medium to another, film to video, for example, refusing to accept as true that video "can pose questions to film that film is incapable of putting to itself." Secondly, the theatrics of presentation, or lack thereof, remain embedded in the original language of the film, in its public screening, or aura of authenticity in the case of a published film scenario. The notion of "stealing" from cinema also suggests a certain mental crime, a theft of ideas, contradicting my interests in finding proof of the past, a recovering of some lost origin, an enigma, where theft is considered wrong, and according to Lyotard, "a defining feature of a wrong is that it cannot be proven." I've never been very interested in "stealing a horse from one state, and selling it in another."

DEMPSEY/MATTESON/KARIMI

But *The Third Memory* could be seen as materialization of Roland Barthes's reference to the eruption of a "third" meaning when two dissimilar memories of a single event are juxtaposed with each other. Joan Gibbons explains this process in these words:

The third meaning manifests as an "accent" and forms a critical metalanguage to the conventions of film language. For Barthes, the third meaning is obtuse, occupying a fold outside the purposeful encoding or the "language system" of the representation ... [or] perhaps better understood by going back even further to the incongruous juxtapositions of Surrealism, described by Max Ernst as "the chance meeting of two realities on an unfamiliar plane" which throw up a third reality.²²

In this sense, Huyghe may indeed share something in common with you—only in his attempt to find a "fold" or an "accent" outside conventional accounts. On the other hand, works by you and Huyghe remind us of Walter Benjamin's reference to involuntary memories that can only be activated by later events—events that give new meanings to the memories so that they become useful to the present. Aren't both you and Huyghe removing films from the archive, activating them, and creating a new interpretive space for them in which to be viewed?

CHECEFSKY

Ultimately, a new interpretive space is created when films are removed from the archive and activated according to your analysis, but in the restaging of a film you have to ask whether the "fold" or "accent" remains a type of non-event, in that there is no real filmic event. In other words, the "fold" is an event, which occurs outside the cinematic context.

During the first sixty seconds of *Pharmacy*, I briefly describe the film, followed by a statement on several sources for my remake, and, finally, that the film was "lost or destroyed during the German occupation of Poland." The audience is at a disadvantage at this point primarily because I've told them how to read the film before seeing the very first frame. Except for two or three minor scenes, there's little in my version that directly corresponds to the original film precisely because there is no longer an original. Viewers often make the mistake of thinking they're about

to see the Themersons' 1930 *Apteka*, reconstructed from found fragments, even though I've made it clear that it is a remake. French film critic Daniel Protopopoff suggests the history of a film is significantly altered by its remake.²³ In a sense, I've displaced their view with a historical narrative, thus averting an overly critical analysis and response to the film, undermining the possibility that the original may have been vastly different than its remake.

My remake can be analogous to a "write" and "erase" practice; the resulting film is as much a "trace" of writing as a mark of the "absence of a presence," where, according to Deleuze, "the copy is an image endowed with resemblance." The paradox of this analogy lies in the function of the resulting archive that serves to de-center the historical narrative, drawing further parallels between the idea of "one's memory" and "memorials assigned to memory."

In other words, Huyghe successfully demonstrates that the film about Wojtowicz's life has permanently altered Wojtowicz's memory. My remake of *Apteka* has irrevocably altered the history of its own making precisely because in the translation of the remake, the "original" is never complete. There is no possibility to compare both films side by side. The remake of the missing *Apteka*, and the missing *Apteka*, share a similar political fate. My filmic activity is political (in Barthes's sense of the eruption of a "third" meaning).

DEMPSEY/MATTESON/KARIMI

After your compelling work with the photogram technique, do you have any interest in developing and working with the Themersons' unrealized "Synaesthetic sight and sound coordinator," later referred to as "Phonovisor"?²⁴ Any plans to recreate other "lost" works, for instance the Themersons' *Europa* or perhaps Janusz Maria Brzeski's *Beton* (Cement) connected to other photographic techniques such as montage?²⁵

CHECEFSKY

I recently completed an adaptation of an experimental film scenario written by Hungarian Dada artist and avant-garde filmmaker György Gerö, and first published in 1924 in the Dadaist review *IS*. The original scene-by-scene scenario consists of four pages available in the Gerö papers collection of the Budapest City Archives.²⁶ György Gerö, a poet, editor, and filmmaker born in 1905, initiated and made the first Hungarian avant-garde film based on a book by Lajos Kassák. Gerö disappeared and his film was never produced.

Stefan Themerson described the Phonovisor as, "a sort of piano producing musical notes that would have a one-to-one relationship with images projected on a screen." He wanted to work from music towards film. The Experimental Film Production Fund, which was renamed the British Film Institute Production Board in 1964, was unable to support the construction of his keyboard, and this project was never realized. I have no immediate plans to realize Phonovisor. However, a similar project of interest is *Abstract Cinema—Chromatic Music*, by Italian Futurists Arnaldo Ginna and Bruno Corra.

In 1910 Ginna and Corra experimented in abstract cinema. Their avant-garde approach had a major influence on Futuristic cinema. In 1912, Corra published his manifesto *Abstract Cinema – Chromatic Music* in which he described his work with his brother called a pianoforte chromatic, or chromatic piano and composed several "sonatas of color" by translating a Venetian barcarole by Mendelssohn, a rondo by Chopin, and a Mozart sonata. These films were lost in 1944 during a bombardment of Milan.

Later this year, I will begin production on a short experimental film based on a film poem published in *Pdsmo* 1 (no. 5–6) in December of 1924, by Czech artists Karel Teige and Jaroslav Seifert, expounding the ideals of Poetism (the art of life, the art of being alive and living life), titled, "Pan Odysseus a ruzne zpravy" (Mr. Ulysses and Diverse News). Teige and Seifert's film uses the allegorical mode of fragmentation and montage through simple filmic dissolve to achieve symbolic, poetic meaning.

Other projects of interest include *Monsieur Phot* (1933) by Joseph Cornell, a film scenario published in 1936 in Levy's book *Surrealist*; and Guy Debord's first script version of *Harlements en faveur de Sade*, published in the journal *Ion* #1 (April 1952), which was different from the final version and reprinted in Gerard Berréby's *Documents relatifs à la fondation de l'Internationale Situationniste*.²⁷

In choosing to remake or produce a film based on a previously published scenario or lost film, I consider the filmmakers prior work, or in the case of a writer or poet, I search for a cinematic vision or "paper movie" in their manuscript.

A paper movie is a type of literary experiment situated between cinema and literature, a concept supported by Serbian author, translator and scriptwriter Branko Vucicevic, a foremost critic of the early-twentieth-century avant-garde. Vucicevic questions whether "paper movies" were strictly literary cinema of the mind or written for film

production. A film on paper, on the other hand, implies theoretical and critical studies.

I work with remaining artifacts including contact prints of original film strips onto photographic paper, film stills, period magazines and books, notes from a journal, storyboard sketches, and personal accounts. The artifact casts a shadow, a proof of existence as an equivalent of the object it represents; it is a mimetic image of the truth.

I employ strategies such as collaboration and interpretation, humoristic or comic imagination resulting in a blurring of authenticity in the content, context and meaning of the original filmmakers vision; nothing I produce is purely authentic. In other words, claiming authenticity suggests an awareness of historical roots, finding meaning in tradition. The limitation of available artifacts in a remake of a previous film, especially a lost or destroyed film where few documents exist, can undermine the past resulting in a radical shift of meaning in its tradition.

Whether an authentic reproduction or not, my films assert their own ideology in difference to the first version; they constitute a new reading or a reinterpretation of a previous film. My films acquire new meaning by their intertextuality, not simply the product of the original filmmaker, but of a relationship to other films and to the structures of film itself.

Special thanks go to Professor Thomas Spencer Ladd of the University of Massachusetts Dartmouth for making this interview possible.

- 1 The term "photogram" refers to images produced through a camera-less photographic technique which involves placing objects directly on a photosensitive material then exposing that material to light. The technique is often associated with the work of Man Ray, though Man Ray preferred the term "rayograph" to "photogram." To produce their films, the Themersons put photograms in motion using a "trick table" assembly designed by Stefan. Their device replaced the photosensitive surface with a suspended sheet of glass covered with translucent paper on which objects were placed, illuminated with moving lights from above, and photographed from below.
- 2 In English, the term is usually rendered as "sanation" (from the Latin for healing, "sanatio"). It is noteworthy that according to the Piłsudski government, "Sanacja" referred to the "moral healing" program of the Polish body politic.
- 3 Theodor Adorno, *Aesthetic Theory*, trans., R. Hullot-Kentor (Minneapolis: University of Minnesota Press, 1997), 227–8. Cited in Lambert Zuidervaart, "Theodor W. Adorno," *The Stanford Encyclopedia of Philosophy* (2008), accessed January 1, 2011, <http://plato.stanford.edu/archives/fall2008/entries/adorno/>.
- 4 Stefan Themerson, *The Urge to Create Visions* (Amsterdam: Uitgeverij De Harmonie, 1983), 60. Ideas in this English translation were formulated in the mid-1930s by Stefan Themerson; see further, idem, "O potrzebie tworzenia widze?," *Film Artystyczny* FA 2 (1937).
- 5 Excerpt from English translation of a 1977 letter from Stefan Themerson to Józef Robakowski. Quoted in Franciszka Themerson, Stefan Themerson, and Karol Symanowski, *The Films of Franciszka and Stefan Themerson/Filmy Franciszki i Stefana Themersonów* (London and Warsaw: LUX and Center for Contemporary Art, 2007), 12. Transcription from the original letter in Polish appears on page 51.
- 6 Richard Raskin, *The Art of the Short Fiction Film: A Shot by Shot Study of Nine Modern Classics* (Jefferson, N.C.: McFarland, 2002), 13.
- 7 Jasia Reichardt and Nick Wadley, "Franciszka and Stefan Themerson," accessed August 16, 2010. http://www.luxonline.org.uk/artists/stefan_and_franciszka_themerson/essay%28%29.html. Reichardt and Wadley are caretakers of the Themerson Archive. In the Loxonline article, they reflect on Stefan Themerson's views of cinema. They write, for example, that "His feeling for film-making was to do with the sovereign properties of the medium itself." They also provide the following verse by Themerson about the nature of photogram:

It is something unique.
It is a photogram.
It doesn't represent anything.
It doesn't abstract from anything.
It is just what it is.
It is reality itself.

- 8 See further, Themerson, *The Urge to Create Visions*, 75.
- 9 Themerson et al, *The Films of Stefan and Franciszka Themerson*, 34.
- 10 Ibid, 35.
- 11 Ibid, 35-36.
- 12 Themerson, *The Urge to Create Visions*, 60-61.
- 13 Ibid.

- 14 Themerson et al, *The Films of Stefan and Franciszka Themerson*, 13. Transcription from original letter in Polish appears on page 52.
- 15 Jacques Derrida, *Archive Fever: A Freudian Impression*, trans. Eric Prenowitz (Chicago and London: The University of Chicago Press, 1993), 4.
- 16 Themerson et al, *The Films of Stefan and Franciszka Themerson*, 9. Transcription from original letter in Polish can be found on page 48.
- 17 Michel Foucault, *The Archeology of Knowledge* (London: Routledge Classics, 2005), 139. See also, Claire Gilman, "Asgar Jorn's Avant-Garde Archives," in *Guy Debord and the Situationist International: Texts and Documents*, ed. Tom McDonough (Cambridge: MIT Press, 2001), 202-203.
- 18 Walter Benjamin, "Theses on the Philosophy of History," in *Illuminations*, trans. Harry Zohn (New York: Schocken, 1968), 255.
- 19 Walter Benjamin, *Sixth Thesis on the Philosophy of History*. Cited in Michael P. Steinberg, *Walter Benjamin and the Demands of History* (Ithaca: Cornell University Press, 1996), 1. Here Benjamin refers to ideas of Leopold von Ranke (1795-1886) who is known to be the father of modern historical scholarship. For Ranke's ideas see, for example, "The Ideal of Universal History: Ranke," in Fritz Stern, ed., *The Varieties of History: From Voltaire to the Present* (New York: Vintage Books, 1973), 54-62.
- 20 Hal Foster, "An Archival Impulse," *October* 111 (2004): 3-22; 3-6, 21-22.
- 21 Daniel Birnbaum, "Stick-up Artist: the Art of Pierre Huyghe," *Artforum International* 39, no. 3 (November 2000), 130-33.
- 22 Joan Gibbons, *Contemporary Art and Memory* (London: I. B. Tauris, 2008), 108.
- 23 Daniel Protopopoff, "The remake effaces its age," *CinemAction*, 53 (1989), 13.
- 24 For Themerson's descriptions of this device see the 1957 letter to Ernest Lindgren and the 1963 letter to Bruno Alfieri. Quoted in Themerson et al, *The Films of Franciszka and Stefan Themerson*, 14-17; 21-22.
- 25 In 1973 Stefan Themerson reconstructed the screenplay for *Europa*, and in a 1988 letter, to Piotr Zarębski, he provided an outline of the structure of the film along with commentaries. For the 1973 screenplay, see Themerson et al, *The Films of Franciszka and Stefan Themerson*, 27-29; for the 1988 letter, see *ibid*, 34-36.
- 26 The location of the original scenario is unknown.
- 27 Gerard Berréby, *Documents relatifs à la fondation de l'Internationale Situationniste* (Paris: Allia, 1985), 113-123.

Inertia of an Automated Utopia

Design Commodities and
Authorial Agency 40 Years after
“The Architecture Machine”

Daniel Cardoso Llach

In a concise history of architects’ embrace of computer-aided design (CAD) Robert Bruegmann notes that in the early days of CAD two camps – Nicholas Negroponte and Yona Friedman in one, and SOM in another – exemplified diverging conceptions of the role of computers in architecture.¹ Whereas SOM pioneered the development of software tools to automate aspects of the design of high-rise buildings, such as cost/area calculation for maximized revenue, Negroponte and Friedman developed socio-technical utopias where computers become partners of people in the design of a “more humane” environment. They envisioned computers as “liberators” of design expertise, allowing people to bypass traditional architects and planners – professionals they saw as elitist middlemen – and the generalizing assumptions about dwellers that, in their view, drove the contemporary housing market. Nicholas Negroponte’s influential book *The Architecture Machine*, published in 1970 by the MIT Press, synthesized this provocative view of CAD in a collection of speculative scenarios and technological artifacts that projected design as an amiable conversation between humans and computers. While an array of fields celebrates *The Architecture Machine*’s pioneering enunciation of key computational paradigms, including gestural and windows-based interfaces, in this article I focus on aspects of *The Architecture Machine*’s cultural and institutional context to unfold its dimension as a social – not to mention architectural – critique. I show that by swapping the social roles of architects and dwellers through intelligent

machines, Negroponte sought to de-stabilize traditional conceptions of architectural authorship and that, by construing computers as social subjects, he aimed at redefining a contemporary debate about human-machine interaction. The terms of this redefinition continue to influence and limit our expectations about design, architecture, and technology.

From “perfect slaves” to “mechanical partners”

Let us build machines that can learn, can grope, and can fumble, machines that will be architectural partners, architecture machines.²

When *The Architecture Machine* was published, computers were unique, expensive devices that only an academic and government elite had access to. However, the notion of widespread personal computing was already part of the American popular imagination, fueled in part by the awe-inspiring wartime advances in electronics and by the contemporary promotion of technology and automation as patriotic endeavors.³ The MIT School of Architecture, where Negroponte’s Architecture Machine Group was housed, was literally (and physically) immersed in an intense climate of technoscientific advancement. MIT – the recipient of the largest sums of federal research funds during the Cold War – was the epicenter of research on mechanical sensors and actuators, cathode-ray tube monitors and computer graphics.⁴ The work of Steven Coons, one of



Figure 1. Photograph of an early CAD system altered by the author. Original from Nicholas Negroponte, *The Architecture Machine* (Cambridge: MIT Press, 1971), 55. Courtesy of MIT Press, Cambridge, Mass.

Negroponte's academic advisors, had a strong influence on the ideas of *The Architecture Machine*. As a professor of mechanical engineering, Coons led important developments in computer graphics and computer-aided manufacturing and was an enthusiastic advocate for the use of computers in art, architecture and design.⁵ Coons conceived design as an iterative process of representation and analysis where a "creative stage," in which a design representation is created, was followed by a "mechanical stage," in which the representation is tested against different metrics – such as mechanical stress and overall structural performance. Coons believed that the "creative stage" was better suited for human designers while the "mechanical stage" could be successfully automated.⁶ In *The Architecture Machine*, Negroponte would adopt the technologies that Coons helped develop as the constitutive elements of his vision, but not without rejecting the dualism between creativity and analysis that rendered computers as the "perfect slaves" of a design process.⁷ Negroponte instead used a language that endowed computers with human-like attributes such as curiosity and judgment, and construed human-machine interaction as the "cohabitation of two intelligent species,"⁸ as a symbiotic relationship that gave origin to an "extended designer," and as an "ecology of mutual design complementation, augmentations, and substitution."⁹ Despite this key rhetorical difference, Coons' themes are noticeable throughout *The Architecture Machine*. Among these the notion of adaptability deserves special analysis. Coons distinguished between two different CAD philosophies: one that relied on a large set of specialized procedures and another that relied on a single one that *adapted* to its context.¹⁰ In *The Architecture Machine*, Negroponte echoed the contrast between these two philosophies by opposing the notion of *flexibility* – the capacity of a system to be extended within a fixed set of constraints – to the notion of *adaptability* – the ability of a single computational procedure to find solutions to different problems. In Coons' and Negroponte's view, user interfaces and programming languages could provide flexibility, but not "true" adaptability:

We have a condition where each designer is creating his own library of services out of the problem-oriented [programming] language. Once created, note that these operations are no less rigid than the predefined package of design commodities.¹¹

However, the means and methods to achieve adaptability were never discussed, and thus the concept remains as a suggestive device, a black box enclosing a computer's potential to revert the perverse effects of industrial standardization and of the notion of *l'homme type* on architectural and urban spaces.¹²

Clashing with the World or, "Ted, many conflicts are occurring"

Instead of presenting a single artifact, as its title suggests, *The Architecture Machine* developed a collection of scenarios and themes, the majority of which fell into one of two categories. In the first, computers were regarded as artificial experts that guide the dweller through design choices until a unique and optimal residential solution is reached – a sort of architectural "expert system."¹³ In the second, a computer network was offered as a communication platform between a community and a human designer. The network's central processor would interpret the community's preferences into clear spatial guidelines to be followed by a human architect, thus penetrating what Negroponte considered "the designer-dweller dissonance that exists in today's housing problem."¹⁴ As a proof of concept for the first, "expert system" category, Negroponte presented URBAN5, a computer-aided design system comprising a cathode-ray tube monitor, a keyboard, an optic pen, and a small console with several controls – including a notorious "PANIC" button. Described as an experiment to test the desirability of natural language as a communication medium between humans and machines, URBAN5 received text commands from the user and interpreted them as geometric and spatial constraints [Figure 3]. The program would then calculate a response based on user inputs, a sort of architectural version of the early language-processing program Eliza.¹⁵ URBAN5's responses were displayed on the cathode-ray tube monitor as compositions of three-

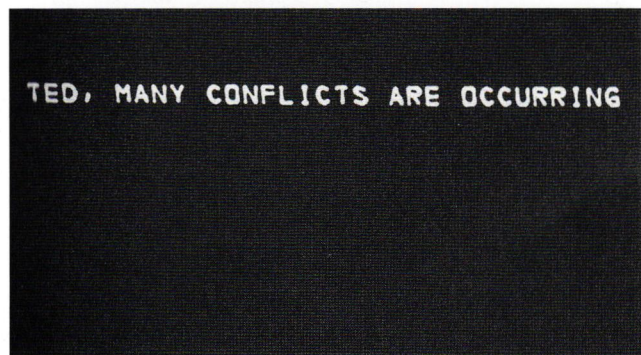


Figure 2. Early CAD system URBAN5 alerts the user "Ted" of design conflicts. From Negroponte, *The Architecture Machine*, 85. Courtesy of MIT Press, Cambridge, Mass.

dimensional cubes.¹⁶ In case of ambiguity in the inputs, URBAN5 would request further specification from the user; in case of conflicting constraints, URBAN5 would present gentle alerts on the screen [Figure 2]. However, URBAN5 did not fulfill Negroponte's expectations because it was unable to enact what were thought to be the attributes of a truly adaptable architecture machine.

Playing is learning, but URBAN5 has not been sufficiently sophisticated actually to frolic; instead it has inexhaustibly printed garbage.... URBAN5 suggests true dialogue, suggests an evolutionary system, suggests an intelligent system – but, in itself, is none of these.¹⁷

An example of the second, “participatory” category is the “Hessdorfer Experiment,” in which three African-American men from “Boston’s ghetto area” were asked to interact with a machine – comprising a keyboard and a printer head remotely operated by one of the researchers – that interrogated them about their “urban needs” [Figure 4]. Negroponte celebrated that during the experiment the subjects (who thought they were communicating with an autonomous machine) “did not type uncalled-for remarks” and argued that the subjects engaged the machine in a way that would not have taken place if the interlocutor had been a “white planner or politician.”¹⁸

The experiment is presented in the book as a sign of the computer’s potential to foster a more transparent conversation with members of a community. The fact that the book is outdated from a racial, nomenclatural point of view is self-evident, but the kind of neutrality Negroponte was willing to attribute to the machine was worthy of notice. In the Hessdorfer Experiment, the machine is assumed as a neutral device that helped the researchers conceal their personas and, quite specifically, their whiteness.

David Noble, writing on technology discourse in the post-war US, informs us that “technology rarely fulfills the fantasies of their creators. As people are fallible, so too are their machines, however perfect, complete, and automatic the designs.”¹⁹ Yet, even failed technologies carry a blueprint of their maker’s time, desires, and questions. URBAN5 and the machine in the Hessdorfer Experiment present design as a collaborative, quantifiable and evolving dialogue with always-adapting machines. These two technological experiments also reveal a desire for design to become a more rational and social endeavor devoid of the imposing



subjectivity of the human architect. Moreover, it expresses an anxiety about the social role played by the disciplines of architecture and planning, conveyed through a populist desire to give people, through technology, the right to design their own environments.²⁰

Rephrasing Authorship Through Social Machines

Aside from a post-structural fantasy of “killing the author,” the symbolic demotion, or reconfiguration, of the architect advanced in *The Architecture Machine* should be understood as a techno-rationalist’s reaction to the individualistic notion of the architect as a sole creator, inherited by architecture from *L’Ecole de Beaux-Arts*.²⁰ The notion of a machine that learns by itself was instrumental in affording Negroponte the space to ignore questions about the machine’s nature as a designed artifact, and to inspire visions of machine agency in computer-aided design:

When a designer supplies a machine with step-by-step instructions for solving a specific problem, the resulting solution is unquestionably attributed to the designer’s ingenuity and labors.... Whenever a mechanism is equipped with a processor capable “of finding a method of solution,” the authorship of the answer probably belongs to the machine.²²

Figure 4. One of the subjects in the “Hessdorfer Experiment” interacts with the system. From Negroponte, *The Architecture Machine*, 56. Courtesy of MIT Press, Cambridge, Mass.

And yet, *The Architecture Machine* sought a larger goal beyond disciplinary critique. At the most basic level, it sought to challenge the terms of the contemporary debate about the relationship between humans and machines. In contrast with cultural critics concerned with the de-humanizing aspects of a technological society and with the rise of an unquestionable scientific ideology, *The Architecture Machine* portrayed computers – and CAD – as vehicles for social and environmental activism. Key to the advancement of this vision was a rhetoric that phrased machines as social entities mirroring the attributes of humans while avoiding inconvenient questions about the programmers' culpability as designers. By re-positioning machines as humans, Negroponte aimed at overcoming – rhetorically, at least – the mechanical-organicist polarity that concerned those who saw technology and people in opposing camps.²³ But his move to equate humans and machines reproduced the polarity: using a symmetric language that obscured the machine's complex ties to its makers, Negroponte broke the bridge between the two.²⁴ Considering, with Louis Mumford, technologies as embodiments of social relations, and *The Architecture Machine's* abundant academic progeny, we can think of Negroponte's socio-technical utopia as inaugurating its own sort of technocratic idealism.

Final Notes: Some Futures Never Get Old

Negroponte's cultural and moral entrepreneurship carried a critique of the "gentleman architect," an idea predicated on the notions of houses and urban spaces as personal commodities and on the inherent value of uniqueness. By proposing to automate the production of uniqueness – via machines that amortize the time and labor involved – Negroponte gave the notion of adaptability between user and context its contemporary wrapping, and anticipated a desire (and a market) for digitally mass-customized goods. In short, he turned the *act* of design into a valuable commodity.

By provocatively construing the computer as a social actor capable of de-stabilizing the relationships between buildings, dwellers and architects, Negroponte aimed at shifting the balance in architecture's political economy, giving it a techno-rationalist – and populist – turn. Interestingly, some aspects of this shift continue to underpin the sensibility and language of today's design utopians, who craft their visions in terms only superficially different from those advanced in *The Architecture Machine*. In the new

design utopias the emphasis on the idea of adaptability is no longer deployed through the fantasy of an artificial mind, but through biologically-inspired, computationally obtained variation. The attacks on a designer's subjectivity do not come from human-like machines, such as those advanced in Negroponte's vision, but from the unquestionable, faceless wisdom of an algorithmic conception of the natural. The electronic sketchpads of cathode-ray tube monitors are now replaced by elaborate associative software platforms, plasma screens and layer deposition 3-D printing technologies. Negroponte's mechanistic idioms have given way to a blend of biological and computational metaphors that reflect a new dominant technoscientific paradigm, yet reproduce the rationalist drive (now called "performance-based") that *The Architecture Machine* synthesized.

The imaginaries set in motion by *The Architecture Machine* – its visions of a technologically enhanced, authorless, participatory planning and design – relate closely to the cultural enterprise of construing technology as a democratizing force, and as a means for uplifting supposedly under-privileged, "third-world" communities (the contemporary equivalents to the carefully chosen subjects in the Hessdorfer Experiment). Yet, the desire for a better environment through an expanded, participatory, and technoscientific practice of design remains unsatisfied today, just as when *The Architecture Machine* was published. As SOM had predicted, the CAD industry evolved in an entirely different direction, more in tune with the realities of the market than with the automated utopias of ethical robot designers. Given the distance between its ambitions of social change and the irony of its deployment into popular culture, quantifying the success of *The Architecture Machine's* technological utopia in terms of social "impact" would be unproductive. But it is worth noting that inverting the equation from the gentleman architect into the gentleman dweller does not fundamentally change the nature of the transaction.

- 1 Skidmore, Owings and Merrill (SOM) is an architectural firm founded in Chicago in 1936. The firm has built a vast number of skyscrapers throughout the world, and its name carries—in the architectural and engineering worlds—an instant association with “glass-box” corporate architecture. SOM’s software was called “BOP” (Building Optimization Program). See Robert Bruegmann, “The Pencil and the Electronic Sketchpad,” in *Architecture and Its Image*, ed. Eve Blau and Ned Kaufman (Cambridge: MIT Press, 1989).
- 2 Nicholas Negroponte, *The Architecture Machine* (Cambridge: MIT Press, 1970), 121.
- 3 For an expanded discussion about the politics of technological discourse in post-war US, see Paul Edwards, *The Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge: MIT Press, 1996) and David Noble, *Forces of Production* (New York: Oxford University Press, 1984). For an early mention to the “personal computer” see “Pocket Computer May Replace Shopping List”, *The New York Times*, November 3, 1962.
- 4 Noble, *Forces of Production*, 11 & 56.
- 5 Coons oversaw the first interactive computer graphics display, the *Sketchpad*, developed by his student Ivan Sutherland. Ivan Sutherland, “Sketchpad: A man-machine graphical communication system” (Ph.D. Diss., Massachusetts Institute of Technology, 1963).
- 6 About the testing stage Coons wrote: “These are all essentially mechanical operations, however, and it is quite clear that at least in principle, the computer can be made to deal with all of them.” Steven A. Coons, “An Outline of the Requirements for a Computer-Aided Design System,” in *Spring Joint Computer Conference, Detroit, Michigan* (New York: ACM, 1963), 301.
- 7 In a 1966 lecture Coons described computers and numerically controlled manufacturing technology as “perfect slaves” who would take over the most laborious and repetitive aspects of artistic and engineering production—a statement that notoriously resembled Alberti’s ideas about the distinction between the architect (who draws) and the “skilled craftsman” (who makes). Daniel Cardoso Llach, “What matters: Certain assumptions in digital design culture,” (paper presented in the Harvard University First International Conference on Critical Digital, Cambridge, Massachusetts, April 18-19, 2008).
- 8 See Negroponte, *The Architecture Machine*, 7 & 17.
- 9 MIT’s technological impetus inspired in Negroponte visions of anthropomorphic machines with human-like organs that “receive direct sensory information from the real world” and that “must see, hear and read, and must take walks in the garden.” Negroponte, *The Architecture Machine*, 27.
- 10 Coons was wary about the risk of narrowing the space of design alternatives in a computer-aided design system by overloading the software—and the user—with a large set of very specialized procedures. See Coons, “An Outline of the Requirements for a Computer-Aided Design System,” 301.
- 11 Negroponte, *The Architecture Machine*, 27.
- 12 The notion of *l’homme type* (French for “man-type”, or “typical man”) was a collection of anthropometric assumptions about architecture’s “end-user” advanced by advocates of modern architecture, especially in the first half of the twentieth century, to facilitate (and legitimize) standardized residential housing design. Abiding by these assumptions could only yield, in Negroponte’s view, impersonal and banal architecture.
- 13 Expert systems are a type of computer program that performs a human expert’s task. Such systems are founded on the notion of “knowledge capture”: the idea that a “knowledge engineer” can study and encode in a computer program the decision-making process and expertise of a human subject. For a sharp perspective on the culture of “knowledge engineering” and artificial intelligence see Diana Forsythe and David J. Hess, *Studying Those Who Study Us: An Anthropologist in the World of Artificial Intelligence* (Stanford: Stanford University Press, 2001).
- 14 Negroponte, *The Architecture Machine*, 55.
- 15 Eliza is a computer program that uses a simple “pattern-matching” algorithm to assign pre-canned phrases as responses to sentences entered as text by the user. The interaction with the program gave the user the impression—generally for a brief time—of having a conversation with a human (the program simulates being a Rogerian psychotherapist). Eliza was written in 1966 by Joseph Weizenbaum at MIT, and is considered an early example of automated language processing. There are many available online implementations of the program. One can be found at “Eliza Test”, accessed January 10, 2011, <http://chayden.net/eliza/Eliza.html>.
- 16 Today we would call these cubes “voxels,” a word that wasn’t available at the time *The Architecture Machine* was written.
- 17 Negroponte, *The Architecture Machine*, 93.
- 18 Negroponte, *The Architecture Machine*, 50.
- 19 Noble, *Forces of Production*, 325.
- 20 Cf. Nicholas Negroponte, *Reflections on Computer Aids to Design and Architecture* (New York: Petrocelli/Charter, 1975). While a few years later, in a less enthusiastic tone, Negroponte would admit the naïveté of these experiments, the notion of empowerment through technology remained a constant of his work.
- 21 In fact, Bruegmann places Negroponte in a tradition of rationalism that goes back to J.N.L. Durand. Bruegmann, “The Pencil and the Electronic Sketchpad,” 140.
- 22 Negroponte, *The Architecture Machine*, 11.
- 23 “What needs to be articulated, regardless of the format of the man-machine relationship, is the goal of humanism through machines... The concern is to avoid dehumanizing a process whose aim is definitely humanization.” See Negroponte, *The Architecture Machine*, 7. Matthew Wisniosky’s history of engineers’ temporary reconciliation with social theory during the fifties and sixties captures and elaborates on the contrast between these two postures about technology and society by distinguishing between two philosophies, a *theory of technological change*, which attributes agency to technology as a semi-autonomous force, and a *theory of technological politics*, which considers technology as an “embodiment of social relations.” Matthew Wisniosky “Engineers and the Intellectual Crisis of Technology” (Ph.D. diss., Princeton University, 2005), 6.
- 24 Lucy Suchman coined the term “dissymmetry” to overcome idioms of absolute symmetry or absolute asymmetry between humans and machines. See Lucy Suchman, *Human-Machine Reconfigurations* (Cambridge: Cambridge University Press, 2007).

Lygia Clark

Between Spectator and Participant

Ana María León

If I were younger, I would be in politics. I feel a bit too at ease, too integrated.

Before, artists were marginalized. Now, we, the proposers, are too well placed in the world. We are able to live – just by proposing. There is a place for us in society.

There is another type of person who prepares what will happen, other precursors. They, they continue to be marginalized in society. When there is a struggle with the police and I see, in Brazil, a seventeen-year-old killed (I put his photo on my wall, in my studio), I realize that he dug a place with his body for the generations that will succeed him. These young people have the same existential attitude as we, they unleash processes whose end they can't see, they open a path whose exit is unknown. But society resists them, and kills them. It's thus that they work all the more. What they try to force is perhaps more essential. They are incendiaries. It's they who shake up the world. We, sometimes I wonder if we are not a bit domesticated. That annoys me.

– Lygia Clark¹

A photograph of the art work *Abysmal Mask* 1968 [Figure 1], presents an image of the Brazilian artist Lygia Clark seemingly lost in a world of her own. The mask envelopes her face, her eyes are covered. Her hands hold the nylon sacking, delicately sensing its shape as it is filled by the air expelled from her lungs. She appears completely disconnected from her surroundings. But what are these surroundings? What is in the air, so to speak?

Clark (1920–1988) is perhaps best known for her *Beasts* or *Bichos* (1960) – metallic sculptures with moveable parts, meant to be manipulated by an active audience. She started her career influenced by Constructivism, but soon became more interested in the actions prompted by objects rather than the objects themselves. Her later works focused on collective actions and personal therapy. It is only recently that her emphasis on agency has been included in broader discussions of participatory art. In *Participation* (2006), an anthology on the subject, art scholars Claire

Bishop and Hal Foster cite Clark's collective propositions as precedents to contemporary participatory work.² In this paper I will complicate these readings by contextualizing Clark's work in the late 1960s, a period in Brazilian history in which the military increasingly gained control of the government. These political upheavals had a clear impact on the Brazilian art world. Argentinean art historian Andrea Giunta has argued that the first symptoms of this change can be seen with the transformation of the artist into a cultural figure, and the shift of the work of art from an abstract aesthetic expression to an engine for real political change.³ Clark's artworks stand at the fulcrum of this development, as both a reaction to, and an escape from, a stifling political environment.

First Moment: 1964

Following the period of rapid modernization that was promoted by president Juscelino Kubitschek in the 1950s – including the building of the famous new capital, Brasília – the country fell into a period of instability. Kubitschek's political rival succeeded him only to resign in a miscalculated political move, clearing the way for João Goulart – Kubitschek's former vice president.⁴ The Brazilian military opposed Goulart's left-wing policies, however, and took over the government in 1964, with General Humberto de Alencar Castelo Branco serving as President. Eager to affirm the legality of his presidency, Castelo Branco intended to serve the remainder of Goulart's term, which ended in 1966, and then turn power over to a democratically elected president.

In order to control the left-wing groups that had multiplied under previous administrations, congress vested Castelo Branco with increasing powers through a series of laws known as Institutional Act 1 (1964). IA-1 suspended dependency on other branches of government, suppressed the autonomy of local municipalities, and authorized the government to target political parties, labor organizers and church activist groups, and suspend the political rights of any citizen. This repression extended to the art world: because of art critic Ferreira Gullar's visible involvement with a student leftist organization engaged in restoring popular art, the military police broke into his house and confiscated some of his belongings.⁵ The relationship between progressive and conservative cultural movements was, however, a complex one. As Brazilian literary critic Roberto Schwarz has pointed out, the government used a conservative discourse to court the ruling elite into supporting a general

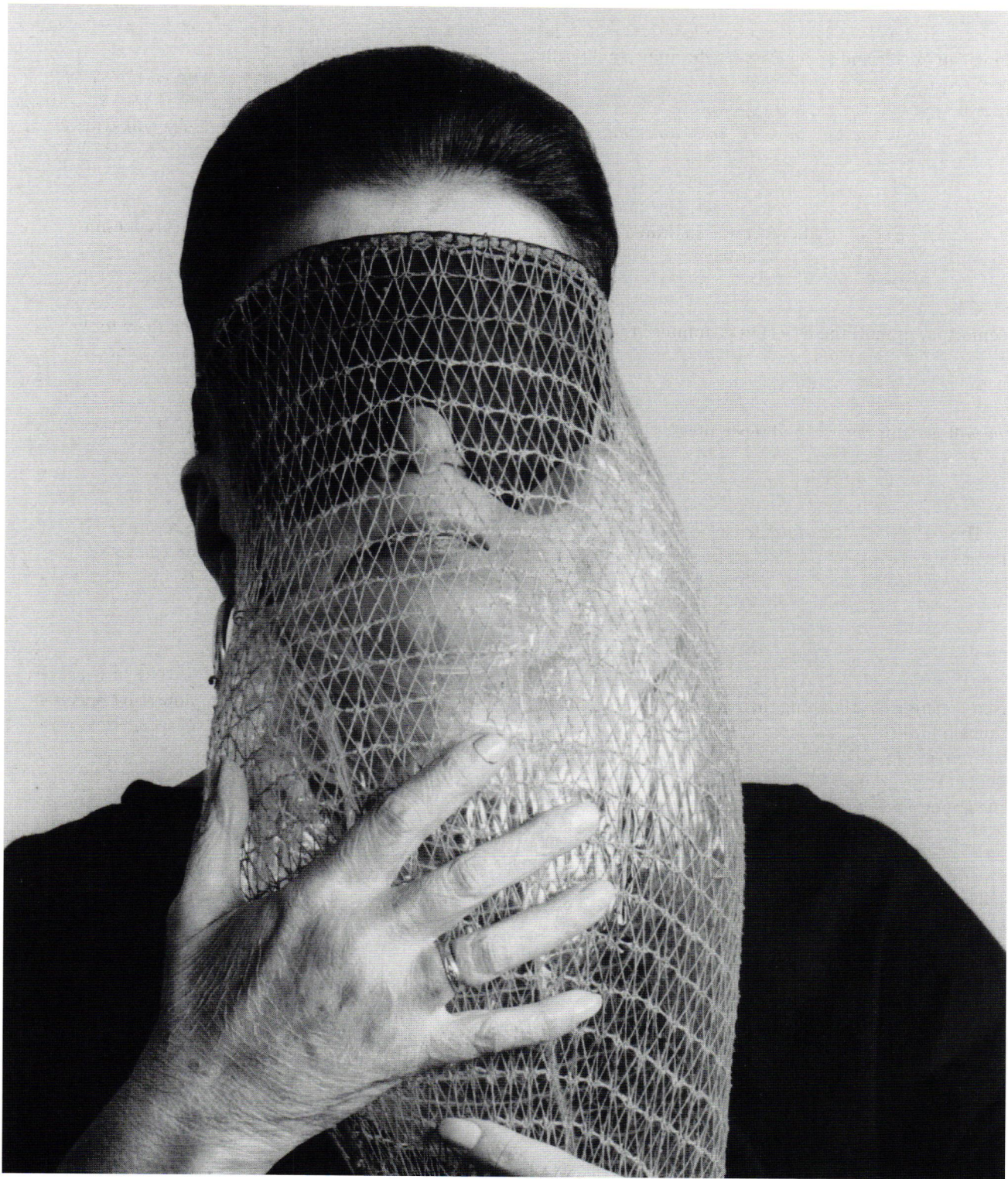


Figure 1. Lygia Clark, *Abyssal Mask* (1967). Courtesy of The World of Lygia Clark Cultural Association.

modernization of the state – a contradiction echoed by the Brazilian middle and upper classes, who argued politically against the left but followed the fashion and music of progressive groups from the United States and Europe.⁶

These modernization plans required financing, prompting Castelo Branco to establish severe economic measures that decreased the government's popularity in subsequent regional elections. To prevent a similar outcome in the presidential elections, a new act was instituted specifying that all public posts were to be elected indirectly by Brazil's congress, effectively depriving the country of its right to vote. While the 1964 regime was supposed to revert to a democracy in 1966, the new laws guaranteed the successive election of military regimes. In only five years, the country had gone from the optimism of Brasilia to a regularly elected dictatorship that would rule Brazil until 1985. As we will see, this reversal had repercussions in the country's artistic production, but to understand them we must go back to 1959, to the foundation of the Neo-Concretist movement during the last years of Kubitschek's presidency.

The art critic Gullar – later persecuted for his involvement with student leftist organizations – had launched the Neo-Concretist movement in Rio de Janeiro as a reaction to São Paulo Concretism, which was influenced by Swiss artist Max Bill. Gullar and the Neo-Concretists viewed the ethos of rationalism and scientific objectivity that was propounded by the São Paulo group as a fallacious. The Neo-Concretists, grounding their approach in the phenomenological orientations of Maurice Merleau-Ponty, thought of art as existential, emotional, and affective. As a founding member of the group, Lygia Clark emphasized the importance of the experience of the participant over the appearance of the object by calling her works "propositions." *Trailings* (1964), for example, consisted of a series of instructions to cut a paper Möbius strip longitudinally until the strips were too thin. Max Bill had famously won the 1951 São Paulo Biennial with a Möbius strip sculpture (*Tripartite Unity*, 1951), and Clark's *Trailings* worked as a literal unraveling of his work. "The act is that which produces the *Caminhando* [Trailings]," wrote Clark, "Nothing exists before and nothing afterwards."⁷ In cutting the strip, the participant must focus on the object as it keeps unraveling, becoming thinner with every cut. Attention and care are needed in order to keep the paper from ripping. Such direct engagement was meant to dismantle the elitist character of the art object by addressing a universal subject without requirements of education or background.

This search for less restrictive forms of art would remain a constant in Clark's work.

By 1966, however, Clark had begun to harbor doubts about the polarities between emotion and reason and popular culture versus elite culture. Her essay "We Refuse..." is both revealing and problematic:

What's happening around me? A whole group of people clearly sees that modern art doesn't communicate, is increasingly becoming an elitist issue. So they turn to popular art, hoping to fill the gulf that separates them from the majority. Result: they cut the ties that attach them to the development of universal art and fall back onto a form of expression that is local in character.

I see another group that clearly feels the enormous crisis of modern expression. Those who compose it try to deny art – but this negation, they find no other way to express it except, precisely, works of art.

For myself, I belong to a third group that tries to elicit the public's participation. This totally changes the meaning of art as one has understood it up to now.⁸

In the first segment of the essay, Clark writes in the first person, detaching herself from Gullar's arguments for popular culture – best represented by fellow Neo-Concretist artist Hélio Oiticica – and more autonomous alternatives of art through negation. After the paragraphs quoted above, the essay shifts to the first person plural, as reflected in the title, "We Refuse..." What is refused is the object as work of art in favor of an experience that elicits the public's participation. We might infer that this "we" is no longer an alliance of artists. Rather, it implies the joint participation of artist and spectator. In a contemporaneous text, Clark clarified the new nature of the work of art: "This is no longer a problem for the privileged."⁹ These privileges she wanted to rule out were less a matter of income differences and more a concern of intellectual elitism in access to art, continuing her desire to address a universal subject. However, there is a tension between introspection and participation, between Clark as an individual and this hypothetical subject, that remains unresolved in her work of this period.

Clark's series of work titled *Nostalgia of the Body* (1966) highlight these problems. The objects are meant to be

balanced collective – a collective that binds us through equality while maintaining our status as individuals, where spectators are emancipated, active interpreters who make their own stories. Clark’s masks and goggles from *The House is the Body* promote this collective by allowing individuals to participate in terms of equality. By repositioning the participant in the role of enforcement and control, Clark’s masks forced her audience to confront the political context at the same time that they invited them to escape it. It is precisely through its critical engagement with the political realm that her work succeeds in activating the audience.

Clark’s desire to transform spectators into participants/escapists may be related to her situated context of artistic production, in a country unable to participate in its own elections. In accepting traditional oppositions of passive spectatorship and active participation, Clark was a passive subject, deprived of agency. Rancière’s paradigm of the

emancipated spectator allows us to view her in a different light. As an emancipated spectator, we can understand Clark’s active role in interpreting the world that surrounded her. In Rancière’s words, “She participates in the performance if she is able to tell her own story about the story that is in front of her.”¹⁹ In this way, Clark’s masks reveal possibilities for political agency beyond the dichotomy of observation and action.

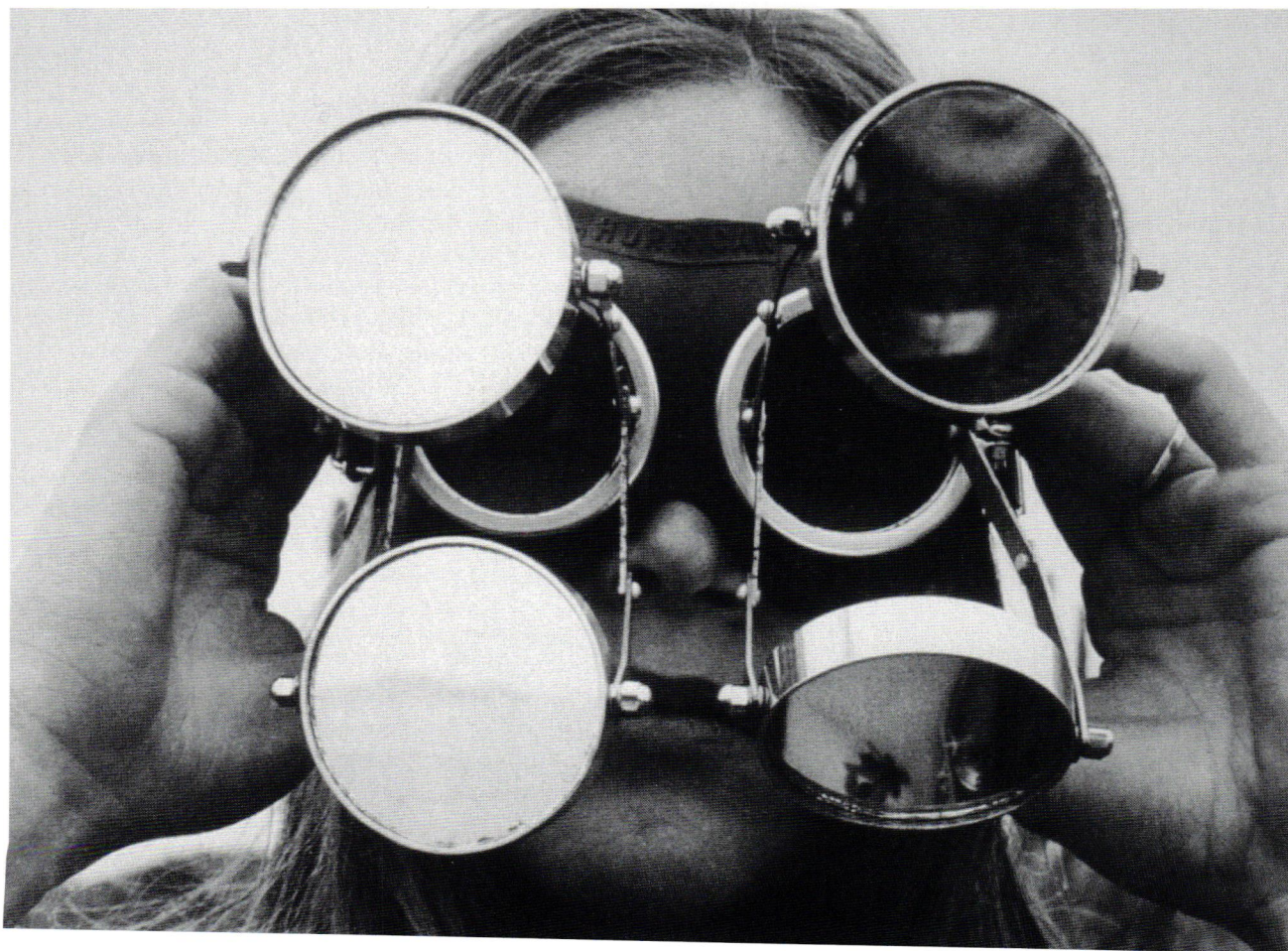


Figure 6. Lygia Clark, *Goggles* (1968). Courtesy of The World of Lygia Clark Cultural Association.

I'd like to thank Robin Greeley and Mark Jarzombek for their generous feedback and encouragement.

- 1 Lygia Clark, "1968: Are We Domesticated?" *October* 69 (Summer 1994): 85-109, 107. Clark's key writings were published in this issue of the journal, along with an introduction by the art historian Yve-Alain Bois. A complete monograph of her works and writings was published by the Fundació Antoni Tàpies. See Fundació Antoni Tàpies, *Lygia Clark* (Barcelona: Fundació Antoni Tàpies, 1998). For Clark's early development up to 1964, see Monica Amor, "From Work to Frame, In Between, and Beyond: Lygia Clark and Hélio Oiticica, 1959-1964," *Grey Room* 38 (January 1, 2010): 20-37. Guy Brett published some early essays on Clark's work in *Third Text* 1, no. 1 (1987) and *Art in America* 82 no. 7 (1994). The cultural association "The World of Lygia Clark" is responsible for administering her archive. Their website contains a biographical summary, a chronology of her work, and other relevant information: <http://www.lygiaclark.org.br/>.
- 2 See Lygia Clark and Hélio Oiticica, "Letters," and Hal Foster, "Chat Rooms, 2004" in *Participation, Claire Bishop* (Cambridge: MIT Press, 2006), 110-116, 190-195.
- 3 Giunta sees this shift taking place throughout South America, where several countries were going through political turmoil. See Andrea Giunta, "The Avant-Garde between Art and Politics," in *Avant-Garde, Internationalism, and Politics: Argentine Art in the Sixties* (Durham: Duke University Press, 2007), 244-279.
- 4 Brazilian law at the time mandated separate elections for president and vice president. Jânio Quadros, a center-right candidate, was elected president in 1961. João Goulart, running for the opposite party, was re-elected vice president, and ascended to the presidency upon Quadros' resignation.
- 5 Gullar was involved with the Popular Culture Center (CPC). According to literary critic Roberto Schwarz, the Castelo Branco government was focused in breaking the links between cultural movements and the masses, and socialist intellectuals like Gullar were only targeted when they had actively organized meetings with members of the working class. Furthermore, Schwarz explains these events took place in the context of a Communist Party that was more anti-imperialist than it was anti-capitalist. This position led it to favor modernization and make alliances with the bourgeoisie in order to oppose the more archaic impulses of imperialism. However, such alliances left it unprepared to resist the coup. See Roberto Schwarz, "Culture and Politics in Brazil, 1964-1969," in *Misplaced Ideas: Essays on Brazilian Culture*, ed. Roberto Schwarz and John Gledson (New York: Verso Press, 1992), 127.
- 6 See Schwartz, *Misplaced Ideas: Essays on Brazilian Culture*, for further analysis of the cultural production in Brazil during this period.
- 7 Lygia Clark, "Caminhando," [1983] n Fundació Antoni Tàpies, *Lygia Clark*, 151.
- 8 Lygia Clark, "1966: We Refuse..." *October* 69 (Summer 1994): 105-106.
- 9 Lygia Clark, "1965: Concerning the Magic of the Object," *October* 69 (Summer 1994): 101.
- 10 It is significant that Clark took these objects with her when she moved to Paris, contradicting her claims to move away from the object and focus on experience. Yve-Alain Bois has written a compelling first-person account of their unpacking in Paris. See Yve-Alain Bois, "Introduction," *October* 69 (Summer 1994): 85-88.
- 11 The Brazilian Military Police (*Polícia Militar*, PM) are preventive state police forces charged with policing and maintaining public order within the states and the Federal District. They are subordinate to state governments. The investigation of crimes is handled by the Civil Police. *Brazilian Constitution*, Title V, Chapter III, Article 144. Available at <http://www.v-brazil.com/government/laws/titleV.html>, accessed 3 March 2011.
- 12 Following the IA-5, Ferreira Gullar was arrested because of his anti-censorship activities in the *Grupo Opinião*. After his release, he was denounced as an activist in the Communist Part in 1970, went underground, and finally left the country in 1971. Art critic and involved political commentator Mario Pedrosa, and theater director Augusto Boal were also forced to leave that year.
- 13 Lygia Clark, "Sensorial Masks," [1967] in Fundació Antoni Tàpies, *Lygia Clark*, 221.
- 14 Lygia Clark, "On the Fantastic Reality of Today and Tomorrow," [1967] in Fundació Antoni Tàpies, *Lygia Clark*, 219.
- 15 Clark, "On the Fantastic Reality of Today and Tomorrow," 220.
- 16 Sylvie Coëllier sees similarities with Ku Klux Klan robes and surgical gloves. Coëllier comes to a similar conclusion on the simultaneous desire for contact with and protection from the world. See Sylvie Coëllier, *Lygia Clark (l'enveloppe): la fin de la modernité et le désir du contact* (Paris: Harmattan, 2003), 130-131.
- 17 Her exile ironically situated her in these two important protest sites of 1968.
- 18 Rancière, "The Emancipated Spectator," *Artforum* 45 (March 2007): 270-281.
- 19 Rancière, "The Emancipated Spectator," 277.



Figure 1. Abraham Bloemaert, *Wide Landscape Prospect* (verso), (1559-1605). Pen and brown ink, watercolor, traces of black chalk, 8 1/4 x 12 3/16 in (21 x 31 cm), Metropolitan Museum of Art, New York, Rogers Fund, 1970, (1970.242.3) © Metropolitan Museum of Art / Art Resource, NY.

Standing Mountains Move Like Clouds

A Watercolor Study of the
Printed Horizon

Caroline O. Fowler

*...’tis on the hither side of this
infinity that are found motion, and
rest, and their opposition, and
whatever may be uttered or conceived.*

- Nicholas of Cusa, *The Vision of God*, 1453

Wide Landscape Prospect (1599–1605), on the verso of a drawing, maps out in watercolor an uninhabited dunescape [Figure 1]. Through subtle gradations of wash, the sand dunes emerge from the paper’s ground. Built from translucent layers of light charcoal shading that mimic the strata of the earth and intermittent bands of lucid color that mirror the ground’s surface, this study offers a landscape at the edges of representation. One layer less of color or shading, and this watercolor would be mere abstract strokes on a page. Instead, the artist, Abraham Bloemaert (1566–1651), traces the contours of the paper, sensitive to its minute bumps and crevices. The ground of the paper and its accidents become the foundation for the landscape and its irregularities of rock, sand and grass. A ribbon of white paper stands out against the background of muted green and brown wash. In filiform script, Bloemaert signs the drawing with his initials and a singular *f* for *fecit* – *Abf* [Figure 2]. It might be easy to dismiss this barely-there watercolor as an unfinished work when it is seen within the folio of Bloemaert drawings at the Metropolitan Museum. With his signature, however, Bloemaert asserts that this is not an incomplete study or a sketch on the way to becoming something else. Abraham Bloemaert made (*fecit*) this; it is complete.

As will be seen, this watercolor looks carefully at the “printed horizon,” a vista that dominated the world of

sixteenth-century landscape panoramas, especially those designed by the prodigious Pieter Bruegel the Elder (1525–1569) and put in print and disseminated by the famous publisher and dealer Hieronymus Cock (1510–1570). In his own watercolor *Wide Landscape Prospect*, Bloemaert examines the horizon that hovered at the back of printed panorama prints. In the medium of watercolor, Bloemaert meditates on the printed horizon, while considering shifts in perception that were generated by the print medium, specifically in regards to movement and force. As will be argued, Bloemaert presents a visual cogitation that resonates with reconsiderations of the correlation between force and movement in seventeenth-century natural philosophy, particularly that of René Descartes.¹ As artists discussed the technical skills necessary to simulate the extension of three-dimensional bodies and objects in two-dimensional space, natural philosophers such as Descartes were radically reconfiguring the relationship between movement and force, reconsidering how bodies that occupied space moved and endured in that space. In turn, in artistic practice, the medium of print introduced a new kind of movement and itinerancy to objects that, I will argue, also challenged previously held beliefs regarding the interrelationship between force and movement. This article will explore the intersection between the developments concerning movement in seventeenth-century natural philosophy and the mobility of objects engendered by the print medium.

Although seventeenth-century Dutch painting is famous for its advancements in printed and painted landscapes,

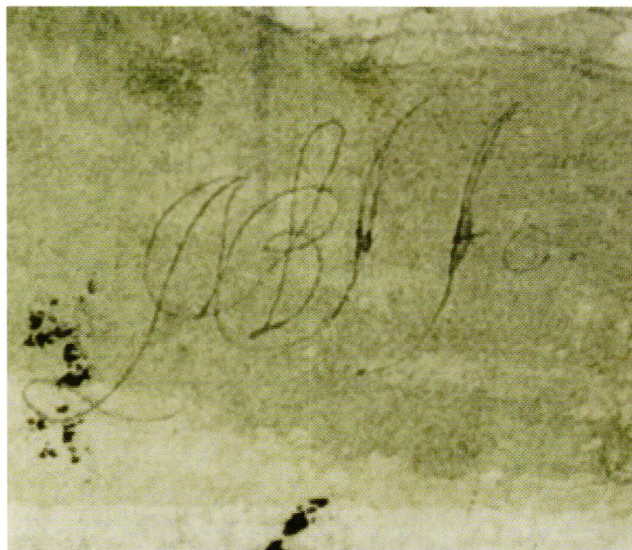


Figure 2. Abraham Bloemaert, detail of signature in *Wide Landscape Prospect* (verso), (1599–1605).

works that focused on the landscape itself instead of using it as a backdrop for a history painting, this watercolor offers a view unlike any other Dutch panorama or scene. It is neither a study of atmosphere and the atmospheric, as contemplated in the work of Jacob van Ruisdael (1628–1682), nor is it the composed placidity of a cultivated countryside or a dammed and diiked waterway, as may be seen in the *landschappen* of Jan van Goyen (1596–1656). And although similarly enigmatic, this landscape does not convey Hercules Seghers' (c. 1589–1638) paradoxical play between disintegration and petrification in his renowned painted prints. Celebrated in later periods for making landscape the focus of the composition as opposed to the figure, Dutch landscape painters invariably included traces of domestication on the surfaces of their worlds: farms and their plotted fields, church spires, bridges, walls, roads, travelers, vagabonds, or the notable Dutch cow. Except for the trace of a path that cuts diagonally across the dunes, Bloemaert brings in no mark of cultivation, urbanization, history or ruin.

In order to understand this strange watercolor, it is necessary to look towards the written body of work surrounding seventeenth-century artistic practice, particularly the theorist and artist Karel van Mander (1548–1606) and his didactic poem, *Der Grondt* (1604). In this poetical treatise on artistic practice, van Mander spends several verses focusing on the importance of the background in landscape. "The landscape in the distance takes in the form from the air, becoming hazy and almost entirely faded into air; standing mountains move, resembling (*lijkt*) clouds."² Van Mander's *ekphrasis* resonates with Bloemaert's seemingly inexplicable watercolor. According to van Mander, the landscape's background requires the careful attenuation of light and shadow, the mastery of conveying air and its force on vision and bodies: "Think of the thickness of the air, that blue substance which obstructs ... between the eyesight, and which hinders the endeavor to take sharpness out of haziness."³ In van Mander's verse, geological bodies exemplifying dormancy, impenetrability and permanence attain the lightness of a cumulous cloud. Geology becomes meteorology. Standing mountains are capable of striding from their lookout posts. In describing the landscape's background through the image of moving mountains, van Mander sets the entire landscape into motion and suggests that which is most permanent – the mountain, the horizon, the background – is best understood through the light and transient bodies of clouds. Bloemaert's watercolor dis-

plays a mastery of a landscape in the distance, "taking form from air." Using the force of the paper's ground, Bloemaert buoys the landscape out of the page, like a cloud. Van Mander turns the permanency of the mountain range into the ephemerality of a cloud, turning the world on its head.

In his treatise on drawing, the art theorist Willem Goeree (1635–1711) writes about tracing "the interval of a place, or distance which is open and empty between each object (*Beeldt ofte Lichaem*), receding or advancing naturally to the eye, as if it were accessible with one's feet."⁴ The practice that Goeree discusses falls under the category of *houding*. An ill-defined concept in seventeenth-century Dutch art theory, *houding* describes an ability to make "a sense of space in a picture."⁵ Through the correct variations of hues, lights and shadows, artists create worlds in which bodies properly advance and recess before the eye. Indeed, this is the technical process guiding Bloemaert's watercolor, light browns and greens blending and contrasting with the paper, in order to shape the relief and crevices of the vale and its dunes.

Although it was not until 1668 that Goeree distinguishes *houding* as the representation of space, beginning with Karel van Mander's *Der Grondt* in 1604, Dutch theorists wrote about the necessity of lucid spatial relationships between objects and bodies in painting. The ability to construct a believable three-dimensional space on the two-dimensional plane depended upon an artist's capacity to use force (*kracht*) with "the appearance of solidity" (*welstandigheid*).⁶ Similar to *houding*, *welstandigheid* expresses the representation of three-dimensional space on the two-dimensional plane. While *houding* may give a sense of space, *welstandigheid* is the artist's ability to make an impression of the extension of things within that space. In order to simulate this occupation of space by things, artists used "force." This interrelationship between force (*kracht*) and "the appearance of solidity" is stressed even further in Philips Angel's *Lof der schilderconst* (1641).

In a famous address to the painters of Leiden, the art theorist Angel (1616–1683) states that the mastery of light and shadow makes objects "actual":

... for shadow being combined in its proper place gives such enchanting force (*tooverachteige kracht*), and so wonderful an appearance of solidity (*wonderbaerlijcke welstandt*), that many things, which can hardly be depicted in colours with a brush, appear quite actual ...⁷

Angel defines *chiaroscuro* (building form through light and shadow) as a force that artists use to simulate the *welstandt* or three-dimensional presence of a thing in space. Exemplifying Angel's words, Bloemaert uses the liquid medium of watercolor to build the tonal variations; the negative space of the page comes into positive relief against the darkened shadings of wash. Through the practice of *houding*, or making space through attention to light and shadow, Bloemaert's use of force conveys the rising of the dunes from the ground of the paper, occupying the space delineated by his brush.

The question of force itself in the seventeenth century came under pressure, scrutiny, observation, and experimentation. Previously, rest was considered the natural state of bodies, to which all bodies inclined; only a "violent force" could set masses in a motion. This Aristotelian understanding of movement guided the ways that artists wrote about and represented motion, most clearly elaborated in the writings of Leonardo da Vinci, who described force as "a non-material (*spirituale*) power, an invisible potency which is imported by accidental violence from without to all bodies out of their natural inclination."⁸ For Leonardo, bodies inclined towards rest or a "natural state;" only a "non-material power" set them into movement. But studies of movement in natural philosophy began to suggest new conceptions of a body's displacement and change. Descartes argued that rest and movement were equal "states" of being: bodies moved in relationship to other moving bodies and required force to continue in a state, whether rest or movement.⁹ Descartes' work foreshadowed the foundation for the concept of Newton's inertia: a body will persist (through force) in a state, either rest or motion, until moved by another body.¹⁰

The Printed Horizon

Dutch paintings and works on paper are famous for their horizons, naturally composed by the flatness of the Dutch topography and the meeting point between the land and the sky.¹¹ But Bloemaert's watercolor of the dunes is not the infinite line of the flat Dutch farmland. Instead, it is the study of a particular horizon, a type that occurred most often in prints; the slow receding of the valleys, the resting point for the eyes. Bloemaert's son, Frederick, reincorporated his father's study of the horizon into the background of a printed landscape for Abraham's *Large Landscape Series* [Figure 3], making obvious the relationship between this study and the printed background¹²

As art historians have noted, foremost Joseph Koerner, the horizon is a central trope of sixteenth-century landscape prints.¹³ Although the horizon is crucial in painting, it takes on a new dimension in works on paper, which were studied and viewed horizontally on a table or bound within a book. A trendsetter for many facets of Northern painting, Bruegel's *Large Landscape Series* with its fantastical engravings of craggy mountains, descending vistas and lone travelers influenced the work of Seghers, Rembrandt, and also Bloemaert, who, as mentioned, designed his own *Large Landscape Series*, which shares many affinities with Bruegel's.

The influence of Bruegel's printed vistas may not only be traced formally to Bloemaert's compositions but also are seen in van Mander's discussion of Bruegel's horizons: "he [Bruegel] teaches us, depicting without great trouble, how one looks into the angular rocky Alps, the deep sight into the dizzy abysses (*duizelingwekkende vallei*), steep crags, pine trees that kiss the clouds, extreme distances and rushing streams."¹⁴ As emblemized in the printed landscapes of Bruegel, such as *Large Alpine Landscape* (1553–1556), Bloemaert's watercolor is a study of the horizon itself that continues at the limits of the viewer's eye. Bloemaert was teaching himself how to look into van Mander's dizzying abyss, the extreme distance delimiting the visible world, hovering in the background of landscape prints.

Bruegel's landscapes position the viewer to enter and to stroll via the eye. In *Large Alpine Landscape* (1553–1556) [Figure 4], a rider sits on his horse, the creature gnawing at his bit and pawing the ground. Despite the horse's restlessness, the rider stops and breaks his journey to stare out over the mountain dotted with varied domestic worlds. This figure acts as a surrogate, leading the viewer down the ridge and into the valley towards the ever-receding horizon, integral to landscape prints, which are dependent upon the itinerant eye. The horizon demonstrates to the devoted viewer, who has strolled the various lined paths of the print, the limits of one's own vision, both within the printed world and within one's own world-view.¹⁵ Bloemaert's watercolor study foregrounds this remote background space. In studying the limit of the visible, Bloemaert materially realizes this finitude with his just-there watercolor – an image that becomes visible from the page with its translucent washes.

The State of the Matter

Today, prints are categorized, sold and studied according to their state (in Dutch *staat*). The surface that presses into the



paper to form an impression, either woodblock or metal plate, is called the matrix. Any change to the material surface of the matrix, whether purposeful or incidental, will result in a new state of the print. Through careful examination, print connoisseurs distinguish amongst different printed impressions to determine their “state” (first, second, third, etc.) and thereby establish a historical chronology for a series of impressions made from a single matrix. Each print is a complete work within itself (although it might be one of many of a certain state), but each state can only be determined in relationship to the other states. The concept of the “state” is integral to the practice of printmaking, a process that developed concurrently with explorations of states of being in natural philosophy.

With the work of Galileo Galilei (1564-1642) and Descartes (1596-1650), rest and movement began to be considered as ontologically equal states. As previously

discussed, all bodies had been regarded as inclined to rest; only a violent force could initiate movement. Positioning himself against this classical understanding, Descartes argued that a body persists in its state – either rest or movement – until moved by another body.¹⁶ To move a body out of any state requires force, regardless of whether the body is in rest or motion. As Alexander Koyré maintains, the post-Galilean and post-Cartesian idea of motion “is thus conceived as a *state*; but not a state just like any other, for it is a *relational state*.”¹⁷

The Dutch *staat*, even more than the English *state*, speaks to the concept of positioning one’s self, as when the various states of prints are situated in relationship to each other as traces of the matrix change through the force applied on it by the weight of the printing press. Considering the importance of relation in Galileo and Descartes, the *staat* of the various impressions from a single matrix

Figure 3. After Abraham Bloemaert, by Frederick Bloemaert and published by Nicolaes Visscher, *Reclining Shepherd in Large Landscape Series* (c. 1635), Etching, 172 mm x 215 mm, © Trustees of the British Museum.



reflects the principle of inertia – the persistence within a state, either in rest or in movement, until contact with the force of another body.

The printed landscape, in particular, engages with this material quality of print and the relativity of its states, which may only be perceived when positioned in front of a viewer, who may compare the variations of the matrix's impressions. Like the horizon within the printed landscapes, the state of prints themselves shift in variation to each other and the viewer. Like the landscapes within the prints, the matrix for the print will change over time as various print presses force the matrix into new indentations, pressing down the raised parts of the plate, so that the print of the lines becomes less clear and more obscure, a new printed state emerging.

As the question of the “state” within print demonstrates, the medium is dedicated to exploring the relation-

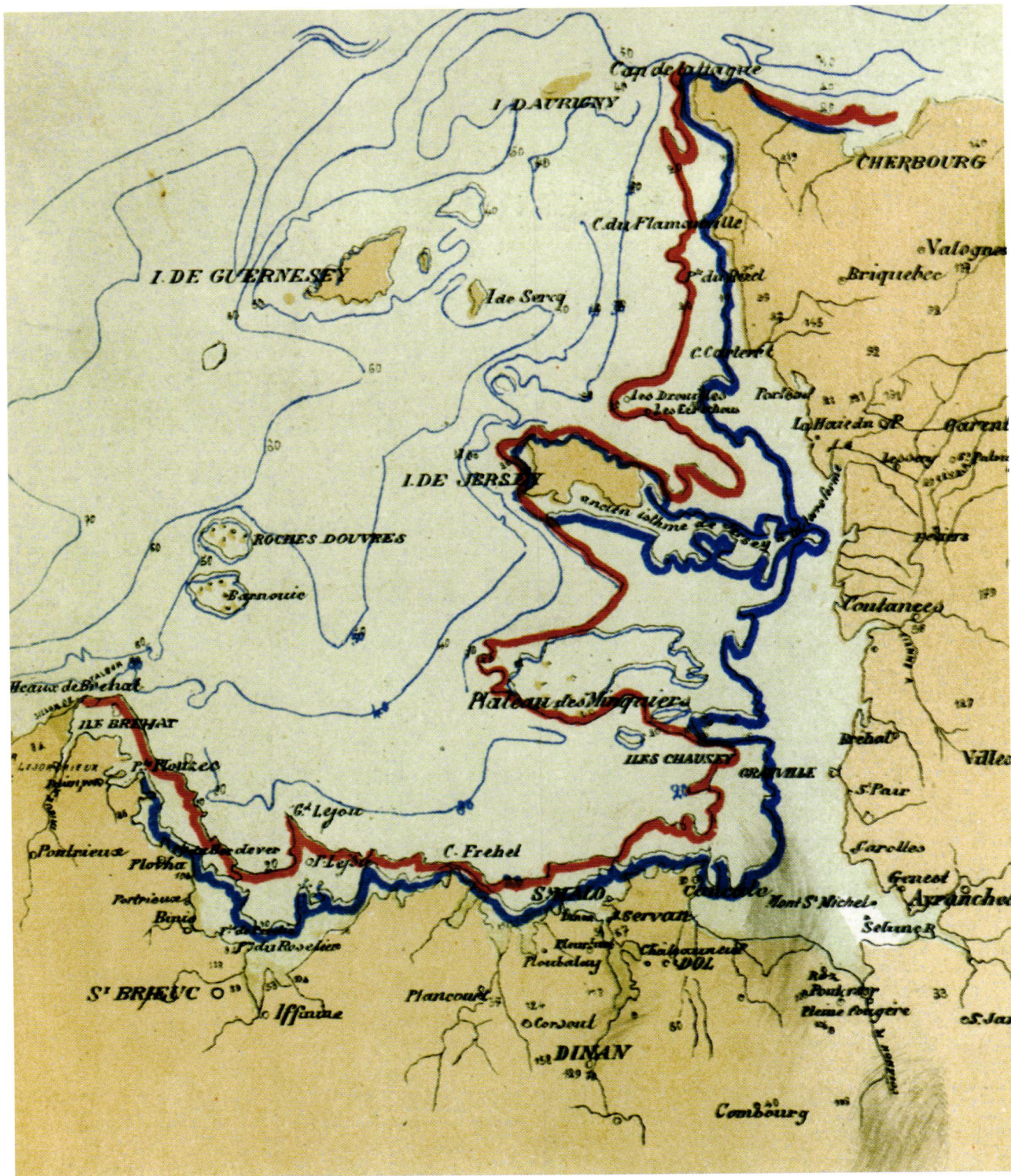
ship among various states, among various impressions, among various works on paper, each a complete work that exists in relationship to other works. It is within this medium, that artists such as Bruegel (and Bloemaert following in his wake) began to exploit and understand the horizon as an “ideal” site in movement that was only realized by, and only existed in relationship to, the viewer. Prints introduced a radical new understanding of movement that pointed to it as a relational “state.” Just as through the force of the printing press, a new “state” of a print emerged, and through force artists simulated space and the positioning and solidity of extended things in space. In studying the printed horizon, Bloemaert evoked a dunescape, his translucent washes resonating with van Mander's cloud-like mountains. But Bloemaert's landscape is not a violent bringing-about of form in the sense understood by da Vinci. Bloemaert's landscape speaks much more to van

Mander's "mountains that move like clouds," suggesting an understanding of movement which is not about the "setting of things into motion" through a violent force, but instead positing the notion that the world may already be in movement, and that like the mountains that move like clouds, movement and rest are two different but ontologically equal states.

In his meditation on the horizon formed in the background of landscape prints, Bloemaert moved towards an understanding of force and movement that is relational. In making this world take form, Bloemaert deployed a mastery of light and shadow to give this piece of earth a *welstandt*, a semblance of a three-dimensional world, a world which only appears, like the horizon itself, in relationship to a viewer. In the nebulous watery medium of watercolor, Bloemaert presented a landscape whose form was inspired by the hard, seemingly immovable lines of the metal print surface. But as the materiality of print revealed, the lines engraved on these various landscapes shift and change – like clouds – obscuring the burin's original pathways, a new "state" of the print thereby emerging. What is perhaps most radical in Bloemaert's watercolor, however, is his realization that the force required to simulate the extension of things in space – their *welstandigheid* – could take shape with a few gradations of wash and charcoal. Bloemaert's landscape presents itself at the limits of representation, yet with his signature, Bloemaert signals that this work is complete in its current state.

I would like to thank the anonymous readers and Adam Fulton Johnson for their insightful comments and suggestions, which helped this article attain clarity and form.

- 1 Descartes was not the first to consider new forms of motion: Isaac Beecman, Pierre Gassendi and Galileo Galilei, among others, presented ideas integral to this developing discourse. I focus on Descartes because his work is paradigmatic of the shift, and he is the thinker discussed most often in relationship to Newton's definition of inertia in his *Principia* (1687). As Leibniz pointedly notes in his writings on Descartes, "It is very true and indubitable law of nature that the same thing, so far as in it lies, always persists in the same state—a law which both Galileo and Gassendi, and several others as well, have long held." Gottfried Wilhelm Leibniz, *Philosophical Papers and Letters*, ed. Leroy E. Loemker (Dordrecht: Kluwer Academic Publishers, 1989), 359.
 - 2 "Kijk hoe al het landschap in de verte de gedaante van de lucht aanneemt, wazig wordt bijna helemaal in de lucht overgaat; staande bergen lijken wolken die bewegen." (8: 8) Karel van Mander, *Der grondt det edel vry schilderconst*, ed. Hessel Miedema (Utrecht: Haentjens Dekker & Gumbert, 1973), 205. The translation is from, *The Foundation of the Noble Free Art of Apintinede*, by Karel van Mander, trans. J. Bloom, ed. Elizabeth A. Honig (1985).
 - 3 "Achteraan kun je het niet te vaag uitvoeren; ... minder rojaal zijn met diepsel dan met hoogsel ... denken aan de dikte van de lucht, die blauw van substantie is en die, daartussen ... het gezichtsvermogen belemmert, en het pogen om scherp waar te nemen door wazigheid geheel verhindert." (8:10) Van Mander, *Der Grondt*, 206.
 - 4 "Houdinghe dan, om den sin van het woordt en kracht van hare werckinge uyt te drucken, is dat geene, 't welcke alles wat in een Teyckeninghe ofte Schilderye komt, doet achter en voor uyt wijcken, en van her voorste tot het achterste, alles op sijn plaets doet staen, also dat yder dinc sijn eygen standtplaets komt te behouden, ende dat men de ruymte en wijdeydt van de plaets die tusschen yder Beeldt ofte Lichaem open en ledigh is, wijckende ofte na sich toe-komende, Natuurlijk met de oogh, als of he met de Voeten toe-ganckelijck ware, kan nasporen, daerom sy dan houdinghe gheenoemt wordt." Willem Goeree, *Inleydinge tot de Al-ghemeene Teycken-Konst*, ed. Michael Kwakkelstein (Leiden: Primavera Press, 1998), 140. The translation is from Paul Taylor, "The Concept of Houding in Dutch Art Theory," *Journal of the Warburg and Courtauld Institutes* 55 (1992): 211.
 - 5 Paul Taylor, "The Concept of Houding in Dutch Art Theory," 212.
 - 6 "Nu moet ik het nodig over iets hebben dat onze welstandigheid met kracht zal bevorderen; namelijk dat men alle gronden, van de voorgrond af, hecht met elkaar verbonden moet schilderen." (8:20) Karel van Mander, *Der Grondt*, 209.
 - 7 "Het wel schicken van dagen en schaduwem by een, is een van de principaelste hoofd-banden daer een goet Schilder mede verciert dient te zijn, om de welstandigheid die de selve onse Konst aen brengt: want de schaduwe by een gevoegt zijnde op haer behoorlijke plaets, gheven sulcken toeverarchteighe kracht, en wonderbaerlijke welstand; dat veel dinghen, die nauwelijcx door gheen *Penceelen* met *verwen* zijn na te bootsen, seer eyghentlijck doen schijnen; want de kracht die de levende en wesentlijcke dingen hebben, schoon haer schaduwem ghestroyt zijnde, onder een haspelen, ende evenwel noch een welstand hebben; soo kunnen wy om de onvolmaecktheyt die in ons noch overigh is, het selve in onse wercken gheen welstandt gheven, noch soodanighen kracht als sy ons voor komen; dan als wy
- het selve wel te weghe kunnen brenghen, wanneer wy de schaduwe, en het licht, ghesamentlijck met geode orden by een gheschickt hebben...." Philips Angel, *Lof der schilder-konst* (Leiden, 1642) 39. The translation is from Taylor, "Houding," 219. Compare to the translation by Hoyle and Miedema: Philips Angel, "Praise of Painting," trans. Michael Hoyle and Hessel Miedema, *Simiolus* 24, no. 2/3 (1996): 244.
 - 8 "Forza non è altro che una vitrù spirituale, una potenza invisibile, (infusa) la quale è create e infusa, per accidentale violenza, da corpi sensibili nelli insensibili, dando a essi corpi similitudine di vita; la qual vita è di maravigliosa operazione, constringendo e stramutando di sito e di forma tutte le create cose, corre con furia a sua disfazione, e vassi diversificando mediante la cagioni." Jean Paul Richter, ed., *The Literary Works of Leonardo da Vinci*, vol. 2 (London, New York, Toronto: Oxford University Press, 1939), 219, 1113B.
 - 9 "La premiere [loy] est que chaque chose en particulier ... continuë d'estre en mesme estat autant qu'il se peut, & que jamais elle ne le change que par la rencontre des autres...De façon que, si un corps a commencé une fois de se mouvoir, nous devons conclure qu'il continuë par après de se mouvoir, & que jamais il ne s'arreste de soy-mesme." (2: 37) René Descartes, "Principes," *Oeuvres de Descartes*, ed. Charles Adam and Paul Tannery, vol. IX-2 (Paris: Librairie Philosophique, 1964), 84. For the question of "force" in Descartes's writings, see: Daniel Garber, *Descartes' Metaphysical Physics* (Chicago: University of Chicago Press, 1992), 293–299; Alan Gabbey, "Force and Inertia in the Seventeenth Century: Descartes and Newton," *Descartes: Philosophy, Mathematics and Physics*, ed. Stephen Gaukroger. (Sussex: Harvester Press, 1980), 230–320; 230–320; Martin Gueroult, "The Metaphysics and Physics of Force in Descartes," *Descartes: Philosophy, Mathematics, Physics*, 196–229; Gary Hatfield, "Force (God) in Descartes' Physics," *Studies in History and Philosophy of Science* 10 (1979): 113–140; Michael Della Rocca, "If a Body Meet a Body: Descartes on Body-Body Causation," *New Essays on the Rationalists*, ed. Rocco Gennaro and Charles Huenemann (New York: Oxford University Press, 1999), 48–81.
 - 10 Both Garber and Gabbey are careful to note that it is anachronistic to apply the post-Newtonian concept of "inertia" to Descartes's writings; although both scholars subtly differ on Descartes's conception of the word inertia and its relationship to Kepler's definition: the property of bodies to resist movement in favor of rest. Nevertheless, Descartes is considered a precursor to Newtonian inertia. See, Gabbey, "Force and Inertia," 285–297; Garber, *Descartes' Metaphysical Physics*, 253–254.
 - 11 Svetlana Alpers famously described this type of landscape under rubric of the "Mapping" impulse in Dutch art, arguing that "surface and extent are emphasized at the expanse of volume and solidity." Svetlana Alpers, *The Art of Describing: Dutch Art in the Seventeenth Century* (Chicago: University of Chicago Press, 1983), 139. Clearly, Bloemaert's watercolor landscape offers a concurrent and different tradition that is concerned with the question of volume and solidity (as much as is historically possible)—primarily in regards to questions of extension-as-three-dimensional force and mobility within the landscape.
 - 12 Like Bruegel, Bloemaert designed his own *Large Landscape Series* (ca. 1635); fifteen landscape studies of rural Utrecht, engraved by his son Frederick. As Jaap Bolten has pointed out, *Wide Landscape Prospect* reappears as the background in one of Bloemaert's prints within the *Large Landscape Series*, print 12, see: Jaap Bolten, *Abraham Bloemaert, c. 1565–161: The Drawings*, vol. 1 (Netherlands: J. Bolten, 2007), 439.
 - 13 Joseph Leo Koerner, "The Printed World," *The Printed World of Pieter Bruegel the Elder: The Saint Louis Art Museum, April 4 – June 25, 1995*; Arthur M. Sackler Museum, *Harvard University Cambridge, September 2 – November 12, 1995*. (St. Louis: St. Louis Art Museum 1995), 2–34.
 - 14 "...van de schilderij en prenten van Bruegel, die er zo natuurlijk uitzien en waarin hij ons leert, zonder grote moeite uit te beelden, zoals [dat zich] in de hoekige, rotsachtige Alpen [voordoet], het diepe neerlijken in een duizelingwekkende vallei, steile rotsen, pijnbomen die de wolken kussen, verre verschieten en ruisende stromen." (8:25) van Mander, *Der Grondt*, 210.
 - 15 Koerner, "Printed World," 26–27.
 - 16 See: Alexander Koyré, "Significance of the Newtonian Synthesis," and "Newton and Descartes," *Newtonian Studies* (Chicago: University of Chicago Press, 1968) 3–114.; Alexander Koyré, "The Law of Falling Bodies," and "Galileo and the Law of Inertia," *Galileo Studies*, trans. John Mepham (Atlantic Highlands, NJ: Humanities Press, 1978), 65–236; Émile Meyerson, "Le principe d'inertie," *Identité et Réalité* (Paris: Librairie Félix Alcan, 1932), 114–165.
 - 17 Koyré, "Galileo and the Law of Inertia," 130.



The Frontispiece for Alexandre Chévrémont, *Les Mouvements du sol sur les côtes occidentales de la France* (Paris: Ernest Leroux, 1882).

Where Time Never Stands Still

On the Losses of
Mont-Saint-Michel

Edward Eigen

The details of the letter, dated “Mont-Saint-Michel, le — — 1791,” provide a glimpse of the world *avant le déluge*. At the moment of its writing, its author Jean-Marie Baudouin de Maison-Blanche, noted jurist and moderate revolutionary deputy, was mid-course on an overland “voyage” to study the monuments (megaliths and manuscripts) of the former Armorica.¹ As eventually published in the *Mémoires de l'Académie Celtique*, Baudouin’s note to an uncertain posterity can be read as an anxious farewell to the fortress abbey of Mont-Saint-Michel, which was soon destined to become a prison for refractory priests who refused to swear allegiance to the *Constitution civile du clergé*.

Baudouin was made sensible to the coming storm as he prepared to descend from the storied “city of books.” His unnamed host and guide, identified by Baudouin only as one of Dom Bernard de Montfaucon’s last disciples, protested that his hospitality would be incomplete were he not allowed to describe the history of the place. The learned Benedictine embarked on an urgent discourse, abridging the ages in anticipation of his narrative’s mournful conclusion. Gesturing to the indistinct horizon, he mapped out the ancient extent of Armorica, which, according to the Welsh historian Nennius (of the ninth century), Maximus had conceded to Conan Meriadoc in the year 384.² Baudouin’s host then spoke of the forest of Sciscy, which had once surrounded the mount, as a spiritual retreat for Druids and, in turn, Christian cenobites, before arriving at the cryptic chapel hesitantly constructed by Bishop Aubert of Avranches (d. ca. 725) following the apparition of the archangel Saint-Michel on October 16th.

“Adieu, Monsieur, adieu,” Baudouin’s guide bade him,

adding that his own permanent departure from the monastic stronghold was imminent. The monk expressed his anticipation that Baudouin, over the remaining course of his voyage, would come to grief from the losses suffered by abbatial libraries and archives. On Wednesday, the 12th of October, 1791, officials of the district of Avranches arrived at Mont-Saint-Michel with a cart to carry off its jewel-encrusted relics and reliquaries, its cups and chalices, all of which had earlier been inventoried by order of the National Assembly.³ Thus began what Hippolyte Taine in his *Les Origines de la France Contemporaine* decried as the Revolution’s essence: a vast translation of property.⁴ On December 21, two commissioners were dispatched to remove the contents of the muniments room, library, and sacristy. The mass of parchment and vellum was taken to the orangerie that only weeks earlier had formed part of the bishop’s palace in Avranches. The choice of location was not a good one for service as a *dépôt littéraire*, a use motivated by expedience and the desire to assign a purpose to the newly nationalized structure. The decision serves as “testimony of the incurious ignorance” concerning the necessary care required by the precious collection during this destructive and anarchic bibliographic interregnum.⁵

The monk’s final words of farewell were full of caution regarding the immediate danger underfoot: “Be careful in crossing the quicksand.” As he himself receded into history, this faithful disciple of Montfaucon offered his departing guest a one-line gnomic history of the darkening chaos, a chaos in the primordial sense of the word, the unbounded expanse of not-land and not-sea that surrounded and formed all the approaches to Mont-Saint-Michel: “I have often seen a great storm cause countless trees to re-emerge from the sands — incontestable evidence of the ancient forest that once covered this region.”⁶

What Time Is This Place?

Baudouin’s letter was addressed as if from the end of the world. More precisely, it arrived from the wave-girdled bit of earth whose history was soon to be relegated to that of the irreversibly terminated *ancien régime*, a world regretted mostly by those who dwelled in or on the past. Only a few months later, in a revolutionary upheaval of time, the newly drawn Republican calendar was reset to *L’an I*.⁷ Notwithstanding the omission of the month and day on Baudouin’s letter, circumstances dictate that it was written sometime before October 12 of that turbulent year, 1791, when the confiscations from the ancient Benedictine abbey

of Mont-Saint-Michel began. Questions of time such as these will be essential in the debates concerning the history of Mont-Saint-Michel that followed in the wake of the Revolution, as we ask, to borrow an imaginative phrase: what time is this place?⁸

Around Mont-Saint-Michel, neither time nor place were steady and solid nor seemingly ever at a state of rest; though to approach an understanding of the rocky island abbey is to sort through what remains, remains which are themselves subject to historical and/or geochronological displacements. This unsettling observation is exemplified by the essay-length footnote in the Abbé François Gilles Manet's *De l'État Ancien et de l'État Actuel de la Baie du Mont-Saint-Michel* (1829), treating the ancient, sunken forest of Sciscy. Citing no fewer than eighteen published sources along with "all the manuscripts from the Abbey of Mont-Saint-Michel," Manet offers that "even if historians had taught us nothing, there remains irrecusable evidence" of the fabled forest's present and former existence.⁹ He was referring to the countless tree stumps which, over the course of centuries, had been "unearthed" from the mud flats surrounding Mont-Saint-Michel. Still more conclusively, there was the "famous storm" of January 9, 1735. Reversing time, making its eddying regime visible, the storm tides uncovered thick stands of fallen trees lying on the bay's bottom. For Manet, the well-documented fact that the trees were all lying in the same direction proved, "independently of history," the force and direction of the "ruinous" tide of March 709 that buried the forest in the sea.

Lost, found, and lost again, the sunken forest of Sciscy was the object of not a few conjectural attempts to establish synchronisms between the mutually unstable earth history and written history of the Normanno-Breton coast. In this dark wood, a sacred wood, even the most circumspect historian was bound to become lost. The competition announced by the Société d'Archéologie d'Avranches on October 7, 1841 sought to find the way out, make sense of the historical record.¹⁰ A gold medal was to be awarded for the best memoir on the question: What was the geographic situation of Mont-Saint-Michel during the reign of Childebert III (695–711)? The unstated but undeniable purpose of the contest was to establish solid grounds for questioning Manet's dating and description of the submergence of the forest. In prescribing a locally specific approach to in-depth research, the contest brief directed as much attention to the internal order of the rare collection of manuscripts formerly housed at the Abbey of Mont-

Saint-Michel as it did to the uncertain indications of time and place given in those manuscripts.

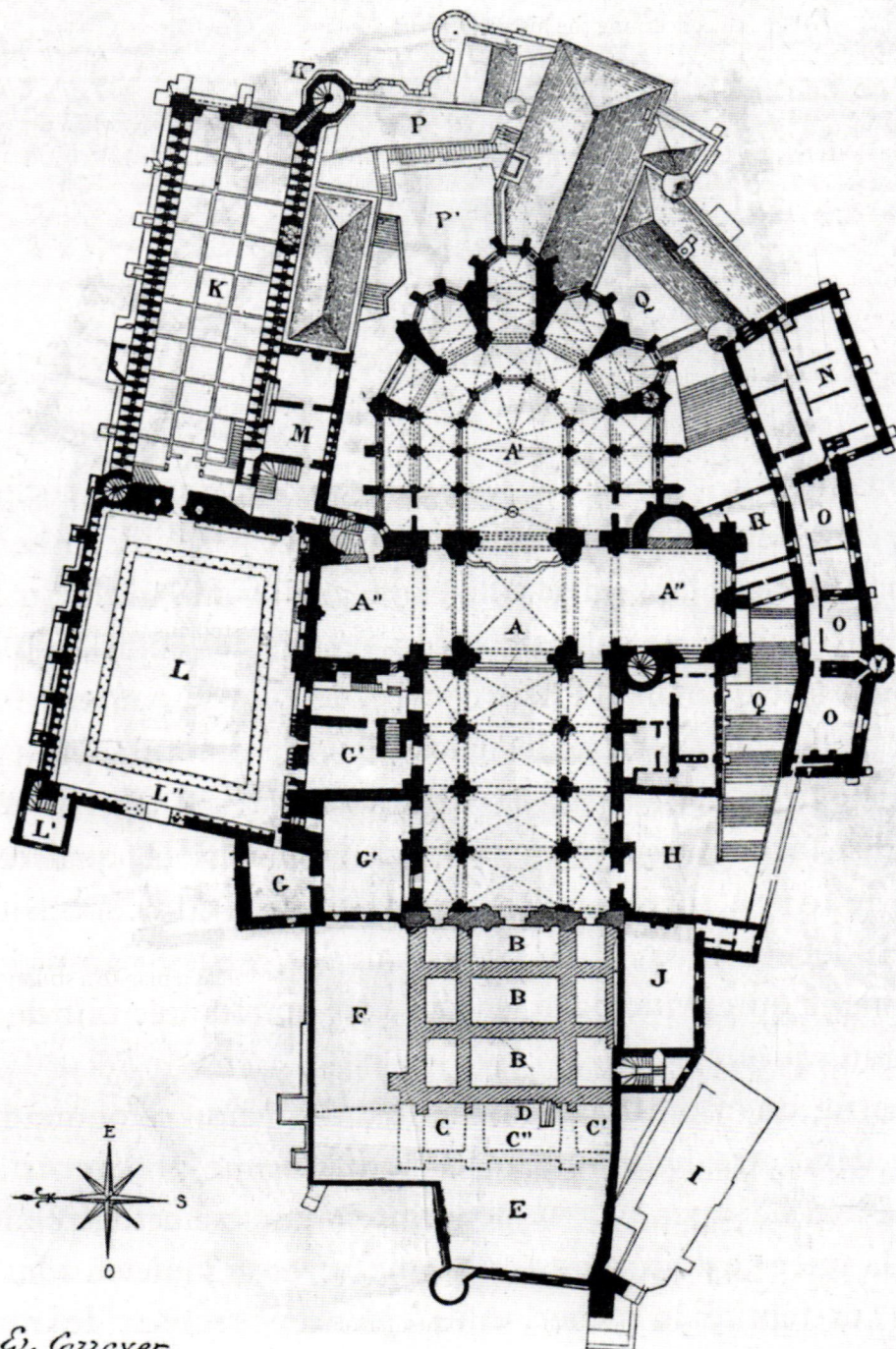
For present purposes, time begins in the "bibliographic revolution" set in motion on November 2, 1789, All Souls' Day, the date of a lunar eclipse, when the National Assembly placed the property of the Church "at the disposal of the Nation."¹¹ On November 13, Dom François Maurice, the prior of Mont-Saint-Michel, presented officials in Avranches with an inventory of the abbatial library, describing in particular its manuscripts (then numbering 290).¹² Once confiscated, the library was removed to Avranches, to languish in one of the *dépôts littéraires* peremptorily established by the National Assembly. From the beginning, documents were misplaced; Dom Maurice's inventory was itself only rediscovered by Édouard Le Héricher in 1852. In his *Avranchin: Monumental et Historique*, Le Héricher expressed his gratitude to those "dedicated and devoted bibliographers" who, amidst the storm of time, wrested the remains of literary history, the literary remains of history, from "oblivion and vandalism."¹³ It was to these steadfast custodians that historians owed their own past, the record of which had been piled up indiscriminately in the *dépôts*. The radical displacement of the abbey's library was meant to put materials at "the nation's disposal," but succeeded mostly in making them available to harm and loss.

The tenuous and tentative work of restoration, of putting books and manuscripts back in order, was animated by the compelling assumption that they once formed an ordered whole – a notion later partially confirmed by Le Héricher's discovery. This effort resulted in a series of catalogues that served as a map to a still more remote time of storms. And it is here that a more extensive vision of lost time begins to reveal itself. The year in question is 709, when the equinoctial spring tides submerged a primitive forest that surrounded the abbey's immovable mount. Such at least was the received account, later challenged by an avid search through the Bibliothèque of Avranches, itself made up of the remains of the library of Mont-Saint-Michel.

The Order of (Lost) Things

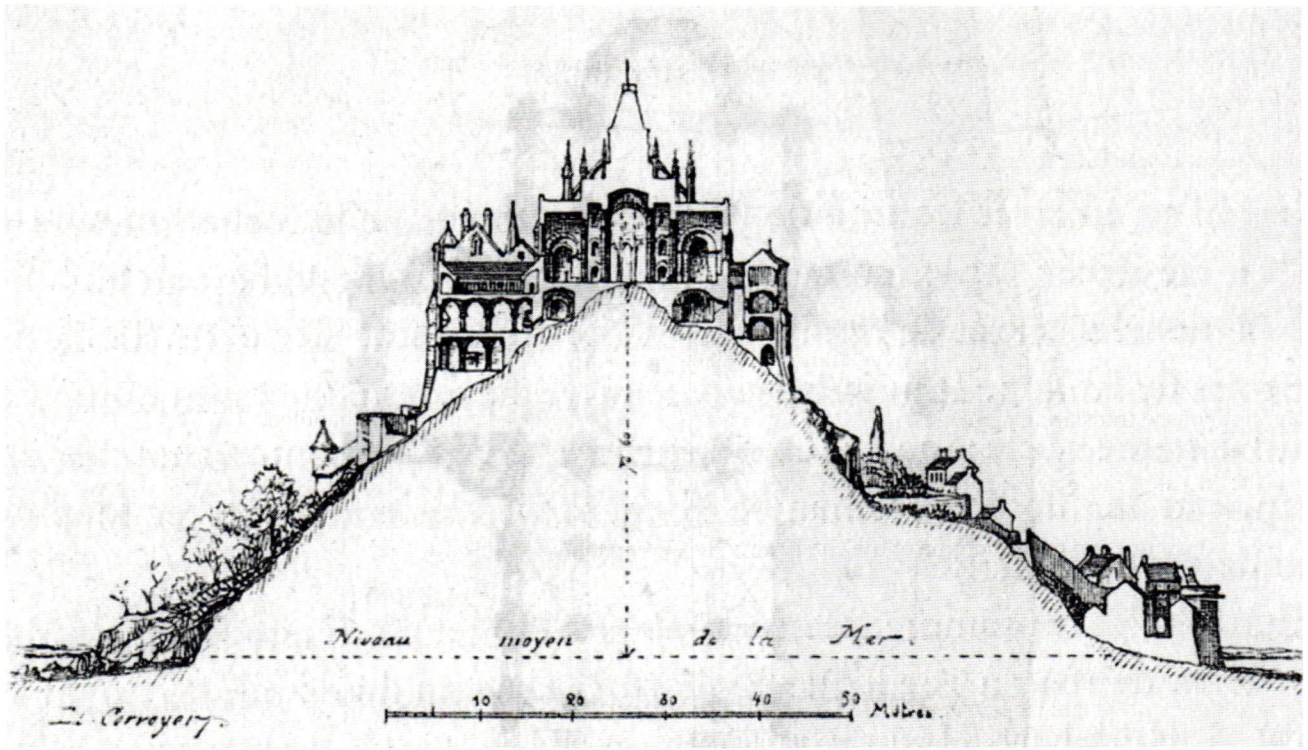
The unavoidable question posed by the Société d'Archéologie's contest was, given the "melancholic fragility of our modern establishments,"¹⁴ what was to be credited from the past? The contest specifically sought to interrogate a matter of long-established faith, a historiographic relic.

Plan for Mont-Saint-Michel, "Plan au niveau de l'église haute (A), du cloître (L), et du dortoir (K);" from Abel Anastase Germain, *Saint Michel et le Mont-Saint-Michel* (Paris: Firmin-Didot et Cie, 1880), fig. 145.

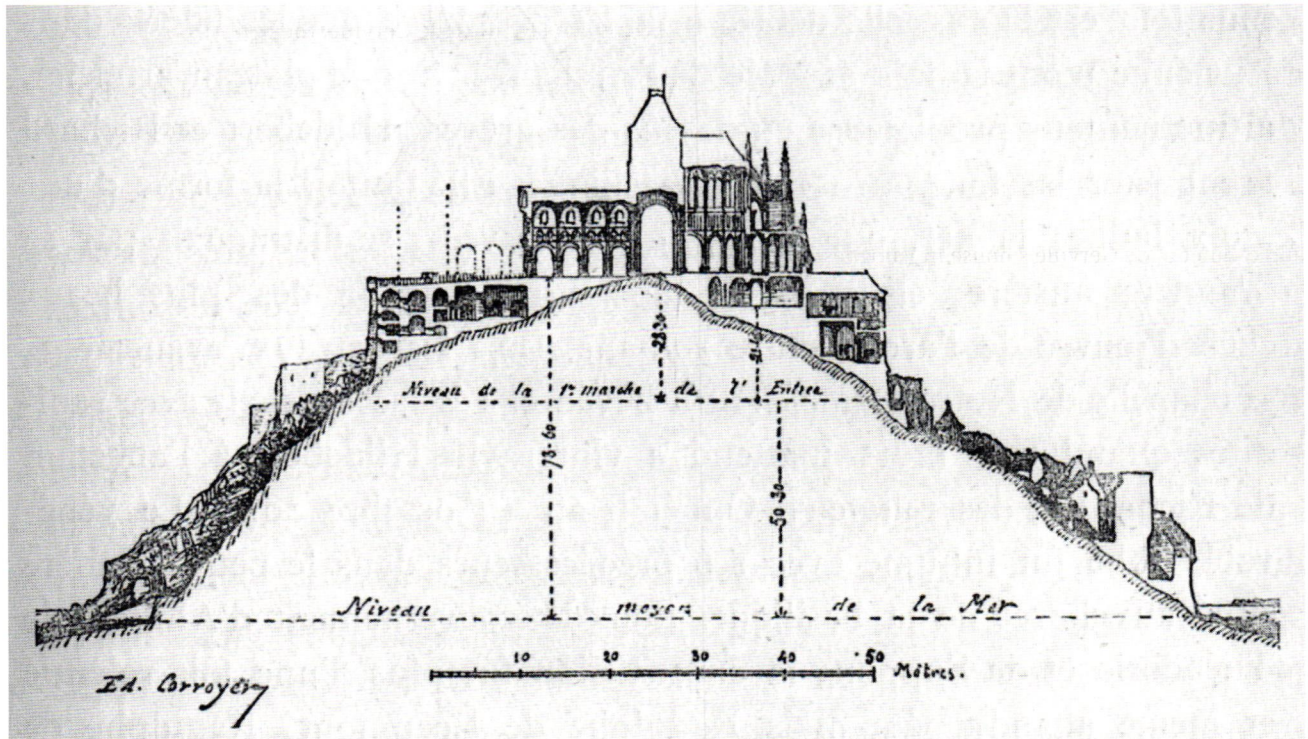


E. Conroy.

0 5 10 20 30 40 50 MÈTRES



North-South Section Drawing of Mont-Saint-Michel. "Coupe transversal du Mont-Saint-Michel (du nord au sud)" from Abel Anastase Germain, *Saint-Michel et le Mont-Saint-Michel* (Paris: Firmin-Didot et Cie, 1880), fig. 146.



East-West Section Drawing of Mont-Saint-Michel. "Coupe longitudinal du Mont-Saint-Michel (de l'ouest à l'est)" from Abel Anastase Germain, *Saint-Michel et le Mont-Saint-Michel* (Paris: Firmin-Didot et Cie, 1880), fig. 24.

This relic was the version of the events of 709, the alleged date of the great inundation of the forest of Sciscy, provided in Arturus du Monstier's widely read *Neustria Pia* (1663). Was du Monstier's account creditable? The answer to this question was supposed to be found in a displaced body of manuscripts. From its founding, the Abbé Jean Desroches writes, the Abbey of Mont-Saint-Michel contributed to the pious labor of transcribing and transmitting manuscripts, responding to what he regarded as the Catholic Church's unique vocation: preserving "literary treasures" both ancient and modern.¹⁵ Baudouin arrived just in time to witness the beginning of the end of this tradition, spared only the sight of the translation of its remains. A new order of research resumed in the Bibliothèque d'Avranches. There the lost forest of Sciscy was to be found, engulfed by the sea but still more obscurely buried in footnotes.

In his introduction to the volume of the *Catalogue Générale des Manuscrits des Bibliothèques Publiques des Départements* (1872) devoted to Avranches, the brilliant paleographer Léopold Victor Delisle explicitly refrained from discussing the history contained in the 246 manuscripts from Mont-Saint-Michel. The "principal architect" of this collection and perpetuator of the tradition of Benedictine scriptoria was Robert de Thorigny, better known as Robert du Mont, whose manuscript, *Chronicle*, Delisle was at the time preparing to publish in a critical edition under the auspices of the Société de l'Histoire de France.¹⁶ The task devolved to him at the insistence of his mentor, the naturalist and architectural historian Charles Duhérissier de Gerville who had commended Delisle's profound knowledge of the region's historical topography.¹⁷ It was in the library and cabinet of de Gerville's house in Valognes, "filled with stones and shells, books and maps, and all sorts of documents and testimonials on the history of Normandy," that Delisle acquired the rudiments of paleography and antiquarian researches.¹⁸

What Delisle did provide in his introduction was a brief recapitulation of the progressive effort to produce a comprehensive catalogue of the library's irreplaceable holdings.¹⁹ While the Maurists Edmond Martène and Ursin Durand visited Mont-Saint-Michel during their literary voyages (1709–1713) in search of documents for a revised edition of the *Gallia Christiana*,²⁰ Delisle indicates that the first person to catalogue the abbey's manuscripts in situ was their brilliant confrère Montfaucon. The enumeration given in the second volume of his *Bibliotheca bibliothecarum manuscriptorum nova* (1739), the compendium of catalogues

he compiled over the course of his patristic researches in libraries and archives throughout Europe, served as an originating point of reference and a seed of order.²¹ Delisle mentions the abridged catalogue that appeared in Maximilien Raoul's *Histoire Pittoresque du Mont-Saint-Michel et de Tombelène* (1834), but he understandably omits mentioning that Raoul's book stages a dispute over priority between de Gerville and the Avranchin bibliophile Louis-Eugène Castillon de Saint-Victor and librarian Alexandre Motet for having "discovered" the Mont-Saint-Michel manuscripts in Avranches.²² Rather than conferring some kind of primacy, priority amounted to stumbling upon a corpse before it had been removed and ritually handled.

Pilgrimage

De Gerville claimed for himself the discovery of the most precious manuscripts from Mont-Saint-Michel, having "exhumed them from the dust and debris in an attic above the library."²³ The partially figurative act of exhumation undergirds the prevailing notion of the archive as a sepulchral space. For example, Jules Michelet, on first entering the Archives du Royaume of which he was given charge in 1830, describes "these catacombs of manuscripts, this wonderful necropolis of national monuments."²⁴ For the staunch legitimist de Gerville, the reversed rite of passage of exhumation derived its pathos and poignancy from the defining and initiating act of the restored Bourbon regime, the translation of the bodies of Marie-Antoinette and Louis XVI from the former cemetery of the Madeleine to the reconsecrated royal burial place at Saint Denis (on the 21st of January, 1815, the anniversary of Louis XVI's execution in 1793).²⁵ No less symptomatic was the dust of the archive, an all-too-material sign of the times. Its undisturbed accumulation was an accusation of the neglect that followed the bibliographic revolution, but also an indication that history and rule had settled in place.²⁶

The April 1817 circular issued by Louis Joachim Lainé, Minister of the Interior under Louis XVIII, summed up the steady and progressive decline in the state of provincial archives in the confused course of Revolution, Empire, and Restoration. In regretful and resentful terms, Lainé ordered prefects to inspect collections which had been "poorly kept and in some departments abandoned to a state of disorder which can only be excused by the diverse revolutions which have agitated France."²⁷ De Gerville experienced and recorded this desolation at the local level. As he relates in the *Mémoires de la Société des Antiquaires de Normandie*, the

organ of Arcisse de Caumont's unrelenting crusade against vandalism and Jacobin centralization, de Gerville made several "pilgrimages" to Avranches beginning in 1820. De Gerville describes a frustrating search for the smallest trace of the past. Asking the "best informed" people in the city what had happened to the Mont-Saint-Michel manuscripts, he was told that they had been "lost or destroyed."²⁸ De Gerville experienced exactly the kind of bibliographic despair Baudouin's guide had foreseen thirty or so years earlier, when the storms of the revolution were fast approaching.

Undeterred, de Gerville visited what by then had become the Bibliothèque d'Avranches where he was "lucky enough" to find the *livre vert* of the diocese of Avranches and a cartulary of the Abbey. In the limited time available to him, he copied as much of the book as possible. Two years later he returned to Avranches accompanied by the antiquarian Auguste Le Prévost, the proudly Norman representative of the nineteenth-century "revolution of the historical sciences,"²⁹ who wished to study the copy in the cartulary of a charter dating to Richard I. But since his previous visit, the library had undergone "large changes, the former conservator was no longer there, and the manuscript had disappeared." History's erasure, or rather the erasure of histories, was being sped up, the absence of the conservator (who was in fact Saint Victor) leading to the rapid deterioration of the library's already tentative order. Thus Le Prévost reports that it was chance alone that led him to an attic space where he perceived a "confused pile of dirty and dusty folios thrown hither and thither." Here were the leavings of the monkish annalists.

De Gerville was ruefully appreciative of the fact that, unlike the manuscripts illuminated with gold letters which had fallen prey to predators, "the ordinary writing tempted no one and had only suffered the injuries of time." As an archaeologist and antiquarian, he was fervent in his desire to preserve a past to which he considered himself a rightful heir. In claiming the discovery of the lost manuscripts for himself, de Gerville confirmed that they were once, but no longer, lost. Repairing the injuries of the past, he seeks to put these historical monuments back in their proper place. In 1811, under Napoléon, the former *maison commune du Mont-Saint-Michel* had been made into a "house of confinement" (*maison de réclusion*); it remained a prison until 1863, during which period the "radiant city of the middle ages" took on the appearance of a "mutilated cadaver."³⁰ An

archive, according to one archaic meaning, is a house, a place where official documents are kept in order. It is through this kind of "domiciliation," of "house arrest," that the archive comes into being, that it takes place.³¹ De Gerville appointed himself its custodian, the keeper of order.

For de Gerville, the cause and effect of bibliographic neglect was the absence of a catalogue that would protect the manuscripts from mutilation and/or oblivion. In the state of disorder in which he found them, the manuscripts were inaccessible, enclosed in a literary depository that sealed in the annihilating injuries of time and paradoxically ensured their oblivion at the same time. Lainé's 1817 circular prompted the then-mayor of Avranches, Belle-Etoile du Motet, to initiate an inventory of the library. The problem was that Pierre Grandais, who had served as librarian during the lean years of the Empire, and whom Raoul later unfairly accused of selling off "parchment by the pound," was set to retire. Motet thus appealed for help from any "citizens zealous to preserve for their city a value depository." Four people came forward to pursue the selfless task of civic self-preservation, but the days were long past when Avranches's librarian, the Abbé Julien Cerisier, offered public classes in bibliography in 1798. Despite the citizens' zealousness, or perhaps because of it, the results were Bouvard-and-Pécuchetian at best.

Finally, as Motet tells it, in January 1820 the mayor appointed his brother-in-law Castillon de Saint-Victor and Alexandre Motet to "reclaim this precious depot from its state of abandonment and waste."³² The work was completed in November 1821, yet they left the manuscripts largely untouched. It is possible that the difficulty de Gerville had in finding his way through the library in fact resulted from these ongoing cataloguing efforts. Thus De Gerville began his own catalogue, describing 130 of the 200 or so manuscripts he was able to examine over the course of three visits to Avranches. He promised that if he was able to return to Avranches, he would provide a "supplementary" catalogue containing the remaining manuscripts, and a postscript on the remains of Mont-Saint-Michel.³³ He implies a morbid model of history in which the past asserts its rights from beyond the grave, demanding that it be put (back) in its proper place.

The only thing that needed to be settled was de Gerville's version of events. Writing a few years later, in 1834, Raoul exposes the controversy of the claim to the

collection's discovery in the 1820s. He reveals that several well-informed and well-regarded inhabitants of Avranches were ready to testify that the manuscripts had been "exhumed" and that Saint-Victor's catalogue had been completed before de Gerville's first visit to Avranches.³⁴ Evidently the *contretemps* was more than a question of timing.³⁵ Raoul expressed regret at having to make these "revelations" concerning the considerably more accomplished de Gerville's alleged conduct, but history demanded the entire truth. In a display of condescending magnanimity, he allowed that "laborious antiquarians" must be forgiven their frequent "small failings," which typically involved forging letters patent on ancient parchment.

Yet Raoul did not reveal de Gerville's alleged historical misdemeanor so much as he uncomprehendingly witnessed the antiquarian's pained recognition of a potentially irrecoverable loss. His discussion of the manuscripts of Mont-Saint-Michel begins with the melancholic reflection that the things of this world are subject to becoming lost. He finds obscure consolation in Jacques-Auguste de Thou's account of his 1580 visit to Mont-Saint-Michel, in which the great historian notes with regret that the library's "best manuscripts were already gone."³⁶ These unnamed monuments were saved from the revolutionary vandals, but possibly also from the misfortunes that befell Mont-Saint-Michel over the centuries – fire, building collapses, and war – by virtue of the fact that the manuscripts had already disappeared. Like a Saint Jerome contemplating a skull, de Gerville read de Thou while consulting Charles-Marie Fevret de Fontette's new edition of père Jacques Lelong's *Bibliothèque Historique de la France* (1758). The word itself, *bibliothèque*, signifying a place for books, a cabinet of books, and a particular collectivity of books, even and especially in the form of a book such as Lelong's, suggested to de Gerville the need for and impossibility of a desired and enduring bibliographic totality.³⁷

Fevret de Fontette viewed his immense labor compiling a "complete bibliothèque of the history of France" as a bulwark against that devourer of all things which was even more ravaging than the vandals.³⁸ His preface begins with the words, "History is the depository of facts, and presents the succession of time."³⁹ The latent juxtaposition of sedimentation (of historical facts) and flow (of historical time) inflects Fevret de Fontette's Thucydidean theme. As defined by Thucydides, history was to be a "perpetual possession," an "imperishable treasure" bequeathed to

posterity. Fevret de Fontette writes, "without the help of the monuments furnished by history, men would pass like shadows of which there remained no trace." Monuments arrest the too-rapid passage of men and deeds into oblivion. Similarly, de Gerville's narrative of his pilgrimages to Avranches, his way-finding through the uncharted darkness of the library, is animated by his fear of a lost past, of losing his way in the tempestuous night of history. It was a search in and for the remains. The monuments discovered by de Gerville, even if they took the sad form of a confused pile of dirty and dusty folios, served the purpose of history.

Some of these sentiments had been anticipated by Abbé Grégoire. He, too, had the *Bibliothèque* in mind when he wrote his report on the conservation of manuscripts and the organization of libraries 22 Germinal an II (11 September 1794). His epoch-defining report on vandalism, a word of his own coinage, followed three weeks later. For Grégoire it represented the prototype of a *bibliographie générale et raisonnée de la France*, the completion of which he recognized to be a practical and political impossibility.⁴⁰ The first and necessary step, where the most resistance was met, was in making inventories of all local depositories. It was necessary to restore by establishing order and also to establish by restoring order. There could no longer be any question of reversing the bibliographic revolution. For Michelet, it ushered in a "glorious time for the archives ... once and for all casting daylight upon the dusty masses."

Anatole Olivier, Belle-Etoile du Motet's successor as mayor of Avranches, wrote that the library's "origin is not perhaps very pure, but the events and the times legitimate the possession of them."⁴¹ He reflects on the abbatial and ecclesiastical confiscations that provided the material for Avranches's library. Possession, meant to be a perpetual endowment, thus became a property of time (and, significantly, it should be said, of the times). Origins could no longer be a source of legitimacy following the justly vindictive violence visited on feudal title-deeds, those "monuments of the barbarity of our fathers" in the fiery words spoken by Le Guen de Kerengal before the National Assembly, words which preserved the name of the otherwise anonymous deputy from Lower Breton in Michelet's history of the Revolution.⁴² Rather it was the "anarchy that desolated France during these stormiest of years," Olivier writes, that legitimated the library's "inheritance." The immediate problem was that the city was not prepared to receive it. Olivier writes that there then existed no suitable locales to

place the books, no shelves or catalogues. The storm produced an unexpected and regrettably unsustainable order. In the “state of confusion” which reigned in the *bibliothèque manqué*, in the bibliographic interregnum, a volume of Voltaire of lay side by side with one of Saint Augustine, a book by Bayle paired with one by Aquinas.

For Emile Vivier, reconstructing the history of the library of Avranches was more than a question of determining what was lost in the storm. It was a matter of *not* becoming lost in the recriminations and counter-recriminations. Working from extensive notes left by the erudite Avranches librarian and historian Albert Desvoyes, Vivier explains that with the Restoration the allegations of the irrecoverable damage visited during the Revolution passed into undoubted fact.⁴³ Desvoyes himself visited this moment in time in an essay entitled “Avranches in 1815,” praised by the great librarian Frantz Funck-Brentano for being a piece of history in which it is the “documents that speak, documents from which the dust of the archive had just barely been dusted off.”⁴⁴ Desvoyes’s study, in fact, focuses on Belle-Etoile du Motet, whose appointment of Alexandre Motet and Saint-Victor to set the archives in order created, knowingly or not, the conditions of documentary permanence which allowed him to leave a record of his own actions and decisions.

Vivier writes that it is only by an “impartial examination of the documents” that the “true proportions” of the damage done to the monuments of barbarians by vandals (but also by neglect, the humidity of the orangerie, unscrupulous bibliophiles, rot and mold, and other factors) could be accurately assessed. He argued that bibliographic facts must replace “exaggerations arising from political passion.” A definitive report emerged in 1852 when Le Héricher found the catalogue drawn up by Dom Maurice just prior to the confiscations. The losses were relatively minor, and one document was restored to the Bibliothèque d’Avranches when Delisle returned a manuscript given to him by de Gerville.

It was Le Héricher who signaled, in 1857, that the stormy passage of time was over. But in so many ways, of course, this was not so. Much had already been lost over the centuries, and losses would inevitably continue. For example, in his itinerary and guidebook to Mont-Saint-Michel, he points out the arcade toward the north-east corner of the Merveille that belongs to the archive founded by the Abbé Pierre Le Roy in the fourteenth century, but Le Héricher omits mentioning that the archive was built following the collapse

of one of the church towers destroying a large number of the works purchased by the Abbé Robert de Torigni in the twelfth century. “There were collected numerous fine vellums for which Mont-Saint-Michel was known as the “city of books,” many them still to be seen at the Bibliothèque d’Avranches.”⁴⁵ Other writers were not so optimistic in tone. Describing the improvements he made to the municipal library beginning in 1831, Olivier writes of books that “humidity, time, and bookworms were slowly reducing to dust.” These sources of destruction are always and ever acting, Olivier writes. His temporary stop to time’s corrosive progress was to replaster the walls, paint the shelves and cabinets in oil paint, give the books a careful cleaning. But in looking back at the “state of confusion” that originally reigned in the literary depository, it was damage arising from the “spirit of the time” that troubled Olivier. Alas, he adds epigrammatically, “*Habent sua fata libelli*” (Books have their own destiny).

City of Books

Here is the epitaph of one such destiny, inscribed in an ancient hand on the final leaf of a scandalous work that in the twelfth century was more fearfully rumored about than read: “*Iste liber est monasterii montis sancti Michaelis in periculo maris*” (“This book belongs to the monastery of Saint Michel in Peril of the Sea”). Or so it once belonged, and to Victor Cousin’s infinite satisfaction it was still to be found nearby – in the library of Avranches. Cousin retraces the steps of his search for editions of the heretic Peter Abelard’s treatise on dialectics *Sic et Non* (Yes and No) in his *Ouvrages Inédits d’Abélard pour servir à l’histoire de la philosophie* (1836). His bibliographic signposts are provided, until a fatal point, by the savant Benedictines. Martène and Durand indicate that a manuscript copy was consulted by Dom Luc d’Archerly at the library of Saint-Germain de Prés, but in his article on Abélard in the Maurist’s monumental, multi-volume *Histoire Littéraire de la France* (1763), Dom François Clément indicates that the manuscript was in fact one of two examples belonging respectively to the abbey of Marmoutiers and the Benedictine’s former “city of books.” Cousin knew that after the devastation of the library of Mont-Saint-Michel during the Revolution, the interrupted trail led to Avranches, where the manuscripts which “escaped” had been transported.

It was the “catalogue of sorts” that appeared in Raoul’s recently published book that offered the clues Cousin needed to find the treatise. After having the manuscript sent

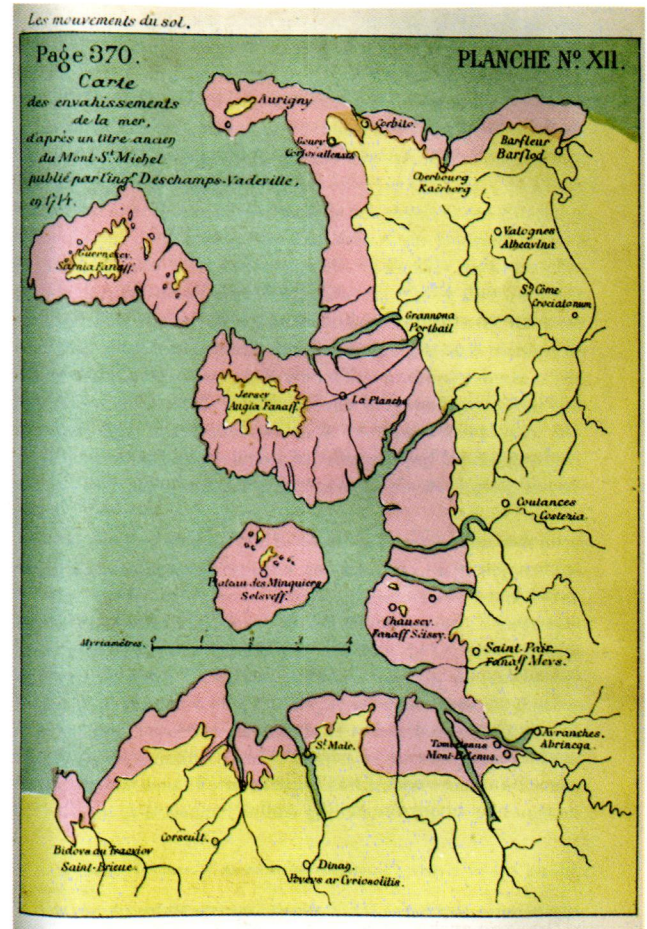
to him in Paris through the offices of the minister of public instruction, Cousin conclusively established that the item indicated by Saint-Victor as *Commentarius in Psalterium ac in Sic et Non* was in fact Abelard's disputatious work.⁴⁶ But the origin of other signs of bibliographic order proved difficult to establish. The spine of the manuscript was marked with no. 2381, which Cousin surmises must be that of the library of Avranches, while the margin of the first leaf is marked, in a much older script, no. 237, which must have been that of the library of Mont-Saint-Michel. In fact, the manuscript is identified as no. 237 in Montfaucon's *Bibliotheca bibliothecarum*. But if this is the case, where did Saint-Victor's own indication of no. 47 refer to? Was this the number given by Pierre-François Pinot-Cocherie, Avranches's first librarian, who in compliance with the law of 8 Pluviôse an II (27 January 1794) produced a catalogue of the literary depository?⁴⁷

Each number was a marker of time and place, points within a real and imagined bibliographic totality the contours of which, like the coast of the bay of Mont-Saint-Michel, were subject to periodic and sudden change. Given that important manuscripts were lost from view between de Gerville's visits to Avranches, the office of the librarian undergoing similarly rapid changes, the fact that Saint-Victor's numbering was reused twenty years later in 1840 when the Abbé Jean Desroches published a catalogue of the Mont-Saint-Michel manuscripts, is a sign of the increasing stability of the library's order; that the catalogue appeared in the memoirs of the Société des Antiquaires de Normandie, the same place where de Gerville's account appeared twenty years earlier, is a separate but related indicator of the continued and increasing strength of regional scholarship.⁴⁸ Despite the brief but incisive comments Desroches makes regarding paleography, drawing on the great Maurist diplomatist and Benedictine Dom Jean Mabillon, he notes without further explanation that his own numbers were taken by those indicated on the first page of the manuscripts.

That same year, 1840, the philosopher Félix Ravaisson arrived in Avranches on the 19th of June, charged by Victor Cousin, then minister of public education, with a mission to inspect departmental libraries. Ravaisson began in the Manche, he explained, because the region was largely "unexplored," a characterization not likely to have been well received by the animators of the region's numerous and intensely active *sociétés savantes*. As if he were arriving on a distant shore, in each town and city he was instructed to initiate contact with the mayor and through him the local

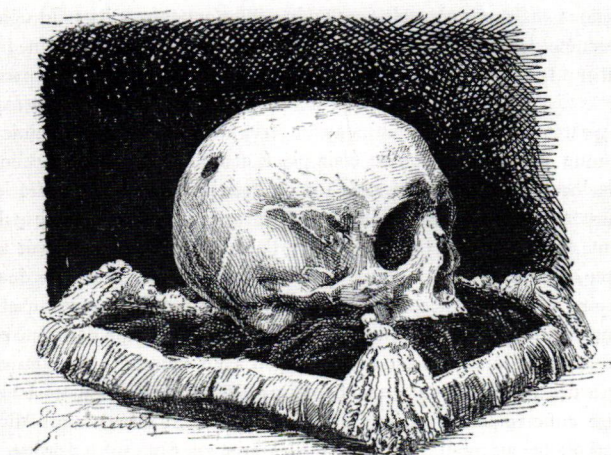
librarian, determine the history and provenance of public and private collections, the days and hours of operation of the library itself, the number of readers, whether it was open at night or heated in winter. Reading and scholarship were understood to be more subject to the cycles of the days and seasons than to the less regular storms of history. Ravaisson's most pressing task was to survey each designated locality's manuscript holdings, establish the state of its catalogue, if there was one at all, and make a recommendation whether one should be produced with the support of the ministry.⁴⁹

As for Avranches, Ravaisson called for a comprehensive cataloguing effort that he imagined would serve as a model for other towns and cities, particularly those in possession of "little-known literary and scientific monuments."⁵⁰ This effort was initiated in 1841 by Nicolas Rodolphe Taranne, future librarian of the Bibliothèque Mazarine, who was



central to François Guizot's expansive and intensive state-sponsored program of heritage formation, the Comité pour la Publication des Monuments Écrits de l'Histoire de France. Reviewed by Delisle in 1867 and 1869, Taranne's catalogue finally appeared in volume four of the *Catalogue générale des manuscrits des bibliothèques publiques des départements* (1872). Beginning with Martène and Durand's visit to Mont Saint-Michel, Delisle's introduction to the *Catalogue* brought the bibliographic history of Avranches up to date with his own work editing Taranne's manuscript.

The year of Taranne's visit, 1841, marked a crucial conceptual change in the ordering of departmental and communal archives. A ministerial circular of 8 August 1839 had already established the fundamental temporal division in the ordering of things: *papiers antérieures à 1790* and *papiers postérieures à 1790*. More than just administratively, they were of separate and different worlds.⁵¹ The reform of 1841 addressed from where within those worlds they came, their *provenance*.⁵² A circular sent by the historian and archivist Natalis de Wailly articulated the principal of *respect des fonds* in the following terms: "All documents which come from a body, an establishment, a family, or an individual form a *fonds* [collection], and must be kept together."⁵³ These natural, social, conventional, and historical types of incorporations defined non-arbitrary classification of papers. Yet these bodies, the unity and coherence of which is an effect of the archive, are subject to dismemberment, particularly and especially in the formation of a Republic, One Indivisible and Imperishable.



The waning days of the abbey of Mont-Saint-Michel provide an example of one such body, specifically in the form of a letter addressed to the end of the world. Read at what was to be the abbey's final chapter meeting in May 1790, the letter from Ambroise Augustin Chevreux, superior general of the Congrégation de Saint-Maur, consoled the Benedictine brothers in the hour of their impending secularization. In quitting their abbeys, he bade them to remain "zealous and fervent ministers of the Church."⁵⁴ Tracked down by the *comité de surveillance*, Chevreux was taken to Les Carmes, the former religious house of the Charles Carmelites which had become a prison for suspected counter-revolutionaries, particularly non-juring ecclesiastics. Chevreux's name appears on the list compiled by Daubanel, the secretary of the *section* of Luxembourg, who was appointed to oversee the inhumation of the 120 detainees who were butchered in the massacre of 2 September 1792.⁵⁵

History, Fevret writes in his Thucydidean mood, is the "second life of the dead, and the school of the living. It is the theater which gathers and reproduces before our eyes men worthy of memory and the times that came before us."⁵⁶ Yet it does so only if the "depository of facts," which his *Bibliothèque* was meant to order and survey, endures or is carefully exhumed. It was precisely to "arrest the assaults of time and to check the vandals who each day weaken and finally destroy our glorious old monuments," that the Société Archéologique d'Avranches was founded in 1836.⁵⁷ The society's effort to recover the history of the Forest of Sciscy was made possible by the restoration of the library of Avranches; it was the place of origin for a new order in and for history. There researchers could shelter themselves from the overwhelming presence of a lost world, sifting through its debris for evidence of a safely remote cataclysm. In waging its campaign against time, the society turned its gaze toward the "events of the year 709 for which Mont-Saint-Michel and its approaches were the theater."⁵⁸ The question was what remained to be seen.

At the Société's 1841 annual public meeting – held on May 22nd, the date in 1172 when Henry II did public penance in the cathedral of Avranches and was absolved of the murder of Thomas Becket – Hélicher outlined in terms of regional patriotism an ambitious program of archaeological research. "At this moment," he said, "France presents an admirable spectacle. The old ground of the Gauls ... is covered by learned and passionate explorers: the past has become a science and a cult."⁵⁹ The past was a new world to

be discovered. With the contest initiated in October 1841, the Société set out to interpret a history that was “written not only on paper, but in the ground itself,”⁶⁰ ground as treacherously mobile as the documentary trail was fraught with aporias, unlikely passages and impracticable passage-ways to and from the past.

The Contest

Fulgence Girard begins his *Histoire Géologique, Archéologique et Pittoresque du Mont Saint-Michel au Pêril de la Mer* of 1843 cautiously and dramatically: “the shadows of history thicken around Monte-Tombe upon which Saint Aubert, following three oneiric visions, consecrated a chapel to the Prince of the celestial army.”⁶¹ Yet it was not only the “facts” of history that were dissolved atmospherically. According to Girard, the uncertainty of events was an endemic feature of the “very ground which served as their theater.” By attempting to determine the former situation of Mont-Saint-Michel by means of an incompletely charted universe of manuscripts, the contest sought to dispel a darkness within a chaos. Its goal was to establish firm historical ground. The contest’s winner, Girard, who then served as the society’s secretary, compares the “witness of ancient authors” to the “deep traces in the soil revealed through the study of geology.” Historical proofs were to be dug up like the shells that pilgrims to Mont-Saint-Michel attached to their clothing as a *testimonium* of their pious trek. The manuscripts preserve laws banning the “pious deprecation” of Saint Aubert’s chapel by pilgrims who broke off small bits of stone to bring home as mementos.⁶²

Consulting manuscripts “unearthed” by Castillon de Saint-Victor, Girard purported to discover “all sorts of things overlooked by others researches,” including de Gerville, Raoul, and especially the Abbé Manet. Their references marked the trail of their investigations, though Girard did not have to look far. Revelation awaited him in the exact place where the contest sent him: MS. no. 34. It reads: “As we can know from truthful narrators, the mount was originally surrounded by a dense forest, six miles distant from the sea.”⁶³ What confirmation did geological clues offer? Girard limits himself to studying the manuscript’s inky deposits. He notes, for example, that its lines were ruled in dry point, as was practiced until the end of the 11th century, and “æ,” which, after that period, was written as two separate letters, is frequently expressed by an “e,” an abbreviation that is not found after the year 1100. For Girard, dating the manuscript was critical to showing

that the chronicler was recalling a comparatively recent past, attesting to events that, though unrecorded in annals, still remained “profoundly engraved” in local memory and tradition.⁶⁴ The timing of the tide was crucial. Girard settles on what might be called a punctuated disequilibrium model: after a long period of tidal erosion, an unusually strong tide of 709 destroyed what remained of the former coastal plain.

On this point, Girard’s principle source is Dom Huynes’s *Histoire de la Célèbre Abbaye du Mont-Saint-Michel au Pêril de la Mer*, which he considered the “most important work the monastery had transmitted to history.” Huynes says that the last stand of the forest was “totally submerged by the impetuosity of the sea during the year that the monks were engaged in their voyage to Italy.”⁶⁵ Therein lies the fault. Girard sees in this “inexact account” the source of an “error which palpably stands out from the irrefutable unanimity of proofs,” and that was spread in written sources, most notably du Monstier’s *Neustria Pia*.⁶⁶

In preparing to consecrate the chapel, bishop Aubert dispatched three “messengers” (the number varies), to secure relics – a portion of his red cloak, a fragment of the marble altar upon which his footprint was miraculously impressed – from Mount Garganus, where the archangel had appeared on 8 May 493. “Upon their return,” Manet writes, “what was their surprise to see that during their absence nearly all the territory surrounding Mont-Jou formerly covered by forest had given way to the sea.”⁶⁷ “Their astonishment was such” – Manet here makes explicit reference to the passage from *Neustria Pia* singled out for suspicion – that the messengers thought they had returned to “another world.”

How had this world come into being? Of the six manuscripts relating to the origin of Mont-Saint-Michel, there is only one that, instead of describing the submersion of the forest some time before the Archangel’s apparition to Aubert, inverts the order of facts and places the invasion of the sea during the voyage of the messengers to Mont-Garganus. Its singularity notwithstanding, this manuscript, dating to the late fifteenth century, was the most frequently consulted by historians, if for no other reason than that it was the easiest to read: MS. 212, *Varia ad historiam Montis Sancti Michaelis spectantia*.⁶⁸ This text was a pious or perhaps willful misreading of MS. no. 34, the primitive source of Mont-Saint-Michel’s founding legends. “The love of the marvelous” prevented the author from respecting the meaning or intention of the original historian.⁶⁹ Drawing

on this corrupted version of MS. no. 34, historians were led off course from the very beginning. Thus the physical and historical geographer Alexandre Chèvremont identifies in precise hydrological terms the “single source, the poisoned well,” which innocently misled so many authors over the course of the seventeenth and eighteenth centuries.⁷⁰ This “preconceived idea,” at variance with all other documentary proofs, made its way into the writings of Huynes, du Monstier, Desroches in his *Histoire du Diocèse de Coutances*, and Gilles Déric in his *Histoire Ecclésiastique de Bretagne*, only to be renewed by Manet and through him embroidered in works including Charles Cunat’s *Histoire de la Cité d’Aleth* (1851).

Cunat’s work provides a poignant record of a fatal misstep which he himself made every effort to avoid. His first and fateful decision was to place his calculated faith in Manet. Cunat explains, “we are often at a loss when choosing the version of events given by one author which is completely different from another author, or all others authors. In making this choice we do not pretend to be free of all error.” Researching in the “shadows which envelop historical times,” he writes, taking a “false step” here and there was more than “probable.” What Cunat assured his readers was that he exercised the “greatest caution” in pursuing his “painstaking investigation.” This caution is precisely what Baudouin’s guide at Mont-Saint-Michel urged on him. If he had “erred” on some point, Cunat writes, it was done only by following in the steps of the most renowned authorities, who had themselves been subjected to the “knowledgeable criticism of modern writers.” Concerning as it did “contested events” in which it is necessary to take sides – for or against a cataclysmic tide, as it were – Cunat watched as the probabilities played themselves out in a historical process of trial *and* error.

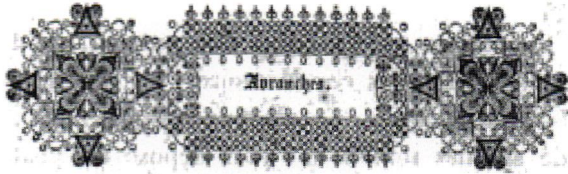
André Marie Laisné, then president of the Société d’Archéologie d’Avranches, presented a memoir of 1865 entitled “Étude sur l’Ancien État de la Baie du Mont Saint-Michel, d’après les Manuscrits de l’Abbaye de ce Mont.” The title ostensibly refers to Manet’s book, but it is avowedly a history written according to the manuscript record, and in another sense one written after the exploration of the Bibliothèque d’Avranches that had been underwritten by his society a generation earlier. Laisné explains that the oft-repeated idea of a unique cataclysm destroying the forest all at once is strongly contradicted by the words in *Apparitio in Monte Tumba* indicating the slow and deliberate conquest of the sea: *mare paulatim adsurgens*. This was the point

of view adopted by Guillaume de Saint-Pair and later by Thomas le Roy (1650): “[L]es inondations de la mer, laquelle, par son flux et reflux, renversa petit à petit toute cette forêt jusqu’au pied du rocher.” According to Laisné, the fact of successive erosions instead of a sudden cataclysm was no longer subject to doubt.⁷¹ He was not the last historical critic to make that confident claim.

In his *Les Mouvements du Sol sur les Côtes Occidentales de la France* (1882), the geographer Chèvremont reprised Laisné’s effort to place Manet’s thesis alongside other misbegotten historical “chimeras.” Chèvremont’s first line of attack was chronological, using astronomical data to calculate the tides in March 709. He determined that the lunar fortnightly tide and monthly lunar elliptic tides were not of unusual magnitude, nor had the “terrible northerly wind” described by Manet left any trace in contemporary annals. To demonstrate this telltale absence, Chèvremont compiled a “recapitulative table” of exceptional tides, storms, and earthquakes on the shores of Western Europe which “history has recorded since the beginning of historic time.” For history to become historical it first needs to be recorded. For Chèvremont, the single original document casting light on the events of 709 is the chronicle which had been “placed by chance” in a compilation of folios, namely MS. no. 34, part 9.

In a close textual comparison, Chèvremont shows how du Monstier, through a “veritable act of blindness,” transformed the manuscript’s account of the messengers’ return to Mont-Saint-Michel on the 15th or 16th of October into “unique proof” of the so-called cataclysm of the year 709. By this reading, the “*quasi novum orbem*” seen by the returning messengers was not the western side of the mount where work was underway on the church. Du Monstier does not have them marveling at a mount once covered with scrub and brush cleared to make way for the *parvis* where Aubert inaugurated a new sanctuary.

The messengers did not even see Monte-Tumbe, the locus so “particularly and iteratively” identified in all the manuscripts. Rather, in du Monstier’s account, the new world that the messengers are astonished to find is in fact one that had been lost to the sea in their absence: the sunken forest of Sciscy. In a footnote to rival Manet’s own, in which he tugged at the historical roots of fallen trees, Chèvremont shows that du Monstier on page 372 fatally miscommunicates this world-changing passage.⁷² In du Monstier’s desire for a miraculous transformation, he resorted to “invention or simple absurdity.”⁷³ Chèvremont



AVRANCHES,

SES RUES ET SES ENVIRONS,

Par M. Alexandre Motet, Bibliothécaire.

L'AUTEUR des pages qui suivent n'a pas eu la prétention de s'ériger en historien. Pour occuper les instans de loisir que lui laissent quelquefois ses modestes fonctions de bibliothécaire, il a fait aussi quelques recherches historiques; et c'est le fruit de ses lectures, de ses remarques, de ses observations et de celles des autres, qu'il vient offrir dans ces Mémoires, et non une histoire arrangée. Ce sont de simples notes, de simples matériaux qu'il dépose au pied de l'échelle de l'habile architecte qui un jour bâtira l'histoire de notre pays. Puissent quelques-unes des pièces qu'il apporte entrer dans la construction de l'édifice; puissent ces courtes notions ne pas être sans intérêt pour le lecteur; puisse enfin la critique n'être pas trop sévère, et l'ambition de l'auteur sera satisfaite.

wished to make his own permanent amendment to the record. In a word, he wished to "scratch out" in Manet's work the luridly attractive historical error: "Au mois de mars 709 eut lieu cette marée aussi fatale qu'extraordinaire."⁷⁴ This erasure was not an act of vandalism, but one of restoration.

Of the evidence which appeared "independently of history," Manet found most remarkable the acorns, beechnuts, and hazelnuts preserved at a depth of 6 to 10 feet in the sand and mud flats between Mont-Dol and Isle-Mer. "It is natural to conclude," he writes, that the final conquest of this particular region of the coast did not take place until the onset of the fall season. Were the historian's research skills modeled on the custom of the wayfaring pilgrims who used their staffs to feel their way across trackless expanses of miry earth, their outfit also including a horn to call for help in case they became lost in a fog bank, or began to sink into the quicksand?⁷⁵

In his *Histoire du Mont-St-Michel au Péril de la Mer* (1638), Dom Jean Huynes, who was noted in Tassin's literary history of the congregation of Saint-Maur for his "talent and taste for writing monastic histories based on original sources,"⁷⁶ explicated the abbey's menacing surname, "In Peril of the Sea." It was not the massive rock rising from the sea that was in peril. Rather it was the pilgrims who were unfamiliar with the expanse of grey silty mud, *tangué* in the local idiom, that surrounded the mount. Traversable only at low tide, the trackless plain was laced with fresh water streams with ever meandering banks. It was wise, Huynes advised, to hire a guide to feel out a path.⁷⁷ For our researchers, pilgrims following their own historical vocation, the catalogue numbers for the manuscripts in the Bibliothèque d'Avranches were so many fixed points of direction when the only available map was proved in the end to be a forgery.

Was the bay of Mont-Saint-Michel once a forest? If so, was the forest catastrophically engulfed or was it lost to a secular process of erosion? In examining the manner in which this questions was posed by the Société

Translation, "Avranches: ses Rues et ses Environs."

The author of the following pages did not have the pretension of raising himself up as a historian. To occupy the moments of leisure that his modest functions as librarian occasionally afford him, he also engaged in some historical research. It is the fruit of his readings, his remarks, and his observations and those of others, which he is going to offer in these *Mémoires*, and not a finished history. They are but simple notes, simple materials that he places at the foot of the ladder of the able architect who will one day build the history of our country. That some of the elements that he offers enter into the construction of the edifice; that his brief notions are not without interest to the reader; that criticism is not too severe, then the ambition of the author is satisfied.

d'Archéologique d'Avranches, we are afforded not only a view of a pervasive nineteenth-century fascination with this legendary landscape, but we can also follow, as if watching a passing storm, the mounting debris as the past recedes from view. Sixty years after Motet and Saint-Victor undertook to reclaim the impure legacy that was Avranches's literary depository from a state of abandonment and waste, an edited version of Taranne's catalogue was published. In recapitulating all the steps along the way, beginning more than a century before the manuscripts were displaced by force from the abbey, Delisle's introduction shows how order appears in time, over time, as a temporary refusal of time's disordering force. The history of the library is written in sedimentary strata, the concordance tables for the catalogue numbers given by Montfaucon, as well as those from the general and manuscripts catalogues of the Avranches library. This was the shifting ground upon which the search for the textual traces of the forest began.

Charles-Victor Langlois and Charles Seignobos write that the fundamental basis of historical research is the "general inventory of historical documents." Thus, understandably, Montfaucon, for one, considered his catalogue of catalogues "the most useful and most interesting work he had produced."⁷⁸ This masterwork of reference provided a finder's guide to the extant "traces" that, according to these positivistic documentarians, were the historian's sole and sufficient medium of contact with the past. The gathering of sources was the sort of unassuming but necessary task Motet fulfilled in his topographic study of Avranches: providing the simple materials for the "capable architect who will one day construct the history of our region."⁷⁹ Motet already foresaw a central and sorrowful feature of this edifice in his discussion of Avranches's cathedral, mere mention of which prompted him to revisit the narrative of Henry II's act of penance. The Roman Gothic cathedral had stood for centuries, he wrote, but the Revolution was "much more prompt in its destruction than was time." It was razed in 1799 to prevent it from collapse. A pile of architectural debris was preserved, including gargoyles, column capitals, and a tomb bearing the bearing the inscription, "Last Remains."

Motet writes that any hope of reconstructing the cathedral was gone. It was not that money was lacking. Rather in the "century in which we live, the century of positivism, those who possess money do not give it to build churches."⁸⁰ At the 1842 annual meeting of the Société

Archéologique d'Avranches, which took place on the anniversary date of Henry II's expiatory act, Charles Florent Jacques Mangon de Lalande spoke of his campaign to preserve the stone upon which the king knelt, by surrounding it with stout bollards and chains to "giving the monument an official character and to shelter it from destruction."⁸¹ Mangon de Lalande was preceded at the podium by Girard, who read from his premiated memoir on the geographic situation of Mont-Saint-Michel during the reign of Childebert III, all based on positive documentary facts. A lost forest was perhaps a more difficult thing to miss than a sunken cathedral, though not "to miss" in the sense of to long for. To find it one had to search through the archives to exhume the remains of the past. The historian and bibliographer are perpetually possessed by the hope and fear that there is still more to uncover, yet they are insulated by the passage of time against the sting of loss.

In his prize-winning response, Girard demonstrated no scholarly acuity. Rather, he articulated the particular urgency of the question. Girard supplied a connection between the loss of Mont-Saint-Michel's library and the forest of Sciscy, and the conditions for their mutual historical restoration. In the Bibliothèque d'Avranches, Girard writes, he found "positive proof," overlooked by others, of the forest's submersion. Yet he just as readily conceded that what really mattered is not what he saw in the manuscripts, but rather that the manuscripts had already been seen by Eugène Castillon de Saint-Victor and Alexandre Motet, thereby giving a name to their steadfast custodians; that having "escaped destruction and dispersion" the manuscripts had been "exhumed, put into order, and brought to light."⁸² In the wake of the bibliographic revolution, they remained, or had been returned to, or perhaps were newly put at the disposition of researchers; where one stood on this question was a matter of historical faith. They had survived what the Rouennais historian Abbé Julien Loth – writing a generation later, and still trembling from the effects of the "cataclysm," the ruins and debris of which he predicted would take another century to reconstruct – called the "flood."⁸³

- 1 Jean-Marie Baudouin de Maison-Blanche, "Recherches sur l'Armorique et les Armoriciens anciens et modernes. Troisième Lettre," *Mémoires de l'Académie Celtique* 5 (1810): 145.
- 2 Arthur Le Moyne de la Borderie consigned Conan to the "hazy ranks of imaginary monarchs" in his *Histoire de Bretagne*, vol. 1 (Rennes: J. Plihon & L. Hervé, 1898), 456. On Nennius, see Borderie, *L'Historia Brittonum attribué à Nennius et l'Historia Britannica avant Geoffroi de Monmouth* (Paris: 1883).
- 3 Étienne Dupont, "Un inventaire au Mont St-Michel 1789–1791," *Revue du Pays d'Aleth* 3 (1906): 205–208.
- 4 Hippolyte Taine, *Les Origines de la France contemporaine*, vol. 1: La Révolution (Paris: Hachette, 1878 [2nd ed.]), 386.
- 5 Emile Vivier, "Notice historique sur la bibliothèque municipale d'Avranches," *Revue de l'Avranchin* 18 (1914): 394.
- 6 Baudouin, "Troisième Lettre," 145.
- 7 1 Vendémiaire An I (22 September 1792).
- 8 Kevin Lynch, *What Time Is This Place?* (Cambridge: MIT Press, 1972).
- 9 [François] G[illes] P[ierre] B[arnabé] Manet, *De l'état ancien et de l'état actuel de la baie du Mont-Saint-Michel* (Sant-Malo: Chez l'Auteur, 1829), no. 26, 52–53. The section of footnotes entitled "Développemens et Notes à l'appui de tout ce qui a été avancé ci-dessus" is given more space in the book than Manet's historical exposition.
- 10 The archives of the Société d'Archéologie d'Avranches were lost when a fire destroyed the building that housed the society's museum, December 15, 1899. Evidently, institutional memory had already dimmed by 1890 when the society's library-archivist made a desultory attempt to recover any record of the contest. "Concours," *Revue de l'Avranchin* 5 (1890): 284.
- 11 [Jean]-B[aptiste] Labiche, *Notice sur les dépôts littéraires et la révolution bibliographique de la fin du dernier siècle* (Paris: A. Parent, 1880), 6.
- 12 "État et déclarations des biens dépendant de la mense conventuelle à laquelle sont réunis tous les offices claustraux et des prieurés non unis de l'Abbaye royale du Mont-Saint-Michel au Péril de la Mer, que donne le R. P. Dom Maurice, prieur, aux officiers municipaux d'Avranches, le 19 février 1790, en conséquence du décret de l'Assemblée nationale du 13 novembre 1789, sanctionné par le Roi le 18 du même mois."
- 13 Édouard Le Héricher, *Avranchin: monumental et historique*, vol. 1 (Avranches: E. Tostain, 1846), 699, n. 1. Héricher is referring to the Abbé Cerisier.
- 14 Édouard Le Héricher, *Itinéraire descriptif et historique du voyageur dans le Mont Saint-Michel*, vol. 1 (Avranches: Auguste Anfray, 1857), 68–69. As evidence of this fragility, Le Héricher writes of Mont-Saint-Michel's spire which was razed in 1796 to accommodate an optical telegraph (Paris to Brest line, opened 7 August 1798), which was in turn replaced by an "invisible" underground telegraph wire.
- 15 Abbé Jean Desroches, "Notice sur les manuscrits de la bibliothèque d'Avranches," *Mémoires de la Société des Antiquaires de Normandie* 11 (1840): 70.
- 16 Léopold Delisle, *Chronique de Robert de Torigni abbé du Mont-Saint-Michel* (Rouen: A. Le Brument, 1872).
- 17 Jules Desnoyers, "Rapport du secrétaire sur les travaux de la Société de l'Histoire de France, depuis sa dernière assemblée générale en 1849 jusqu'à ce jour," *Bulletin de la Société de l'Histoire de France* 12 (1849–1850): 259.
- 18 "Allocution de M. Louis Passy, au nom des Sociétés Normandes," *Sociétés de l'Histoire de France et de l'École des Chartes, Célébration du Cinquantenaire de M. Léopold Delisle* (Paris: 1902), 10.
- 19 Léopold Delisle, *Catalogue générale des manuscrits des bibliothèques publiques des départements*, vol. 4: Arras, Avranches, Boulogne (Paris: Imprimerie Nationale, 1872), 429–430.
- 20 Edmond Martène, Ursin Durand, *Voyage Litteraire de Deux religieux Benedictins de la Congregation de Saint Maur* (Paris: Florentin DeLaulne, 1717).
- 21 Bernard de Montfaucon, *Bibliotheca bibliothecarum manuscriptorum nova*, vol. 2 (1739), 1356–1361. In the opening lecture of his course at the École des Chartes, Benjamin Guérard said that it was the Benedictines of Saint-Maur, guided by Mabillon and Ruinart, who were the first to "trace the rules" of diplomatic, the first to "form a body of doctrine" for interpreting the documentary record of the past. "Discours prononcé par M. Guérard pour l'ouverture du cours de première année à l'École des Chartes, en 1831 ou 1832," *Bibliothèque de l'École des Chartes* 17 (1856): 1.
- 22 Castillon de Saint-Victor's "Catalogue des manuscrits de la bibliothèque de l'Abbaye du Mont-Saint-Michel," appears in Maximilien Raoul, *Histoire pittoresque du Mont-Saint-Michel, et de Tombelene* (Paris: d'Abel Ledoux, 1834), 271–281. Charles de Gerville, "Recherches sur le Mont-Saint-Michel," *Mémoires de la Société des Antiquaires de Normandie* 4 (1828): 24. On the condition of the library itself, see August Boudent-Godelinière, *Essai historique et statistique sur l'Avranchin*, vol. 1 (Avranches: E. Tostain, 1844), 219.
- 23 Charles de Gerville, "Recherches sur le Mont-Saint-Michel," *Mémoires de la Société des Antiquaires de Normandie* 4 (1828): 24.
- 24 Jules Michelet, *Histoire de France*, vol. 2 (Paris: L. Hachette, 1833), 701.
- 25 See, Edme-Louis Barbier, *Notice sur l'exhumation de leurs Majestés Louis XVI, et Marie-Antoinette* (Paris: Le Normant, 1815).
- 26 On interpreting the varieties of dust, see Carloy Steedman, *Dust: The Archive and Cultural History* (New Brunswick: Rutgers University Press, 2002), 157–170.
- 27 Louis Joachim Lainé, Le Ministre Secrétaire d'État de l'Intérieur, "Circulaire No. 38 (April 28, 1817)," reproduced in "Lois, instructions et règlements relatifs aux archives départementales, communales et hospitalières," *Le Cabinet Historique: Moniteur des Bibliothèques et des Archives* 28 (1882): 118–121.
- 28 De Gerville, "Recherches sur le Mont-Saint-Michel," 24.
- 29 Léopold Delisle and Louis Passy, eds., *Mémoires et notes de M. Auguste Le Prevost pour servir à l'histoire du département de l'Eure*, vol. 1 (Évreux: Auguste Hérissey, 1862), xv.
- 30 Abel Anastase Germain, Pierre Marie Brin, Édouard Corroyer, *Saint Michel et le Mont-Saint-Michel* (Paris: Firmin-Didot, 1880), 353.
- 31 Jacques Derrida, *Archive Fever: A Freudian Impression*, trans. Eric Prenowitz (Chicago: University of Chicago Press, 1998), 2.
- 32 Alexandre Motet, "Avranches, ses Rues et ses Environs," *Mémoires de la Société Archéologique d'Avranches* 1 (1842), 66.
- 33 In a postscript to the extensive endnotes following his scholarly note on Guillaume de Saint-Pair's *Le Roman de Mont Saint Michel*, a twelfth-century rhyming chronicle of 3790 verses, the Avranches-born scholar and archivist Eugène de Robillard de Beurepaire sought to untangle the complex skein of genealogical relations—some admitted and others not so—connecting the manuscripts sharing a family vault in the Bibliothèque d'Avranches. Guillaume de Saint-Pair's mention of the forest of Scisy, or the "forest of Quokelunde," prompts Beurepaire to revisit Manet's thesis and the critical climate in which the contest to settle Mont-Saint-Michel's geographical situation was initiated.
- 34 Raoul, *Histoire Pittoresque du Mont-Saint-Michel*, 238.
- 35 Even de Gerville's host in Avranches, Auguste Boudent-Godelinière, a founding secretary of the Société d'Archéologie d'Avranches, gave Saint-Victor credit for having composed the library's catalogue. Auguste Boudent-Godelinière, *Essai historique et statistique sur l'Avranchin*, vol. 1 (Avranches: E. Tostain, 1844), 222.
- 36 *Mémoires de la vie de Jacques-Auguste de Thou* (Rotterdam, Reinier Leers, 1711), 52.
- 37 This reading is offered in a translation of Justus Lipsius's *Syntagma de Bibliothecis* by Gabriel Peignot in his *Manuel Bibliographique* (Paris: Villier, 1800). Librarian of the École Centrale du Département de la Haute-Saône, Peignot wrote the manual for the benefit of librarians and students of all the new Écoles Centrales, whose establishment led to the appointment of the Abbé Cerisier and the transfer of books and manuscripts from the destructive damp of the Orangerie.
- 38 Louis Dupuy, "Éloge de M. Fontette," *Histoire de l'Académie Royale des Inscriptions et Belles-Lettres* 40 (1780): 185.
- 39 Jacques Le Long, Charles-Marie Fevret de Fontette, *Bibliothèque historique de la France: contenant le catalogue des ouvrages, imprimés & manuscrits, qui traitent de l'histoire de ce royaume ou qui y ont rapport*, vol. 1 (Paris: Jean-Thomas Herissant, 1768), i.
- 40 "Rapport de Grégoire sur la conservation des manuscrits et l'organisation des bibliothèques, 22 Germinal an II (11 September 1794)." The report was written in response to the general failure of the decree of 8 Pluviôse An II (January 27, 1794) which had instructed directors of districts, within four months, to draw up inventories of collections, propose suitable places in national buildings for libraries, and provide an estimate of the cost. Some reports were submitted, but the majority of them were done poorly. Negligence was one cause. Another reason was that departments possessing large collections feared for their removal by central government.
- 41 Anatole Olivier, "Rapport sur la bibliothèque d'Avranches," *Annuaire des Cinq Départements de l'ancienne Normandie, Publié par l'Association Normande* 6 (1840): 233.
- 42 Jules Michelet, *Histoire de la Révolution Française*, vol. 1 (Paris: Imprimerie Nationale, 1889), 277. Le Guen de Kerengal spoke on the night of August 4, 1789, when the Vicomte de Noailles and the duc d'Aiguillon proposed the abolition of feudal rights.
- 43 Vivier, "Notice historique sur la Bibliothèque," 405.
- 44 Frantz Funck-Brentano, "Préface: Avranches en 1815," *Revue de l'Avranchin* 15 (1909): 161.
- 45 Édouard Le Héricher, *Itinéraire descriptif et historique du voyageur dans le Mont Saint-Michel* (Avranches: Auguste Anfray, 1857), 15.
- 46 Saint-Victor records the manuscript differently as "Psalterium commentaria ac in Sic et Non," under the heading "Interpretations of the Separate Books of the Old Testament."
- 47 Catalogue du district d'Avranches et dont l'inventaire sur cartes a été envoyé au comité d'instruction publique, et rédigé par le citoyen Pierre-François Pinot-Cocherie, commissaire (MS. 246 in the Bibliothèque d'Avranches). See, W. Marie-Cardine, *Histoire de l'enseignement dans le département de la Manche de 1789–1808*, vol. 1 (Saint-Lô: P. Prével, 1888), 533.
- 48 Abbé Jean Desroches, "Notice sur les manuscrits de la bibliothèque d'Avranches," *Mémoires de la Société des Antiquaires de Normandie* ser. 2, vol. 1 (1840): 70–156. Desroches was earlier the author of *Histoire du Mont Saint-Michel et de l'ancien diocèse d'Avranches* (Caen: Mancel, 1838).

- 49 Félix Ravaisson, *Rapports au ministre de l'instruction Publique sur les bibliothèques des départements de l'Ouest, suivis de pièces inédites* (Paris: Joubert, 1841), 114–194.
- 50 Ibid., 114. Shortly after Ravaisson's visit, Ludwig Bethmann, one of the able deputies dispatched by Georg Heinrich Pertz to collect documents for the *Monumenta Germaniae Historica*, came to Avranches (October 24 to November 5, 1840). He produced an interesting proto-anthropological account of his scholarly travels, "Reise durch die Niederlande, Belgien und Frankreich, vom Junius 1839 bis September 1841," *Archiv der Gesellschaft für ältere deutsche Geschichtskunde* 8 (1843): 66–71.
- 51 Instructions pour la garde et la conservation des archives (Paris le 8 Août 1839), 12. Proclamation du roi du 20 avril 1790 sur un décret de l'Assemblée Nationale concernant les comptes à rendre par les anciens administrateurs aux nouveaux corps administratifs, et la remise des pièces et papiers relatifs à l'administration de chaque département.
- 52 Shelley Sweeney, "The Ambiguous Origins of the Archival Principle of 'Provenance,'" *Libraries & the Cultural Record* 43 (2008): 196.
- 53 "Instructions pour la mise en ordre et le classement des archives départementales et communales (April 24, 1841)," in Ministère de l'Instruction Publique et des Beaux-Arts, *Lois, Instructions et Règlements Relatifs aux Archives Départementales, Communales et Hospitalières* (Paris: H. Champion, 1884), 17.
- 54 Abbé Julien Loth, *Histoire du cardinal de la Rochefoucauld et du diocèse de Rouen pendant la Révolution* (Évreux: de l'Eure, 1893), 258.
- 55 Alexandre Sorel, *Le Couvent des Carmes et le séminaire de Saint-Sulpice pendant la Terreur* (Paris: Didier, 1863), 137.
- 56 Fevret de Fontette, *Bibliothèque Historique de la France*, i.
- 57 Gustave de Clinchamp, "Introduction," *Mémoires de la Société Archéologique d'Avranches* 1 (1842): vii.
- 58 Alexandre Chèvremont, *Les Mouvements du sol sur les côtes occidentales de la France* (Paris: Ernest Leroux, 1882), 345.
- 59 Edouard Le Héricher, "Esquisse d'archéologie générale et locale," *Journal d'Avranches* (June 13, 1841): 2.
- 60 Sosthène Mauduit, "Société d'Archéologie de Littérature, Sciences et Arts d'Avranches et de Mortain, Séance du 21 Juin 1883," *Revue de l'Avranchin* 1 (1882): 305.
- 61 Girard, *Histoire Géologique, archéologique et pittoresque de Mont Saint-Michel*, 2.
- 62 Arnould Locard, "Recherches historiques sur la coquilles de pèlerins," *Mémoires de l'Académie Royale des Sciences, Belles-Lettres et Arts de Lyon* (1888): 152.
- 63 "Qui primum locus sicut a veracibus cognoscere potuimus narratoribus, opacissima claudebatur sylvia longe ab Oceani, ut estimatur, estu millibus distans sex, aptissima prebens latibula ferarum."
- 64 Girard, *Histoire Géologique, archéologique et pittoresque de Mont Saint-Michel*, 7.
- 65 Ibid., 27.
- 66 This version appears in MS. no. 24 *Fundatio et Miracula Sancti Michaelis in Tumbâ*.
- 67 Manet, *De l'état ancien et de l'état actuel de la baie du Mont-Saint-Michel*, 62. The Roman name for Monte Tumba, i.e. Mont Jovis, for the cult of Jupiter they established there.
- 68 Variante: version abrégée du manuscrit d'Avranches MS. 212. Revelatio f. 3v. "Pendente vero illo tempore quo dicti nuncii missi fuerant, locus ille qui nutu Dei futuro parabatur miraculo sanctique sui archangeli venerationi, mare quod longe distabat paulatim assurgens omnem silve ejus magnitudinem virtute sua complanavit et in arene sue formam cuncta redegit, prebens iter populo Dei ut enarrent mirabilia Dei summi." The original version is as follows: Revelatio Ecclesiae Sancti Michaelis Archangeli in Monte qui Dicitur Tumba MS. 34 (211). Revelatio VII. De exceptione angelici patrocini: "Summi interea nuntii, repedantes post multa itineris spatia ad locum quo digressi fuerant ipso die quo fabrica completa est in Monte jam dicto in occiduis partibus, quasi novum ingressi sunt orbem, quem primum veprium densitate reliquerant plenum." f.18 r-v. (The messengers, after their having crossed great distances, upon their return to their place of departure, and the very day even when the construction was completed on the eastern face of the precipitous rock face, entered as if into a new world, so much had changed with the place they had left covered in thick undergrowth.)
- 69 Émile-Auber Pigeon, "Note sur une carte de fabrication moderne prétendue du XIIIe siècle," *Bulletin de la Section de Géographie Historique et Descriptive: Année 1889* (1890): 185.
- 70 Chèvremont, *Les mouvements du Sol*, 342.
- 71 André Marie Laisné, "Étude sur l'ancien état de la baie du Mont Saint-Michel, d'après les manuscrits de l'Abbaye de ce mont," *Mémoires Lus à la Sorbonne dans les Séances Extraordinaires du Comité Impérial des Travaux Historiques et des Sociétés Savantes. Tenues les 19, 20, et 21 Avril 1865* (Paris: Imprimerie Impériale, 1866): 96.
- 72 Chèvremont, *Les mouvements du sol*, 360, n. F.
- 73 Ibid., 365, n. F.
- 74 Manet, *Histoire de la Petite-Bretagne; ou Bretagne-Armorique*, vol. 2 (Saint-Malo: Chez l'Auteur, 1834), 144.
- 75 Paul Gout, *Le Mont-Saint-Michel: histoire de l'abbaye et de la ville*, vol. 1 (Paris: Armand Colin, 1910), 340.
- 76 René Prosper Tassin, *Histoire littéraire de la Congrégation de Saint-Maur, Ordre de S. Benoît* (Paris: Humblot, 1770), 57.
- 77 *Histoire Générale de l'abbaye du Mont-S.-Michel au Pêril de la Mer, par Dom Jean Huynes. Publiée pour la première fois avec une introduction et des notes, par E. de Robillard de Beaurepaire*, vol. 1 (Rouen: A. Le Brument, 1872), 43. Beaurepaire discusses the textual difficulties of the Avranches manuscript, which is a transcription by Huynes's fellow Benedictine Louis de Camps. Beaurepaire's own text is based on Bibliothèque Nationale, MSS. Français, no. 18947, 18948, formerly nos. 924, 925 of the library of Saint-Germain-des-Prés.
- 78 Charles-Victor Langlois, Charles Seignobos, *Introduction aux études historiques* (Paris: Hachette, 1898), 13.
- 79 Motet, "Avranches, ses Rues, et ses Environs," 44.
- 80 Ibid., 56.
- 81 "Conservation des monumens," *Bulletin Archéologique* 2 (1842): 114. See Mangon de Lalande, *Rapport fait à la Société d'archéologie d'Avranches*, relativement à la pierre expiatoire de Henri II, roi d'Angleterre (1841).
- 82 Fulgence Girard, *Histoire Géologique, Archéologique et Pittoresque de Mont Saint-Michel au Pêril de la Mer* (Avranches: E. Tostain, 1843), 4.
- 83 Julien Loth, *Les Conventionnels de la Seine-Inférieure* (Rouen: Esperance Cagniard, 1883), vi.

Inertia and Development Approaches to Africa

Towards African Mobilities

Clapperton Mavhunga

Africa the Inept?

The predominant image of Africa is that of people that are “infantile, primitive and without culture or civilization.”¹ The German historian Georg Hegel had declared in 1837 that Africa had no history except that which outsiders have left behind. In H. Rider Haggard’s many writings, and also Joseph Conrad’s *Heart of Darkness* (1902), Africa is the “dark continent,” dark not just in the color of its people, but specifically as something in need of enlightenment. Today many scholars speak of *science and technology in Africa*, but are completely silent about *African knowledge production and technology*, deliberately or fortuitously confirming Hegel’s argument that only what outsiders (especially Europeans) have left constitutes technology or knowledge. In the drawing of the technological map of the world Africa is often either illegible or completely excluded – unless commentators are referring to the itineraries and footprints of outsiders, or the tracks left by their technologies.

Audiovisual representations offer some of the most illuminating insights on the caricatures of an Africa in technological stasis. Indeed, films like *Tarzan* – the first in the series being *Tarzan of the Apes* (1918) – were cinematic affirmations of Hegelian portraits of Africa as silent until spoken for, invisible or hidden until revealed or discovered by the European itinerant, primitive until he civilized it, and static until pushed.² Since the production of the *Tarzan* movie series, the celebration of tools of empire as “tentacles of progress” has increasingly given way to a different kind

of “Tarzanism,” one that maintains emphasis on the powers of Western technology but casts its effects as destructive to static African culture. Two films, *Darwin’s Nightmare* and *Wild Ocean* are two recent examples of this genre. Where in the *Tarzan* films Africans were cast as beneficiaries of Western civilizing missions, in these recent ones (produced by Western directors), Africans are depicted as victims, with “good white men” (filmmakers, reporters, intellectuals, NGOs) coming in as rescuers of “the natives” from Western injustices and self-destruction. *The Last King of Scotland* and *Blood Diamond* are also good examples. These films would have us believe that it is the Western technology that stirs an innovative instinct and mobility in these Africans; since this technology is a product of Western engineering, the West is also designing African initiative. (Western) technology drives (African) society; Africa is a product of Western design.

In latter-day Hollywood, Fox, and *Vanity Fair* portraits, Africa is a mere exhibition, an exposé; it is this popular, if false, media image, that shapes policy towards the continent.³ The exhibition of Africans is not only confined to yesteryear circuses, museums, and zoos but is central to the practice and discourse of global development, public health, and environmental conservation. “CNN Heroes” honors these Western exhibitors of African desperation every year; one would think the real heroism worth exposing is that of people whose survival is completely written off, and yet they always come back. Yet the CNN “hero” is one who facilitates the exposure of these true heroes, and the eulogies to purported philanthropic celebrities (who need the publicity to boost their images) and the helplessness of “the helped” often reduce the whole thing into an exercise in moviestar narcissism. Shades of this “exposure” are found in *The Boy Who Harnessed The Wind* (2009) in which American Bryan Mealer exhibits the African “boy,” William Kamkwamba, to the West using biography and extensive road shows. After being exposed, the boy who harnessed the wind for his village is squirreled out of sight to a South African institute for “formal training.” By taking these young innovators out of the village to the city, those responsible for “developing him” are doing exactly what they have done with traditional knowledge of African villagers. Namely, to extract it from its organic production site in the countryside and isolating it in an urban-based, Western-type laboratory, completely excised from its originators, whose loss of intellectual property rights is not acknowledged or compensated.

Figures like Kamkwamba are silhouettes juxtaposed

programmed set of rules, a *script*, combined functional influences with the intrinsic formal tendencies of linear geometry to produce an architectural space. This computational process can be described in a series of phases, as seen in the adjacent diagrams.

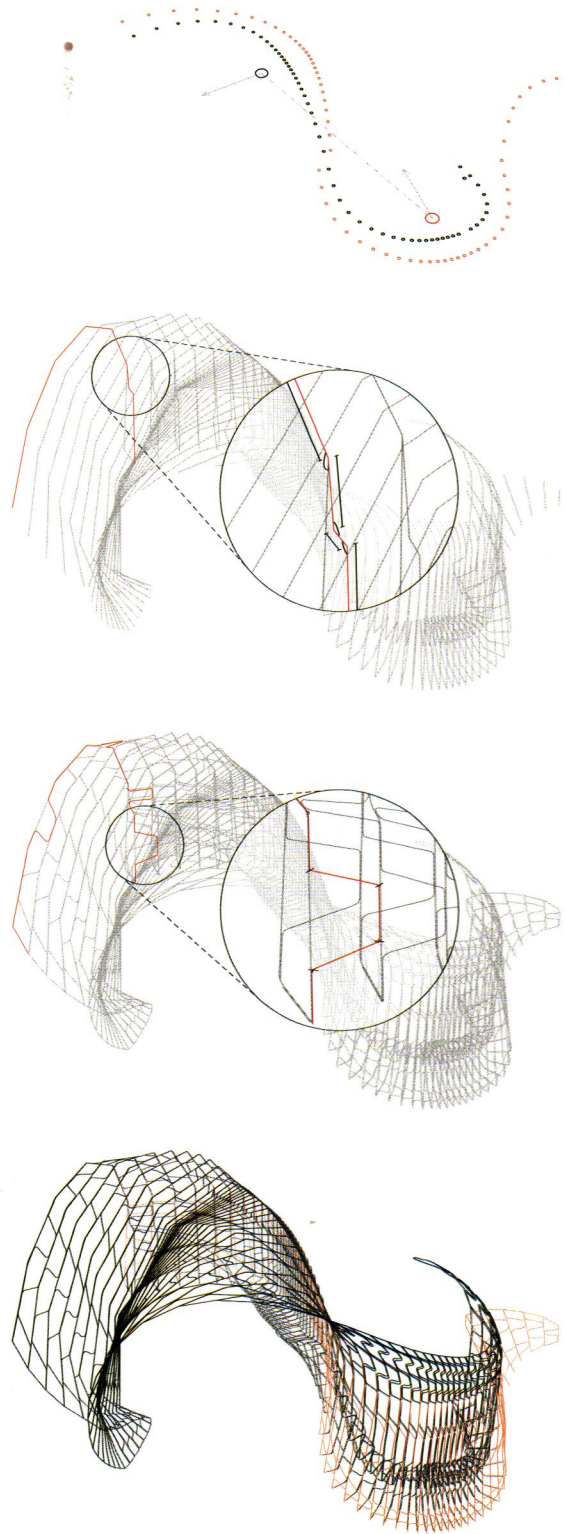
The virtual environment in which this computational process operates is established in a 3D modeling software. This environment is seeded with information tied to real-world spatial requirements. This information influences the behavior of the script as it grows within the environment, demarcating two zones with distinct views and orientation [Figure 1]. These spaces are simultaneously connected and autonomous, a perception reinforced by the modulating density of the emerging form. A secondary array of geometry delaminates from the primary form, highlighting the internal variation possible within a single form-making strategy.

A network of three-dimensional lines grows from the base geometry on the ground plane [Figure 2]. Each segment develops with a specific scale and direction with respect to the formal tendencies of the script and the real-world information embedded in the environment. These lines are the progenitors from which more complex geometry evolves. This *ancestor geometry* establishes the morphological characteristics of the pavilion, but lacks the sophistication to address issues of structural integrity and user occupation.

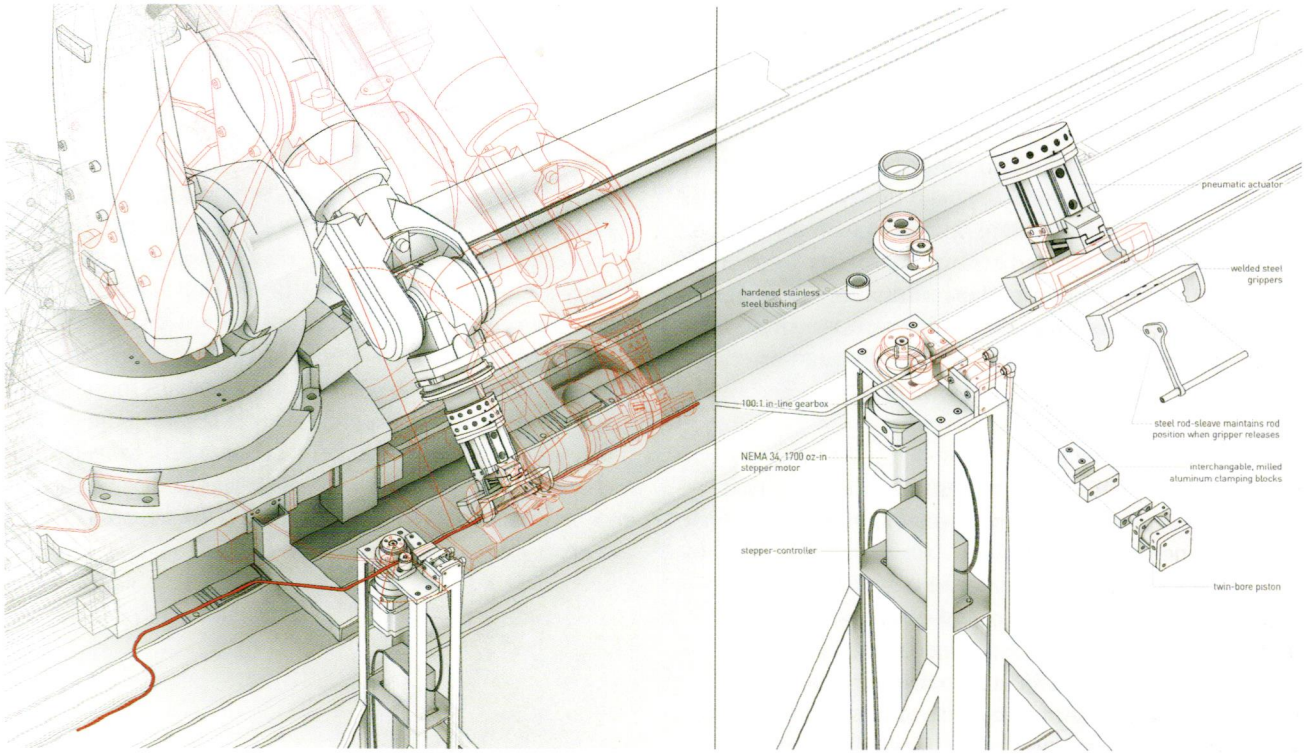
The *descendent geometry* [Figure 3] refines the *ancestor geometry* through new rules based on proximity to neighboring lines. Individual components engage in physical exchange with their neighbors, forming aesthetic and structural alliances toward the development of a cohesive *society of form*. This *form society* displays broad networks of structural affiliation while maintaining a high degree of local diversity [Figure 4]. Behavioral gradients read across the breadth of the pavilion, but moments of eccentricity—phase shifts, vestigial phenotypes, dormant features—reveals the complex relational processes of the underlying system. Through this process of formal evolution, *wavePavilion* manifests an index of its own phylogeny while satisfying pragmatic requirements of built, occupiable form.

Robotic Fabrication

The project relies on precise fabrication and assembly of its constituent elements. To this end, a multi-use 7-axis robotic arm was paired with a bespoke CNC rod-bending device [Figure 5]. These operated in tandem to shape multi-planar

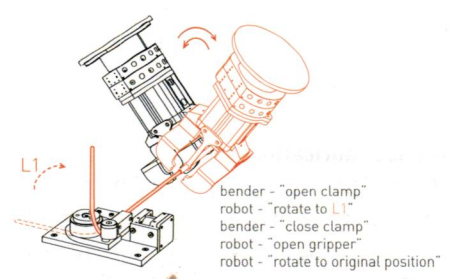
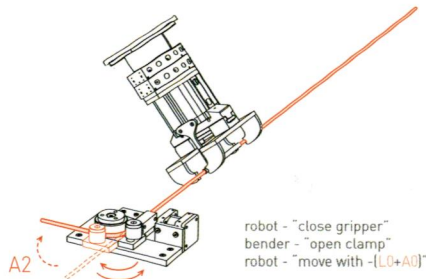
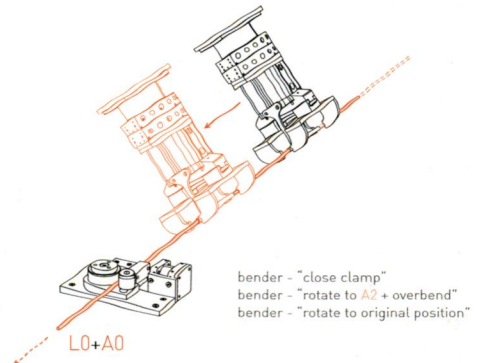
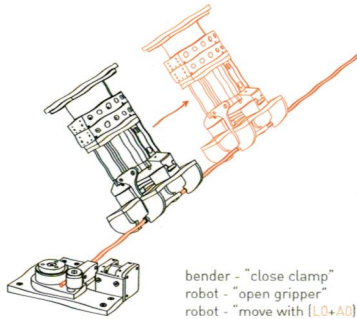


Computational Design, TOP TO BOTTOM: Figure 1, Figure 2, Figure 3, Figure 4.



Robotic Fabrication

A custom CNC rod-bending device operates in tandem with a multi-use 7-axis robotic arm to shape the steel components. The behavior of this toolset is driven by a communication script which translates 3D computer geometry into robot/bender choreography.



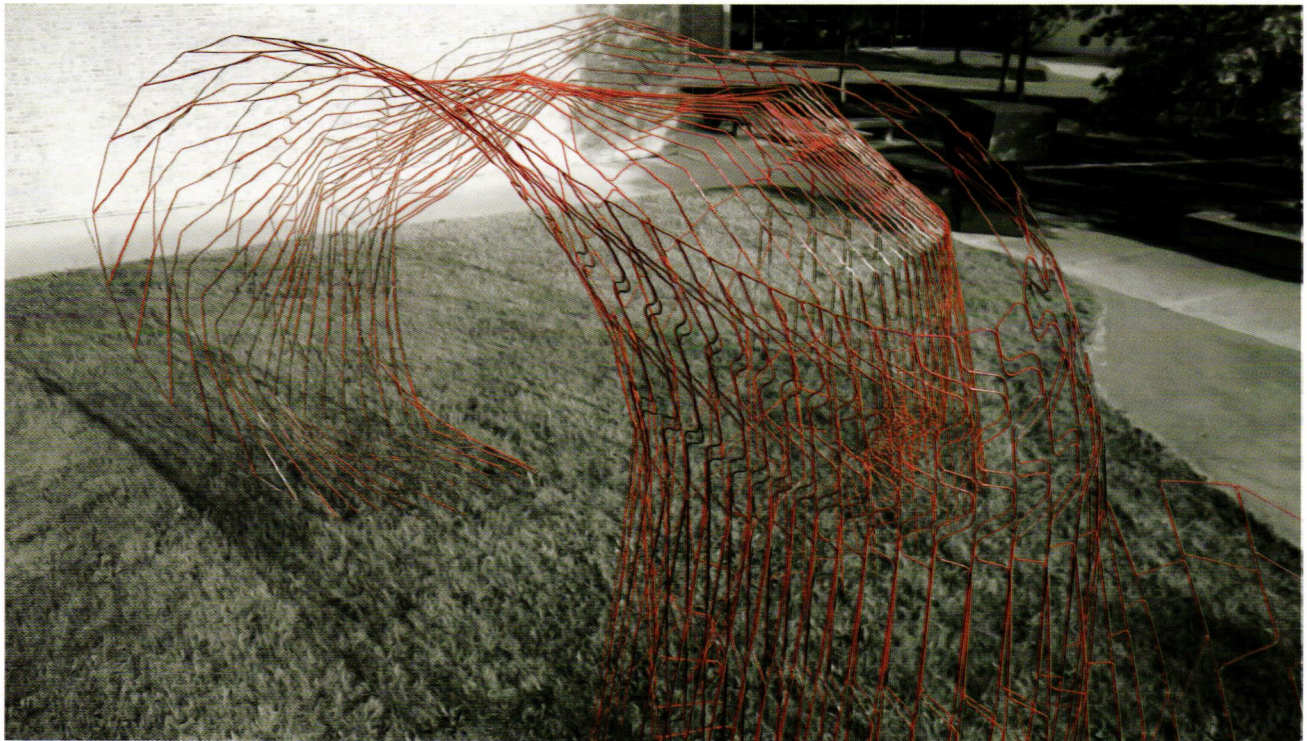
components out of 1/4-inch steel rod. A custom script was developed to analyze the digital geometry and translate that information into a series of operations for the bender and robot. The data is exported as a series of commands which direct the actions of the robot and bender in order to construct the digital geometry out of steel rod [Figure 6].

The bent components were organized with an indexing system and transported to the site, where they were manually assembled. The non-standard nature of each component is ultimately beneficial as it eliminates the need for positioning jigs: each component can only align with its neighbors in a single, specific orientation.

Conclusion and Projection

wavePavilion was a quick, two-month investigation that has since initiated an ongoing trajectory of research. Both scripting and customized robotic fabrication have a daunting learning curve that inhibits the potential of these tools and processes, so the physical and computational tools developed for *wavePavilion* have been shared with other designers in hope of accelerating the research through open-source participation. Experimentation by the authors and others have continued in 1/4-inch and 3/8-inch metal

rod. Refinements to the toolset are also ongoing, and the next-generation bending device currently in development will expand this experimentation to larger diameter materials. Computational improvements, such as visualization software to better predict fabrication challenges, expands both the operability of these processes and their capacity for broader application. Mechanical attachments might replace welded connections to increase assembly speed. Secondary membrane systems may be developed to provide enveloping capacities. The bent steel of *wavePavilion* may even be paired with wire mesh and shotcrete to produce highly customizable structural forms. Perhaps most critical of all, *wavePavilion* is a proof-of-concept showing the potential of digital fabrication and its ability to link conception and production without the need for the mediation that occurs between design intent and fabrication in conventional construction.



Complete pavilion.

Biobank for America

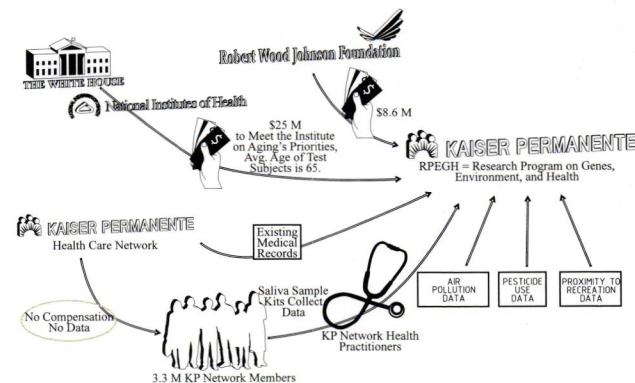
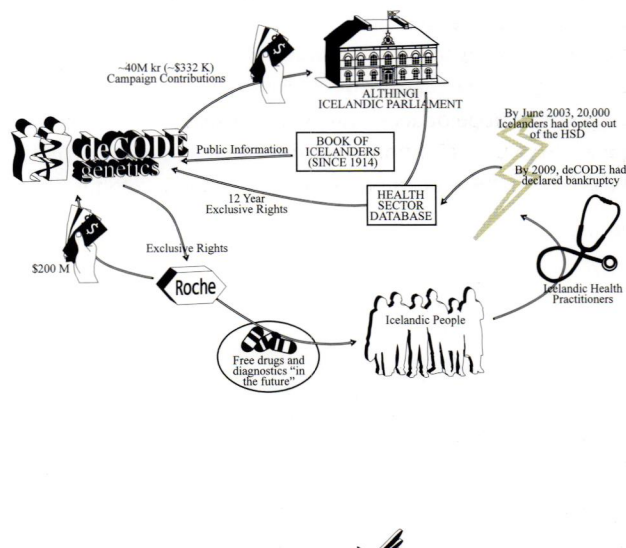
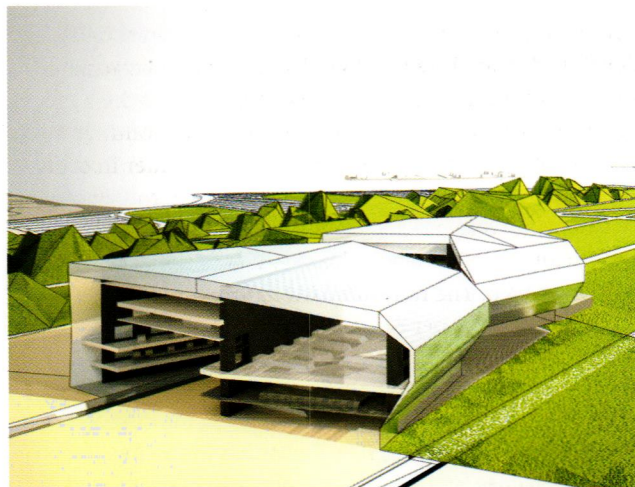
Sarah M. Hirschman

All over the world, collections of biospecimens and medical records databases help researchers and scientists draw conclusions about disease and genetic mutation. These collections are comprised of excised tumors, blood samples, and saliva swabs, and are generally the by-product of a hypothesis-guided study into a particular topic. At the same time, and for the quite-different purposes of fertility treatment, life extension, and life-saving transfusions, other types of collections are being amassed at sperm banks, cryobanks, and blood banks. And, while they may not be expressly bound for biobanks, all sorts of samples and biometric data – fingerprints, facial recognition metrics, and newborn baby blood stamps – are being collected and recorded constantly by private security firms, law enforcement, and public health officials.

Most large biobank projects are begun with specific research aims in mind, and are funded either privately by stakeholders who stand to profit from the venture, like DeCode¹ in Iceland, or by public sources that have money earmarked for research into specific types of studies, like Kaiser Permanente² in California. These narrowly focused ventures may satisfy individual research aims, but they don't feed information back into a forum where it can continue to contribute to the public good.

The tight hold that researchers have on their data once their studies have been completed represents a detrimental dead end, and is a function of complex archaic funding structures that need to change. It is in this forum of productive use for dead ends that the most research potential is housed since, as ventures like the Personal Genome Project have shown, the most meaningful statistical data is that in which all aspects of an individual's genotype, their genetic code and phenotype, their biometrics like CT scans and MRIs, as well as their health history and environmental exposure, can be cross-referenced and compared. The more metrics, the better.

A new American institution is needed to harness the power of all this information – a Biobank for America.



DeCode secured exclusive rights to the Icelandic Health Sector Database and made a deal with the Swiss company Roche, promising Icelanders "free drugs and diagnostics" in the future. The Kaiser database represents a huge resource for biobankers, but their scope is limited to the 65+ year-old members of the network because of grant priorities.

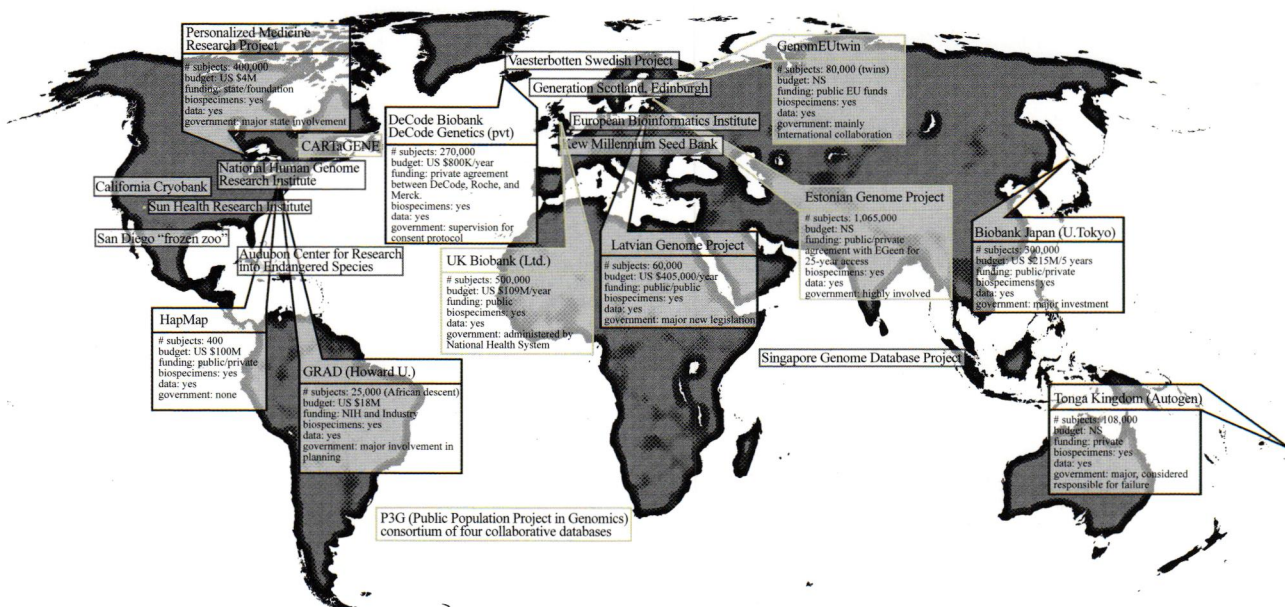
300,000,000 biospecimens are already being stored today across the country. Collectively, they represent a unique storehouse of information from which trends may be retroactively extrapolated. The networking of these existing collections would be a small amount of work that might reap tremendous results. The only barrier to this leap forward in public health information is the public itself. The widespread belief that anonymity and privacy are desirable prevents collaboration and the effective use of information we already have.

But the information is out there – it's not a question of wanting to share personal information or not. At this point, it's how we, as a country, choose to use the information that is already being collected. The Biobank is more than a repository, it becomes a monument to collective heritage, and a proactive stance against the way information is traded. It is an investment in the discoveries of the future and a movement towards transparency.

The consolidation of this archive under the auspices of governmental regulation will diminish the harm it can do to any one individual and forestall an information economy like that already under construction with Google's HEALTH application.³ As has been shown by George Church and the

Personal Genome Project, anonymity in medical research is neither intellectually productive, nor practically possible.⁴ Steps like the 1998 Genetic Informational Nondiscrimination Act (GINA) indicate trending of thought in this direction, as we slowly catch on to the hazards of a lopsided entry into a new territory of biological information availability.⁵ A major change in public understanding of genetics will be required to fully realize this goal, as this type of medical knowledge has long been portrayed as deterministic and dangerous.⁶

It is clear that new medical technology is making more information available than ever. This calls for a wholesale rethinking of the way we deal with medical information. The Biobank for America takes this to heart and consolidates the 300 million existing biospecimens in the United States to make them accessible, visible, and present in the national public conscious. Considering the changes that have taken place in the past ten years, and the giant leap this type of collection would represent for the country, a total restructuring of the field does not seem quite so impossible. The Biobank consolidates material and data, certainly, but it also articulates a national position on public support for discovery and innovation, and against an old model of counterproductive information economies.

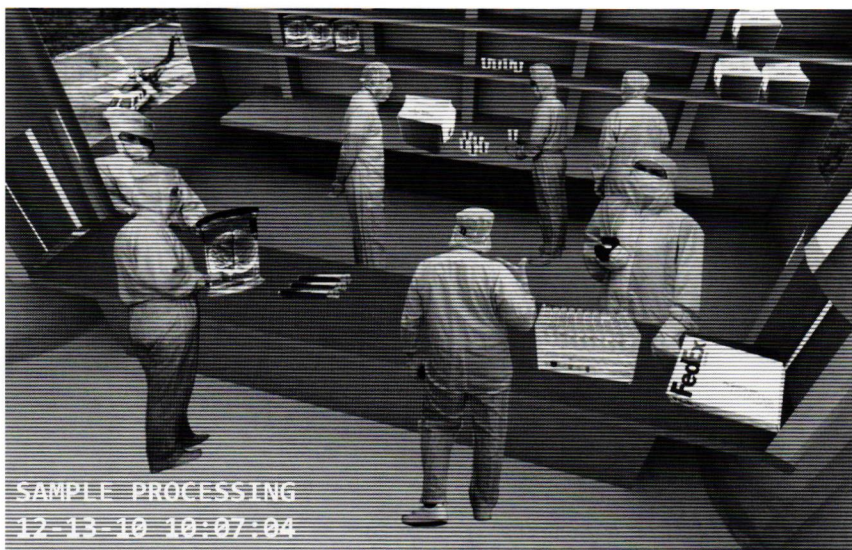


Very few world biobanking projects even attempt to share information or collaborate towards more robust research databases.

Biobank samples are collected throughout the facility and cross-referenced with existing databases.



Samples brought to the Biobank must be sorted, packed, and categorized for archiving.



- 1 Herman T. Tavani, "Genomic Research and Data-Mining Technology: Implications for Personal Privacy and Informed Consent," *Ethics and Information Technology* 6 (2004): 17.
- 2 Robert Wood Johnson Foundation, accessed 18 July 2010. <http://www.rwjf.org>.
- 3 Consider the case of Hasan Elahi, the Rutgers professor and artist who documents his life through photographs and GPS readings, posting this stream online in a quasi-performance-art piece of protest against (and for) government surveillance. See Clive Thompson, "The Visible Man: An FBI Target Puts His Whole Life Online" *Wired* 15, no. 6 (22 May 2007). See also: <http://trackingtransience.net>.
- 4 Jeantine E Lunshof et al, "From Genetic Privacy to Open Consent," *Nature Reviews Genetics* 9 (May 2008): 408.
- 5 "Editorial," *Nature Biotechnology* 26, no. 6 (June 2008).
- 6 For a couple of recent pop-culture examples of the anxiety surrounding what is the predictive nature of genetic sequencing, try Andrew Niccol's *Gattaca* (1997) or Steven Spielberg's *Minority Report* (2003).

Daedalus

Holding Pattern/Problem

Haseeb Ahmed

This installation was commissioned for the inauguration of the MIT Center for Future Children in 2010.

Through a black hole cut in the ceiling of the MIT Center for Future Children enters the wingspan of the human-powered Monarch-B Aircraft (1985) together with a wind tunnel model of the city of Toledo, Ohio (1978) and a Danish drogue parachute (1996).

Ahmed retrieved these deteriorating fragments of once-groundbreaking research from the archives of the MIT Museum. They reappeared at the MIT Media Lab on the occasion of its inauguration to hover over its technocratic vision of the future. By moving and restoring functionality to these forms, the new was made to confront the old with all the force of the artifacts' historical importance as the forgotten objects of technological promise.



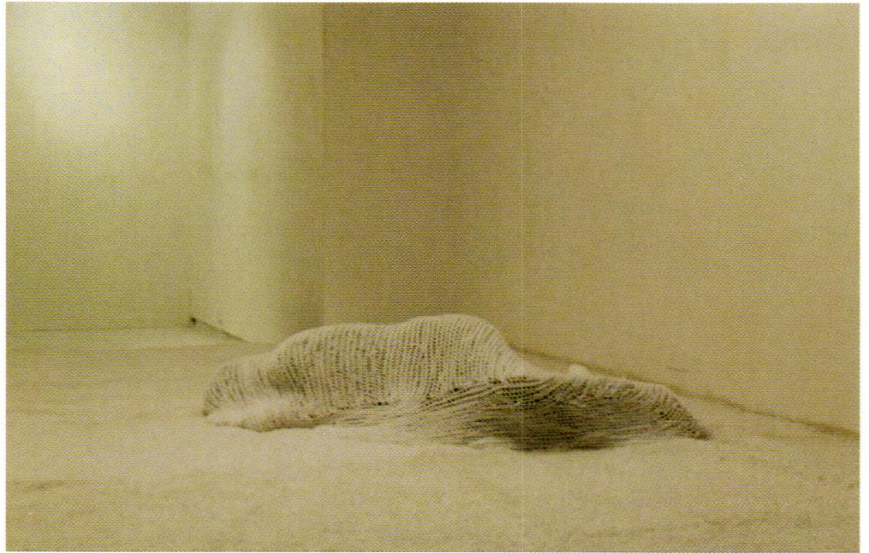
Efface (2008)

Enclose II (2010)

Bea Camacho

TOP: Efface (2008) was a video performance that was produced in Green Papaya Art Projects in Manila, Philippines.

BOTTOM: Enclose II (2010) was performed in the Turbine Hall of the Tate Modern, London.





Containment Building Interior.

Containment Building

Architecture Between the City & Advanced Nuclear Reactors

Lisa Pauli

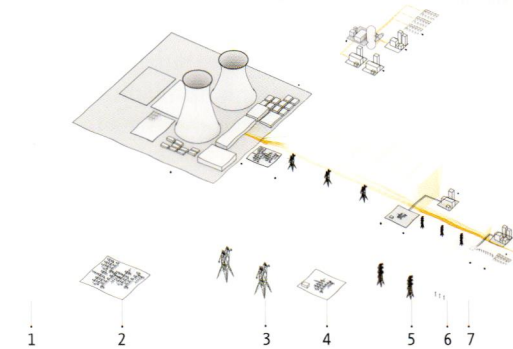
Somewhere in between precedent models of utopian visions of electrified cities and existing nuclear implementations is a means to propose a forward-thinking (if not futuristic) architecture grounded on real, working models of nuclear plants, cities, and military applications.

Since the inception of nuclear energy research, the element thorium (Th) has been considered the superior fuel for nuclear reactions because of its potency, safety, abundance and reduced waste. Cold War agendas, however, broke from the logic of efficient energy production to establish a nationwide network of reactors designed to enrich uranium fuel for a nuclear arsenal, leaving nuclear energy with only one fuel option. Contemporary dilemmas of global warming, increasing fuel prices, carbon emissions, and anti-proliferation movements have brought the discussion of clean, safe nuclear power to the forefront of American energy policy. It is no longer tolerable or sustainable to rely on a uranium (U) nuclear network.

Containment Building is an architectural response to nuclear technological advancement that challenges historical separation between nuclear power and the public. It is a radical proposal of a self-sustained, thorium-powered nuclear plant sited in and powering New York City. It is an active nuclear campus that programmatically and urbanistically engages the public and contains radio isotope labs, a nuclear medicine and imaging facility, a food irradiation center, a wellness hotel and spa, an electric taxi charging station, and a plug-in park along the Hudson River waterfront. *Containment Building* is a test site; it confronts the public's nuclear apprehensions with adjacency, and responds to misconceived fear with undeniable benefit.

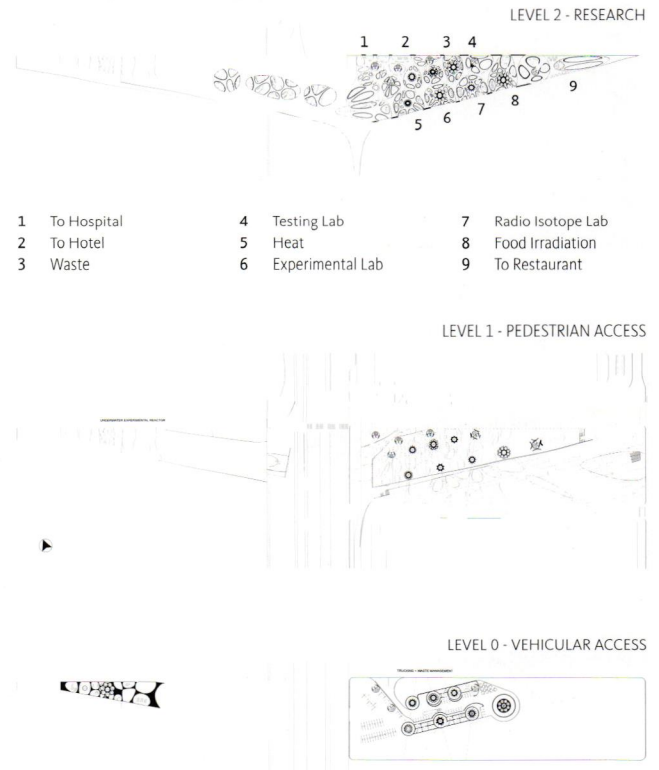
The eight reactors on the site are coupled to provide one fifth of New York City's total consumed energy. By concentrically arranging program around each of the eight reactors

Uranium Reactor and Electricity Transmission Lines



- 1 Electricity generated from power plant.
- 2 Transmission substation at power plant. Voltage increased from generator 2300-22,000 volts to the amount needed to travel long distances: 230,000-345,000 volts, sometimes 765,000.
- 3 High-Voltage transmission lines carry power to city (up to 300 miles).
- 4 Electricity enters NYC at 345kv, 138kv, or 69kv.
- 5 Stepped down at area substation to about 13,000 volts to underground grid.
- 6 Inside building: a service panel controls building's power distribution to individual apartments.
- 7 Power leaving street transformer travels on secondary feeder, in and out of manholes and through a service box before hitting a specific building.

Containment Building Plan

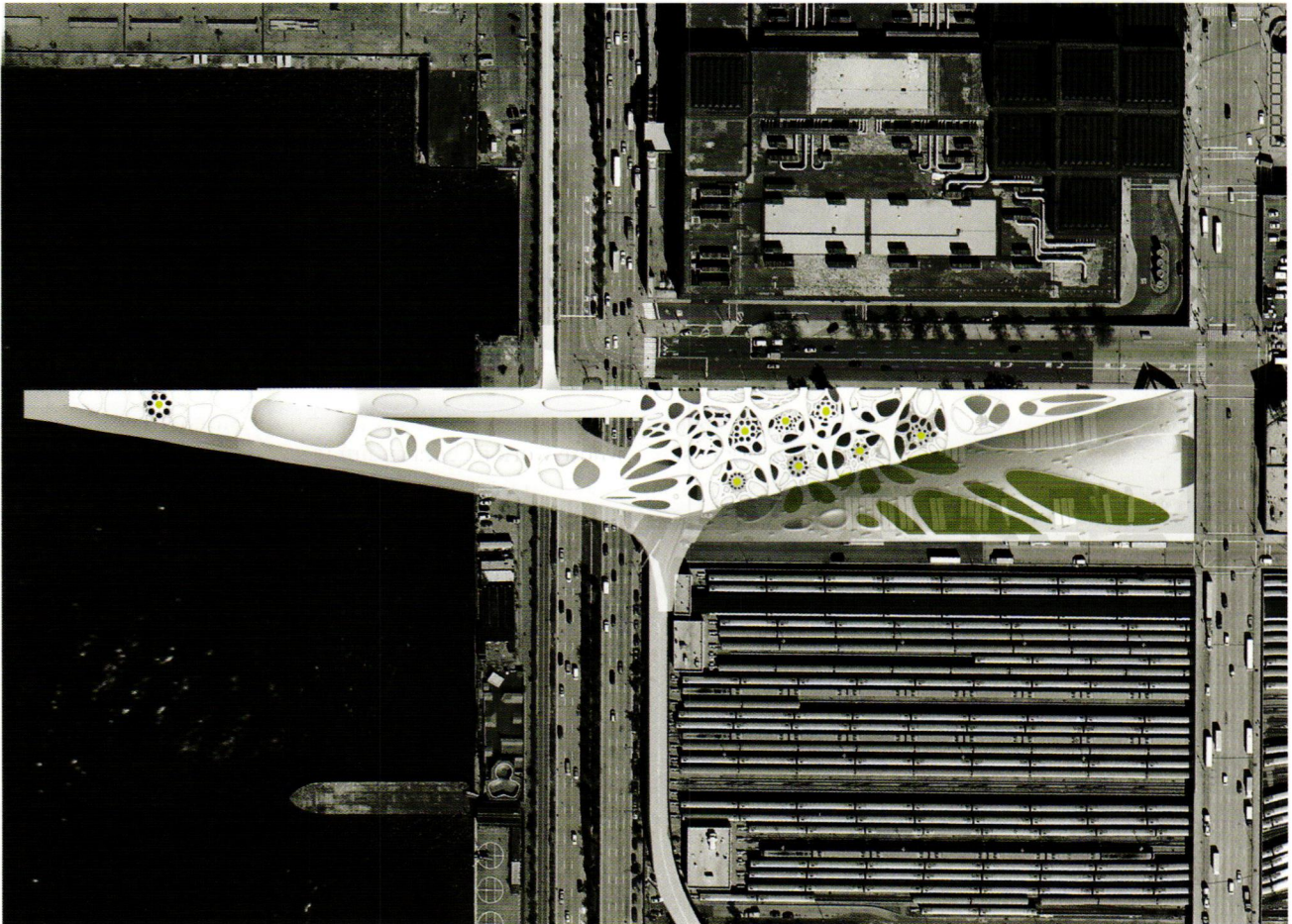


on site, a maximum circumference exposure to the reactors is achieved. In turn, nuclear-reliant programs such as nuclear medicine, nuclear imaging, and food irradiation have direct access to the reactors. Concrete bundled tubes house the reactors and nuclear programs, insulating vulnerable reactions from the public while providing structural support for the overall building.

As we venture into the next few decades, generation IV reactors utilizing hyper-efficient fuel in safe and compact containment structures will dot the landscape, making today's antiquated, disaster-prone uranium-fueled reactors obsolete. The abundance of clean, carbon-free nuclear energy resources will transform the way people and industry consume electricity. Mass produced units will power facilities and communities of countless configurations of electricity demands and terrain variations. *Containment Building* is an exploration of the urban nuclear typology. People will

utilize the structure for work, play, wellness, and day to day infrastructural dependence. Electrical abundance will flow into the public way, offering sporadic instances to power mobile devices or vehicles. Heat from reactors will branch into the streets in an underground network, warming the streets and planting heat-steam outlets around the site. Year round and free of charge, people will warm, cook, or simply relax under the constant-temperature heat outlets.

The massive *Containment Building* is the host for newly developed interactions. The nuclear and radiological proximity unveil connections between production and consumption and celebrate its dispersion, marking its users with a stamp of technological progress. With city power generation at the cores, nuclear science and medicine is advanced in a place where the public may enter and meander while learning about the sciences that power their everyday lives.



BIOS

Haseeb Ahmed's practice binds together antagonistic elements from the world they share. Towards this end, he mobilizes historical, technical, and artistic processes to produce site-specific installations, discrete and designed objects. His research-based art practice straddles architecture, curatorial practice, and critical theory. Ahmed is a founding member of the political group Platypus. Currently Ahmed is a research fellow in fine arts at the Jan van Eyck Academie, Maastricht, Netherlands. He holds a Master of Science in Visual Studies from MIT and a BA in Visual and Critical Studies and a BFA in Architecture and Sculpture from the School of the Art Institute of Chicago. Originally from Toledo, Ohio, Ahmed has exhibited work in Germany, Ecuador, Switzerland, Israel, Turkey, and the United States, including the Museum of Contemporary Art, Chicago.

Bea Camacho (b. 1983, Manila, Philippines) is a visual artist who works with installation, video and performance to explore ideas of distance, absence, memory and loss, often in relation to family and home. Camacho received her BA in Visual and Environmental Studies from Harvard University, where she was awarded the Albert Alcalay Prize for Outstanding Work in Studio Art and the David McCord Prize for Achievement in the Arts. She was selected as an exhibiting artist for the 2006 Asian Contemporary Art Week in New York City and for the 2009 International Women Artists Biennale in Incheon, Korea. Her work has been shown in several institutions, including the National Museum of the Philippines, Metropolitan Museum of Manila, Cultural Center of the Philippines, Hong Kong Cultural Center, Kyoto Art Center, Triennale di Milano Design Museum and the Tate Modern.

Jimena Canales is Associate Professor in the Department of the History of Science at Harvard University, specializing in the history of physics and astronomy and contemporary cultural theory. She is the author of *A Tenth of a Second: A History* (Chicago University Press, 2010) and numerous articles on the history of science, architecture, film and visual technologies. Recent publications include "A Number of Scenes in a Badly Cut Film: Observation in the Age of

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Joseph Taylor lives in Oregon and teaches environmental and western history at Simon Fraser University in British Columbia. His first book, *Making Salmon* (University of Washington Press, 1999), on the history of the Pacific Northwest salmon crisis, won the George Perkins Marsh Prize in 2000. His latest book, *Pilgrims of the Vertical* (Harvard University Press, 2010) won the National Outdoor Book Award for history and biography. He is currently finishing a book on the role of historical analysis in environmental advocacy and management.