Sensing Changes

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NATURE | HISTORY | SOCIETY

Sensing Changes

Technologies, Environments, and the Everyday, 1953-2003

JOY PARR

http://megaprojects.uwo.ca
with new media by Jon van der Veen

FOREWORD BY GRAEME WYNN

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In grateful memory of

Athnasios (Tom) Asimakopulos (1930-90),

McGill University economist,
enthusiast,
whose teaching of theory made us attend,
first and last,
to the assumptions
through which we simplified the material world.

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FOREWORD

"Now I am Ready to Tell How Bodies Are Changed Into Different Bodies"

Graeme Wynn

In 1933, the London firm of Chatto and Windus published *Culture and Environment* by Cambridge don and literary critic F.R. Leavis and poet Denys Thompson. Remarkably, this little book, addressed to school teachers, was intended to ensure the survival of English life and literature. Ultimately, it reflected early interwar concerns about the increase in leisure time and consumerism, anxieties over the meaningless nature of modern work, fretfulness about the general public's incapacity to engage in positive forms of recreation, disquiet at rising levels of unemployment after 1929, and a critique of industrialism voiced by Matthew Arnold in the nineteenth century. On the face of it, however, *Culture and Environment* was an attack on the enemies of good taste and sensibility – "films, newspapers, advertising – indeed, the whole world outside the class-room" – and an assertion that "it is on literary tradition that the office of maintaining continuity must rest."[1]

Leavis and Thompson accepted that literature was only a substitute for experience, but in the circumstances of the times they regarded it as the best hope for the future. Their book opens with a lament for the loss of an earlier England, for "the organic community with the living culture it embodied." In their view, "folk-songs, folk-dances, Cotswold cottages, and handicraft products" were "signs and expressions of something more: an art of life, a way of living, ordered and patterned, involving social arts, codes of intercourse and a responsive adjustment, growing out of immemorial experience, to the natural environment and the rhythm of the

year." There was a time, in other words, when "English people did once have a culture" but it had been destroyed by the machine and all that it brought with it in the way of standardization and levelling-down. This, said Leavis and Thompson, had produced a loss of oral tradition, and of "the memory that preserves the 'picked experience of ages,'" since it had debased words, emotional life, and the quality of living. There could be no going back, but literature could substitute for talk, foster the remembrance of things past, and sustain the sense of "something more."

There is a mythic quality to this history, and the logic of the argument it seeks to advance is weak. So Raymond Williams has pointed out that this picture of olde England ignores the "the penury, the petty tyranny, the disease and mortality, the ignorance and frustrated intelligence" that marked earlier times. Likewise, literary scholars have wondered how to square the circle in the argument that literature maintains tradition because "the vigour and potency of words" depends upon their association with tradition when the tradition to be maintained is dead.[2] But the book's ideas had consequences, not least for a young Manitoban studying at Cambridge in the mid-1930s. Marshall McLuhan soon fell under the influence of F.R. Leavis and his wife, Q.D. Leavis. From them he came to understand that "practical literary criticism could be associated with training in awareness of the environment," and to see writing as a response to different reading publics. *Culture and Environment,* concludes Marshall McLuhan's biographer Philip Marchand, "helped nudge ... [him] away from being a purely literary critic ... to becoming a student of society and eventually the media."[3]

From these beginnings McLuhan shaped an intellectual position that made him a world-leading figure in the study of popular culture and communications media. A critical element of McLuhan's developing thought lay in the distinction he drew between visual and acoustic space. On this account, visual space is a concept, a construct of the eye, a space demarcated with vision. It is typically regular and static, it encourages a linear way of thinking, and it has long been the dominant mode by which educated members of Western civilization have apprehended the world. Acoustic space, by contrast, is a percept – unenclosed, dynamic, and interactive. It lacks a primary centre and is distinguished by the inclusivity and simultaneity, the "allatonceness" (to borrow McLuhan's term), of its resonances.[4] The distinction between concept and percept is important here, and helps clarify the fundamental point at issue. For McLuhan, concepts are detached systems that neutralize participation by explaining the world; they distance people from objects by encouraging passivity and

producing inventories. Percepts, by contrast, are participatory and engaged; they elicit feelings and draw upon the full range of senses – smell, sound, taste, and touch, as well as sight. "Perception is mercurial ... instantaneous, boundless, and involving. Conceptualization is static, repetitive, detached, and self-enveloping."[5]

All of this warrants reprise because it provides a valuable platform for the contextualization and deeper appreciation of *Sensing Changes*, Joy Parr's perceptive exploration of local peoples' embodied understandings of the mixed set of environmental and technological changes that affected everyday lives in different parts of Canada after 1945. Like Parr's previous books, *Labouring Children*, *The Gender of Breadwinners*, and *Domestic Goods*, *Sensing Changes* challenges readers to think again about the frequently taken-for-granted.[6] How, she asks, do people know their worlds? And how do changes in those worlds affect their being? Adopting a firmly materialist perspective, and maintaining a resolute focus on technologies, environments, and everyday practices, she argues that experience – physical, embodied, tactile, textured, sensuous experience – precedes the symbolic construction of meaning through thought or language in the process of understanding the settings and circumstances of human lives. In other words, Parr urges us to recognize that people make sense of the world "directly through their sensing bodies" and that "human bodies are conditioned by the circumstances of time and place" (8). In these pages, bodies are multifaceted instruments registering the sights, sounds, smells, touches, and tastes through which people develop their awareness of the world, they are storehouses of phenomenological knowledge about places, and they are laboratories for experiment and adaptation in reaction to change. In bringing us to our senses, so to speak, this book offers a fresh perspective on the past.

Writing early in the twenty-first century, Parr self-effacingly suggests that this perspective should be easy enough for historians and geographers to accept, because they are engaged in "fundamentally contextualizing crafts, committed centrally to recuperation of elements once common sense, relationships enduring in the place and now passed out of mind" (8). But I am less certain, and less sanguine, especially in considering these ideas against the canvas of past practice in these disciplines. Both, it seems to me, have strong concept-ual pedigrees built upon their commitment to the assumptions and structures of visual space and their embrace of what the historian of sound Mark M. Smith once called "an Enlightenment conceit with visuality."[7] In practice if not by explicit precept, generations of historical scholars honoured the conviction, expressed by Joseph

Addison in the English magazine the *Spectator* early in the eighteenth century, that "OUR sight is the most perfect and most delightful of all our senses."[8] Into the late twentieth century at least, most historians seemed comfortable portraying bygone times through the eyes of historical actors (whose apprehension of events was, of course, generally retrieved from written or, in McLuhan's terms, highly visual records), and drawing upon the works of photographers as "illustrations" to offer "an unwittingly visualist representation of the past."[9] Indeed, one might still harbour the suspicion that initiating a conversation about a study of the senses is quite likely to be heard and understood by colleagues as a proposal to study the census.

Geographers, with their emphasis on space, place, and the look of the land have been as resolutely committed as any group of scholars over the years to working within the visual space paradigm. Much of the discipline is devoted to "visualizing," whether through maps, diagrams, charts, and other image forms, through fieldwork intended to develop "an eye for the country," or through the practice of geographical synthesis or seeing together the constituent elements of a scene or landscape. Indeed, Denis Cosgrove authored a series of elegant and cogent contributions associating geography's visual bias with the discipline's embrace of the landscape idea, equating the geographers' use of the concept of landscape with Western traditions of landscape painting, and arguing that this way of seeing worked to entrench notions of objective knowledge and visual authority.[10] According to one of its practitioners, who perhaps chafed a little at this realization almost thirty years ago, "Geography is to such an extent a visual discipline that, unique among the social sciences, sight is almost a prerequisite for its pursuit."[11]

Now back to McLuhan, who understood as well as anyone that things are not fixed. One import of his well-known formulation, "the medium is the message," is that each medium "impose[s] its own spatial assumptions and structures" on consumers. From this it follows, as Richard Cavell has noted in his study of McLuhan as a spatial theorist, that "visual space was only one kind of space, and [that] as electronic media brought the other senses back into analogical interrelationship, other sorts of spaces would come (back) into being, spaces that would be dynamic and interactive."[12] In recent years, new media – the Internet, search engines, social networking sites, and, more darkly, various forms of digital surveillance – have produced a tsunami of change in intellectual and everyday life. We now live in something rather akin to acoustic space, in a world that is increasingly global, inclusive, and synchronic, and this has (as McLuhan anticipated) begun to

transform world views, scholarly practices, and customary patterns of behaviour.

The term "multitasking" has jumped from the black box of our computers (where it describes the process of context switching, or rapidly reassigning a CPU [central processing unit] from one task to another) to daily life (where it marks the allocation of CPA [continuous partial attention] to a rapidly rising tide of information and responsibilities). Classrooms (and learning and knowing) have been transformed as rigid rows of seats have given way to flexible configurations; "sages-on-stages" have been superseded by "guides-at-the-side"; dispersed, student-centred learning has replaced the linear transmission of information; podcasts available anywhere, anytime threaten the static (fixed in time and space) gathering "in class"; and service learning is embraced, in part, because it replaces the linear inflexibility of traditional teaching with dynamic, collaborative, communal engagement.

Academic practice, scholarship in the disciplines, has also felt the impact of these changes. Indeed, the very traditional idea of disciplines (demarcated, defined, fixed) is weakening as interdisciplinarity has become a watchword and boundary-crossing a norm. In recent years, many geographers, influenced by deconstructive impulses to question taken-for-granted assumptions and to ask how and why particular interpretations become accepted, have grown critical of the Cartesian (or visual) emphases of their field (in terms McLuhan would have understood) as linear, mechanistic, nationalistic, and fixed and have sought a more multifaceted, inter-relational, discursive understanding of the contemporary world.[13] History, too, has responded to these influences as practitioners have redefined their aims, probed new dimensions of the past, adapted new research methodologies, and experimented with new forms of presentation reflecting the concerns of our times. But however moved they may be by their existence in acoustic space, historians studying what are, in the main, visual-space times have generally found it difficult to bridge and reconcile the two worlds.

Of course things are neither as neat nor as simple as this brief sketch suggests. Thought-provoking as McLuhan's division of the past into visual and acoustic spaces may be, it is ultimately as vulnerable to qualification and question as Leavis and Thompson's "then and now" portrayal of English history. Both depend upon mythopoesis, the invention of a narrative to explain how the world and humankind reached their current state. And both necessarily fail to acknowledge that the enormous and varied *complexities of our naughty world constantly wriggle beyond, and escape,*

our efforts to wrestle them into neat categories.[14] Precursors and reactionaries, prophets and visionaries complicate straightforward narratives to the point of undermining their coherence. Hidden riffles, and little islands of thought, create eddies and swirling currents in the braided and ever-contingent stream of time. All of this is to say that tempting (and not entirely inaccurate) though it may be to associate *Sensing Changes* with the inception of acoustic space (because it offers a more holistic view of the past than much earlier scholarship, hybridizes "oral and literate modalities," and articulates what McLuhan called an "integral awareness"), to do only this is to short-change both Joy Parr's achievement and the contributions of other scholars whose influences are registered in the pages that follow.

A few years ago, the appearance of a new journal announced a "sensorial revolution in the humanities and social sciences," but however dramatic this upheaval, its influence upon the writing of history in North America remains limited.[15] Early in the 1990s, sixteen textbooks treating twentieth-century US history were found wanting in any "analytically significant" discussion of the "smells, tastes, sights, sounds, and tactile sensations" of the past.[16] Fifteen years on, a survey of Canadian texts would yield no different conclusion. From the spate of historical research monographs that have appeared in the last decade or so, one can draw a slightly fuller shelf of works engaging the senses, and environmental historians have begun to examine what Linda Nash calls the "inescapable ecologies" imbricated in the relations between human bodies and the world beyond their skin.[17] In Canada, however, such pickings are still thin.

Against this backdrop, *Sensing Changes* stands as a pioneering contribution to Canadian historical writing. Through half-a-dozen carefully chosen, closely textured case studies, Parr reveals the "gritty specificity" of history as she unfolds an argument for the importance of understanding how bodies adapt(ed) to changing times, places, and practices. Each of her local narratives centres on peoples' responses to relatively dramatic alterations in their natural and/or built environments and on the ways in which these changes produce a cognitive and cultural reordering of the ways in which they understood and behaved in place. Together these accounts demonstrate how the patterns and practices of everyday life form an intricate tapestry of threads drawn from the social, technological, environmental, psychological, aesthetic, and other realms that regrettably remain all too separate one from another in the work of scholars trained to comprehend the world from within the particular perspectives of a particular discipline.

The robustness of these distinctions is often surprising. Even within single fields of endeavour, practitioners with different interests seem to march guardedly side by side more often than they appear to walk gleefully arm in arm. Journals mark out sub-fields and contributors use their pages to talk to others who self-identify as fellow travellers. Occasionally, authors from one realm enter another to lament the lack of more active engagement between them. So social historians, historians of science, and historians of technology have danced wary courtships with environmental historians (and vice versa), but the various houses have yet to be formally united. Still, at some slight remove (and with seemingly unavoidable recourse to a metaphor forged in visual space), the separate fields of endeavour merge into a broader landscape, the vitality of which rests upon the effective integration of its constituent elements.[18]

In this long view, it is clear that *Sensing Changes* has varied and interesting antecedents (some of them in parts of the landscape far from the section labelled "history") and a good deal to contribute to the understanding of modern Canada. Anthropologists, who have by and large led work on the senses, at least in the social sciences and humanities, sometimes trace the beginnings of their interest in the topic to Mary Douglas whose *Purity and Danger,* published in 1966, argued that the body and its parts "afford a source of symbols for other complex structures." Following this lead, others explored the symbolic roles of bodily functions and forms across cultures, but as David Howes, director of the Concordia University Sensoria Research Team in Montreal and the general editor of the Sensory Formations book series, has noted, "most of this work ... was curiously desensualized." Only since the early 1990s has the anthropology of the senses become a significant and discrete field of scholarly endeavour.[19]

Historians can push the roots of their discipline's interest in the senses even further back in time. In 1947 the *Annales* historian Lucien Febvre devoted a section in *Le problème de l'incroyance au XVIe siècle. La religion de Rabelais* to a discussion of "Odeurs, saveurs et sons" (Smells, Tastes, and Sounds), and a decade and a half later Robert Mandrou included a discussion of the senses, including a history of hearing loss, in his *Introduction à la France Moderne: Essai de psychologie historique 1500-1640*.[20] In a similar vein, Annaliste Jacques Le Goff, writing in 1960, distinguished church time from merchants' time in medieval Europe.[21] More recently, Alain Corbin extended these beginnings with rich and finely shaded studies of smells and sounds in the French countryside.[22] Most of this work had little influence on scholarship beyond France until it was translated in the last quarter of the twentieth century. For those working in English,

E.P. Thompson's landmark 1967 account of the ways in which those caught up in the web of early industrialization developed new forms of time-consciousness and offered a persuasive (but not initially widely accepted) invitation to think more about "how individuals experienced, understood, made sense of, and invented their environments and themselves" by demonstrating how time was understood bodily, how it was communicated through sound as well as sight, and how it was reconfigured by precepts intended to alter familiar practice.[23] These works stand as precursors to *Sensing Changes* but, rooted in anthropology and social and cultural history, none goes as far as this book in linking the theoretical literatures on embodiment with the concerns of environmental history and science and technology studies.

What, then, does Parr's work add to our understanding of modern Canada and ourselves? First, by recounting the metamorphoses of people and places across the country (and thus giving substance to the opening lines of Ted Hughes' translation of *Tales from Ovid*: "Now I am ready to tell how bodies are changed / Into different bodies"),[24] *Sensing Changes* forces readers to recognize that lives skinned of memory are lives skinned of meaning.[25] Time and again, Parr's case studies demonstrate how transformations in the settings and practices of everyday life alter the ways in which people know themselves, their place, and their work. Ready though we are to accept that traditional knowledge is local knowledge and that relocating those who depend upon such understanding is, in effect, asking them to live their lives in a radically foreign tongue (with all of the stumbling and inaccuracy and incomprehension implied by that), we often forget the vital reassuring benefits of the place attachment, or familiar comfort with setting, that many people develop in relatively short order. As the waters rose behind the Long Sault Dam on the St. Lawrence Seaway in early July 1958, one resident of the area turned to his tearful wife and said simply, tenderly and affectingly: "There goes our youth."[26] Much is lost when the past is shaved from the landscape or when familiarity is filed away by change or displacement. By acknowledging this, Parr reminds us of the price paid by those left lamenting losses, looking back in anger, reminiscing with longing, or building up the "sensory calluses" required to move on: in doing so, she reaffirms the profoundly humanistic warrant of historical scholarship.

A second recurrent, if implicit, theme here is that modern-day Canadians have rarely counted the full costs of their society's enormous technological capacity to alter the environment, or of its collective commitment to industrializing nature in the name of progress.[27] As in the Arrow Lakes

district of British Columbia (the subject of Chapter 5), those whose accidental plight placed them in the path of development schemes have often found themselves dismissed as "people in the way" of important projects and their interests discounted as impediments to growth or obstacles preventing the satisfaction of larger, pressing societal needs. This story assumes particular poignancy when state-driven megaprojects force the dislocation of people from their home-places because such actions raise questions (as the title of Chapter 2 suggests) about place and citizenship. But other imperatives, operating at different scales, provide many heart-rending counterparts to tales of displacement by officially orchestrated development schemes.

Environmental as well as human costs have typically been missing from or discounted in the "balance sheets" of these various projects, and the third contribution rendered by Parr's integration of disciplinary perspectives in *Sensing Changes* is an encouragement to think anew about discussions of sustainability and resilience in Canada and elsewhere. To date, much of this discussion has focused on the economic and environmental dimensions of sustainability; social sustainability, the third leg of the sustainable development stool defined by the Brundtland Commission in 1987, has proven more difficult to grasp. But Parr's discussions of the effects of displacement on individuals and communities are an invitation to think harder about human resilience and social sustainability. By standard economic and environmental measures, the settlements of Summer Hill and Lawfield Road, evacuated to establish the Gagetown military base, were settlements of poor people on poor lands. Yet these settlements were rich in shared experience, community leadership, and mutual aid, and those who lived in these places had a sense of belonging that sustained them, and made them resilient against long odds – at least until they no longer had access to the communities to which they belonged.

Parr also gives us an arresting clarion call from the other side of the country from the pen of Donald Waterfield, author and farmer along the Columbia as it was turned from river to reservoir. Commenting on the 1956 Report of the Royal Commission on Canada's Economic Prospects, he asked, "Have we become so confused by the complexity of modern economics that we can no longer distinguish between good and bad?" Were Canadians blind to the "'aesthetic value' of working to live rather than working to produce, when 'beyond the acquisition of bare necessities, we all have food, clothes and shelter, and most of us, entertainment as well'"? Here and in other writings, Waterfield called into question the view of development described by the environmental historian Donald

Worster "as a single cultural standard against which all people could be measured."[28] It was Waterfield's great insight to counsel moderation rather than "unlimited materialism and accumulation" and to advocate stewardship rather than exploitation of nature (118). Fifty some years on, Waterfield's questions remain pertinent and his intellectual position worth contemplation. Amid rising debate about expanding ecological footprints, declining fossil fuel supplies, and the wisdom of eating locally produced food, it is good (and humbling) to remember that we are not the first to walk this line of argument.

Fourth, let it be said that *Sensing Changes* is a beginning rather than an end and a methodological as well as a substantive contribution to the Canadian literature. By asking new historical questions, it illuminates important and neglected aspects of the past. Other facets of the story that Parr has outlined beg investigation, and their interrogation will raise new questions about the ways in which history is practised. Because here it must be noted that for all its topical and scholarly freshness, the book you hold in your hand (shaped by the constraints of print as a medium) is a methodologically transitional work struggling (as McLuhan might have said) to reconcile its roots in visual space with the concerns of our increasingly acoustic space times. With Jon van der Veen, Parr has sought to address this tension by developing new media explorations of most of the settings discussed in this book (available at: http://megaprojects.uwo.ca). There, oral recordings, air photographs, documents, and other materials are brought together to amplify and extend the limitations of the printed page and allow those who follow the links to come a little closer to experiencing the sites of investigation. But questions remain: Can we ever hope to hear and smell and touch and taste the past? Can we apprehend bygone eras and lost places as they were sensed by those who lived in them? Indeed, in what sense can we claim (for all of our visualist representations of it) to see the past?

Although *Sensing Changes* focuses for the most part on megaprojects of one sort or another (the building of big dams and nuclear generating facilities, the excavation of ship canals, and the establishment of a military training ground), and its final chapter examines a tragic and infamous case of failure by a public utility to ensure the supply of untainted water to Walkerton, Ontario, it would be a mistake to conclude, from these pages, that only such dramatic and disruptive events affect peoples' phenomenological ways of knowing or, indeed, that changes in embodied practice are always negative or traumatic. Parr's aim is to revise and modulate our understanding of the past by drawing attention to the ways in which

environmental, technological, and social changes are felt in ways that people know but cannot always tell. Her mandate is not to catalogue all the ways and instances in which knowledge held "beneath the skin" is altered by changing material circumstances (10). Her case studies make her case, and they do so in dramatic fashion. Still, readers must not make of megaprojects the sort of deus ex machina that Leavis and Thompson conjured from industrialization in *Culture and Environment*. Change in one form or another is a staple of history, and people have responded to change intellectually and bodily in countless different ways. They have moved and changed of their own volition as well as under the forced and unanticipated circumstances detailed in these pages. Loss and dislocation have been balanced by hope and adaptation, and the sharp edges of sensed changes have been blunted by mindful visions of new things to come.

None of this is to minimize the sense of loss, the emotional toll, or the sensory assault produced by the silencing of river rapids, the inundation of familiar acres, the waft of the rotten egg smell of hydrogen sulphide across a popular campground, or the erosion of trust occasioned by good water turning bad. But just as "folk-songs, folk-dances, Cotswold cottages, and handicraft products," were not the sum of "olde England," so these instances are but part of the sensory history of Canada. Consider by way of illustration what I take to be one of the more poignant observations in a poignant story about the losses occasioned by the establishment of Camp Gagetown: Eugene Morris' recalled "lost delight in things that have grown under our moulding" (38). And compare this with the affecting lines penned by Charles Bruce, Nova Scotia newspaperman, author, and poet, chronicler of the slow changes that reshaped his imaginary Channel Shore between the great wars of the twentieth century, who wrote, in "Orchard in the Woods," of a place where:

> Red spruce and fir have crossed the broken lines
> Where ragged fences ran ...

In this place "Where oats and timothy" once "moved like leaning water" in the late summer wind, now only "stunted alders and tall ferns" grow. Nothing stands atop the collapsing cellar and a woodchuck burrows beneath "the wreckage of the vanished barn."

> Only the apples trees recall the dream
> That flowered here – in love and sweat and growth,
> Anger and longing.

But in this place, where "Clearing and field and buildings [have] gone to waste" – a hunter heading home in the fall

> will halt a moment, lift a hand to reach
> One dusky branch above the crooked track,
> And, thinking idly of his kitchen fire,
> Bite to the small black shining seeds and learn
> The taste of ninety seasons, hard and sweet.[29]

This small example from eastern Canada, and Parr's six larger case studies from across the country suggest, as the environmental historian Roderick Frazier Nash once observed, that all places are "multi-faceted composite[s] of history, natural environment, and personal experience." In demonstrating this, Parr has moved us to a deeper understanding of the process of place making. By reminding us of the importance of the senses through which people engage their settings and constitute their experience, she has also thrown down a gauntlet for future scholarship: to pay close attention to the ways in which people sense and value places. Doing so, one might hope, could help unlock "the secret to living lovingly and sustainably on this endangered planet."[30]

The Megaprojects New Media Series

Jon van der Veen

Facing each chapter in this book are introductions to the new media projects associated with that chapter's site of study. The entire series, which we call the Megaprojects New Media series, is available at http://megaprojects.uwo.ca. Unlike web resources that serve to echo the findings of a book to an online audience or to provide a residual basin for items that could not be included in the book, the Megaprojects New Media series was conceived of as a parallel path of experimentation and scholarship into new media representations of the accounts of people living amid megaprojects.

Design of the Megaprojects New Media series is informed by my doctoral dissertation research at Concordia University into the culture of the database. In contrast to the notion that web-based media may portend the eclipse of the dominance of the printed word, new media forms are in fact often subtended by databases that follow a textual logic of keyword markers, and this approach has been increasingly applied to the organization of video, audio, and image materials.[1] Even the most forward-looking and intriguing approaches to integrating historical scholarship with new-media practices are modelled after such textually dominated database services as Google search and Wikipedia.[2]

However, the Megaprojects New Media series emphasizes the sensual over the searchable. By keeping closer to the visual and auditory material contexts through which we came to know the accounts of those who were affected by the megaprojects discussed in this book, our new

media experiments aim to effect a more coherent, sensuous, and memorable reclamation of experience than is possible through textual representations.[3]

Rather than approach our evidentiary documents as "entries" to be tagged and granularly re-contextualized into search results, the materials and their accompanying contexts matter: the hesitations registered in the audiotaped voices from Bruce County are not apparent in the transcriptions; the writing Val Morton etched over his old photographs could not be captured by rendering their content in type; the landscape changes around Base Gagetown are uniquely apparent through diachronic image sets; the Iroquois images and the recollections of its citizens are installed as they were remembered, along the street.[4]

These new media projects are available as resources for users to differently experience the sites shared in this book, and they are tentative, practice-based probes towards sensuous new media forms not organized around keywords and search queries.

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Joy Parr

Sensing Changes

1

INTRODUCTION

Embodied Histories

As humans, we live in environments, amid technologies, learning by doing. Our bodies are the instruments through which we become aware of the world beyond our skin, the archives in which we store that knowledge and the laboratories in which we retool our senses and practices to changing circumstances. Bodies, in these senses, are historically malleable and contextually specific. Our senses are the conduits through which knowledge of technology and the environment flow and, through retuning habit and reflex, the ways we habituate to our changing habitat.[1] Most of these adaptations are held beyond speech, often outside conscious awareness.

A decade ago I began to study five mid-twentieth-century Canadian megaprojects and along the way became involved with a Canadian community overtaken by a catastrophic water contamination. As I listened to residents in these six contexts, the focus of my attention was drawn from the megaprojects to the processes by which inhabitants adapted to the habitats the megaprojects had transformed. Local people recounted how these radical changes had unsettled their daily lives and forced them to encounter their environment anew and adapt the practices through which to live competently and sustainably day by day. They described a collective relearning of what to infer was ordinary and exceptional in the winds and the weather; in the lakes, rivers, and native vegetation that surrounded them; in the needs of the crops and livestock they tended; and the aquifers, fish, and woods upon which they depended. These were the interfaces

where their active sensing bodies, through the technologies they used and the practices they deployed, engaged their environment as habitat – as sites of mutual remaking. Human bodies tuned to one world beyond their skin,[2] which once had seemed "the world," by sensing the differences and, sensing differently, retuned to another. They talked about learning to recognize and work with a different "ordinary" beyond their skin, to find ways to adapt this new "natural" to their purposes. Their accounts of these crises of competence and confidence, when the recognition of these disjunctions led them to revise their inferences from sensuous signs and to reconsider effective practice, changed the course of my journey among them. For here, in these radical disjunctures, were researchable traces of human bodies being made contextually, temporally, and spatially specific. As inhabitants incorporated into their bodies the altered world beyond their skins, awarenesses they usually held beyond telling, as habit and reflex, became urgently speakable. This process of habituation to habitat through the tuning of the senses and the honing of habit and reflex is embodiment. In *Sensing Changes*, we encounter embodiment both as active adaptation to changed circumstances and as "the whispering of ghosts," relicts of past successful adaptations to familiar worlds later remade, persisting as familiars, reminders of losses, and also sources of resilience and resources for rebuilding.[3]

This interface between the body and the world has been much theorized,[4] but this theorizing, as Katherine Hayles has noted, has been unchastened by the ornery attrition of instances and is resistant to push-back grounded in the concrete and the corporeal.[5] The balance between universalizing postulates and gritty specificity must be reset if we are to bring research about environments, technologies, and the everyday – turned for a decade towards the different issues of representation, the symbolic, the linguistic, the discursive, and the textual – back towards the materiality and sensuality of direct encounters with the world beyond our skin. By close scrutiny of the environmental and technological change that megaprojects involved and the adaptations among human neighbours these changes required, I aim to capture how the arrival and persistence of the megaprojects remade modes of dwelling and earning a living, the discernment of hazards, and the experience of pleasures at home and at work in time and place. The book you are holding in your hands reports these findings in a conventional textual way. Yet, attempting to communicate through texts, these meanings, awarenesses, and associations, which intrinsically have resisted representation,[6] has been a challenge.

Conventional modes of scholarly publishing are not well suited to this task, nor are many scholars disposed to welcome the implications of the research. Academic traditions are deeply invested in texts and in textual critique as the arbiter of research results.

For this project, these conundrums spawned a parallel path through which to share findings. These new media experiments, a project led by Jon van der Veen of the communications department of Concordia University, aim to convey the embodied histories words alone cannot tell. You may find this Megaprojects New Media series work at http://megaprojects.uwo.ca. Before each new chapter there are introductions to the relevant work available online: the audio and visual presentations, walking tours, chronological archives, geographic information systems reconstructions, music, and videos that are our attempts to more thoroughly reclaim the embodied "lostscapes" residents mourned.

No place is merely local. All of these instances are located within a single national political economy: Canada in the decades after the Second World War. All were implemented along the international boundary between Canada and the United States and, to varying degrees, were responses to the shared North Atlantic political and military climate of the mid-twentieth century. These transnational influences are most apparent in the political influences upon the choice of project sites. Yet the technical demands the succeeding engineering order placed on human residents and on the air, water, soil, fauna, and vegetation upon which they had relied, while locally inflected, reveal challenges that have relevance beyond the particular. While in many nations such large engineering works are now more often questionable and less commonly initiated, their human and broader environmental effects linger in place. And in many parts of the developing world, megaprojects remain essential elements of statecraft. The usefulness of understanding how changing technologies and environments are taken into the habits and practices of sensing bodies, challenging the security of individuals and the viability of their communities, will remain for some time to come.

We begin with cases where the transformations in technologies and landscapes were effected by the large engineering works – megaprojects – common in the twentieth century, and with hinterland residents, those most frequently obliged to cede their habitats to unquestioned priorities of modern statecraft, to power projects, military bases, and transportation infrastructures. The sixth instance, the water contamination, occurred in May 2000 and takes us from the brute force physical disruptions and

population displacements of modernist megaprojects to the environmental and technological challenges to embodied knowledge and local sovereignty likely to be more common in the twenty-first century. This instance hinges on a freak weather event, the intensification of livestock production, and the implementation of science-based regulatory regimes to discern environmental hazards. As with the studies of how the neighbours of twentieth-century megaprojects learned how to cope with unbidden technological and environmental change, so the twenty-first century Walkerton case is a Canadian instance with wider resonance and relevance.

Because the historical study of embodiment is relatively new, and the cases and places here will be unfamiliar to many readers, some conceptual and contextual introduction is in order. This chapter makes the case for embodiment, specifically corporeal embodiment, as a historical process. While in some cases language is the filter that organizes perception (this is embodiment as a figure of speech, as it was commonly employed by literary scholars and some historians during and after the linguistic turn of the late twentieth century), often we know directly by sensing and doing, by corporeal embodiment. We make meaning by doing and organise our awareness and skill through bodily practice. The body is a synthesizing instrument that defies the categorical and linear discipline of language and science. The environments and technologies with which we live, play, and work lead us to develop specific modes of bodily attention and perception. This tuned reciprocity among body, environment, and technology has historically allowed humans to feel at home, competent, and safe. Creating environmental histories and histories of technologies, which borrow more prodigiously from sensory history, attending explicitly to these sensuous adaptations and the habits that organize them into practice, captures both the challenges and possibilities posed by changes in habitat and technique.

Chapter 2 concerns the Canadian Forces Base at Gagetown, New Brunswick, which is set back from the Saint John River, near the Atlantic seaboard and just north of the US border. It was established during the Cold War to train NATO troops. The base took up on 958 square kilometres of developed meadows and timber lands created over several generations by Protestant Loyalists, refugees from the American Revolution, and Catholic Irish families fleeing the potato famine. The inhabitants who had made the wood lots and farms ceded lands they had never intended to sell. Thereafter, many were employed on the base, some using Agent

Orange to clear mazes for tanks and training grounds for infantry. The residents' departure was traumatic and, we now know, wrought grave health effects on local nature, both human and non-human. The chapter investigates the making of timber lands and Jersey herds, their unmaking to accommodate the base, and the subsequent remaking of local religious and language identifications when the British Dominion for which residents had been willing to make sacrifices was reconstituted as a bilingual and multicultural Canada. Their music and crafts are chronicles of their displacement. We have also created a series of representations using air photos linked by geographical information systems (GIS) to show the changes in land use and topography that preceded and followed the development of the NATO base.[7]

Two sites – the Bruce Generating Stations on the eastern shore of Lake Huron in Ontario and the Point Lepreau station near the Maine border in New Brunswick – are the locations for Chapter 3. This is a study of how embodiment figured within a nuclear occupational health and safety regime. The workers at these generating stations, mostly men, came to nuclear work from farming, forestry, fisheries, chemical industries, and shipyards – occupations in which the signs of danger were physical. They learned to adapt to work in the radiation fields of nuclear generating stations by reading instruments, attending to proxies for insensible dangers, and modifying their gait and posture to stay within the registering range of their instruments. Canadian radiation protection practices are singular among early nuclear sites in their non-hierarchical work rules. Each employee was responsible for his own safety. Each learned the theory of ionising radiation so as to infer, from the measurements his instruments registered, the bodily practices to keep himself safe. These physical habits and reflexes substituted for the somatic signs of their former workplaces and for the military discipline in nuclear generating stations in the United States and Europe. The elements in the design of Canadian stations, which accommodated these work routines, are part of the story. Another part, less readily apparent in the textual transcripts of the oral histories than audible in the hesitations, repetitions, and intonations of the digital sound records, is the bodily retuning to signs of danger and safety by which men adapted to this technological transformation in their occupation. We have tried to capture some of this sensory information, lost in the transcriptions,[8] through four sound compositions.[9]

Iroquois, one of eight Ontario villages dislocated by the Seaway, is the focus of Chapter 4. First a Loyalist settlement and then a mill village that

attracted textile workers from Quebec, Iroquois was the first village to be remade to make way for the St. Lawrence Seaway and hydro-electric projects in 1958. Some wooden houses were moved back the short distance to the new village. Before the inundation, Iroquois' mature hardwood trees were cut down. In the interests of unimpeded navigation, the masonry structures of the village were burned and then reduced to rubble. Those who had lived in brick and stone eighteenth- and nineteenth-century dwellings moved into 1950s bungalows. The three-storey commercial buildings were succeeded by a small plaza, the Victorian churches replaced by 1950s contemporary brick structures. The International Rapids, the sound mark of the old village in all seasons, was silenced, the roaring river replaced by a placid shipping channel behind a series of dams. The much valued fishery ended. This settlement of walking mill workers was remade as a suburb/village, a treeless built environment designed for the car and the commuter. This chapter is about bodies oriented by sound in space and by the scale of built structures. The new media work associated with this chapter consists of three audio walks of the village as it existed before the inundation.[10]

In 1968, the closing of the High Arrow Dam at Castlegar on the Columbia River in British Columbia turned the Arrow Lakes, narrow mountain bodies of flowing water with a nine-metre seasonal variation in levels, into a storage reservoir for the Bonneville Power Authority. The twenty-one-metre difference between full pool and maximum draw down occurred in response to a US utility's demand for electricity. This is the site for Chapter 5. Most valley residents had lived by combining work in the formal and informal economies, logging, ranching, fruit growing, market gardening, dairy, poultry, and sheep-raising. They lived well but were scorned by resource planners of the 1960s as "stump farmers" insufficiently attuned to the "highest and best use" of their home places. The reservoir flooded the rich bottom lands and the transportation infrastructure of the valley. The movement of water, by which residents had judged distance, direction, and depth in their shoreline habitat, changed from a flow to a radical rise and fall, alternately flooding and exposing an arid wasteland. In this industrialized and colonized environment, many described losing their sense of place and their sense of self. Among these were a family of market gardeners, a writer and mixed farmer, and a rancher. The new media work associated with this chapter chronicles several peoples' lives and land with photographs and video and an account of rancher Val Morton's years on the ranch in his own voice and handwriting.[11]

Chapter 6 is a study of the regulatory decision making that closed a beloved Ontario shoreline park to accommodate a large chemical plant, and of local responses to this emerging hazard. The plant emitted hydrogen sulphide, a gas benign at low concentrations, when it can be smelled, and potentially lethal at high concentrations, when it extinguishes the sense of smell by killing olfactory cells. The chapter explores how somatic, scientific, and topographic constraints (a coastal place of strong and seasonally variable winds contained and directed by a nearby steep ancient shoreline) influenced the decision making of campers, cottagers, a pastoral family, and the scientific staff of the federal and provincial regulators. The audio compositions about danger and nuclear work linked to Chapter 4 also include material gathered from pastoralists and cottagers recounting their growing sense of danger amid uncertainty in and near the park.[12]

We move into the twenty-first century with the case discussed in Chapter 7. In Walkerton, Ontario, unprecedentedly heavy spring rains falling in May 2000 on fields underlain by permeable limestone karst carried surface runoff containing *E. coli* 0157 H7 from cattle manure into a shallow unprotected well, contaminating the drinking water of the town. Seven residents, all elders and children, died of the effects of acute gastroenteritis, and half of the four thousand people in Walkerton that holiday weekend became ill. Many have suffered lingering physical health effects. Walkerton was one of many Canadian communities in which popular suspicions of chlorination made municipal evasions of mandated drinking water quality guidelines acceptable and commonplace. Contemporary neoliberal cost-cutting reduced the effectiveness of regimes whose purpose was to protect public health across the country. Events in Walkerton exposed the grave inadequacy of local ways of judging the safety of water; they revealed how climate change might cause long established agricultural practices to become hazardous; and they made apparent the challenges that increasingly dense human and animal populations sharing a watershed posed to the environment and to health. The new media work associated with this chapter draws on the Walkerton Inquiry transcripts to feature the shifting contexts and meanings of selected utterances such as "good water."[13]

The Conclusion revisits the theme of historically specific bodies. Most historical studies of the consequences of large-scale environmental and technological change focus on property losses and effects upon physical health and employment opportunities. This framing leaves "the people in

the way" with "no place to put" the disorganization they experience in their sensuous judgments, habitats, and workplaces. The grief for which they could not find words is often dismissed as nostalgia. At the end of the Conclusion there is an epilogue that brings together accounts of how many in these sites have dealt with this estrangement by action-oriented projects.

"Embodied history" is a term Pierre Bourdieu used to invoke the "active presence of the whole past ... internalised as second nature and so forgotten as history."[14] The idea is not new. In the mid-nineteenth century, Marx had argued for "the forming of the five senses ... [as] labour of the entire history of the world down to the present."[15] That human bodies are conditioned by the circumstances of time and place is easy enough for historians and geographers to grasp. Ours are fundamentally contextualizing crafts, committed centrally to the recuperation of elements that were once common sense, relationships enduring in the place and now passed out of mind.

The next step towards embodied histories is not yet commonsensical to most scholars. Bodies are not only being *conditioned* by circumstances, they are also enduring reservoirs of past practice, which *actively influence* subsequent responses. The body can hold what has passed out of mind. Bourdieu affirms that awareness honed in practice might be "internalised as second nature" and persist, "palpable and absent,"[16] even when "forgotten as history." These assertions refuse mental habits we hold so reflexively that we have forgotten their presence and can scarcely discern their influence: the Cartesian division between body and mind; the founding premise of recent social construction theories, which holds that knowledge precedes experience; and Foucault's "epistemological view of the body as existing only in discourse."[17] The studies I present are founded on different epistemological assumptions: that minds are embodied; that doing can organize knowing; that logic can be founded in practice; and that knowledge can elude symbolic representation in texts, the central conduits through which historians in particular have interrogated the past.

In two 1995 essays in environmental history collections,[18] Katherine Hayles made the case for a more "embodied" historical practice. She wrote at a time when social scientists were in the thrall of the "linguistic turn," exploring how discourse made and held meanings. Amid the enthusiasm for Foucault, Scott, and Latour, and the celebration of the many useful insights we might borrow from literary scholars, her contribution was

neither nourished nor taken up widely by others. It is time to try again – not to turn our backs on the representations of tools and places in language but, rather, to open interpretive space in which to study the robust materiality of technologies, environments, and the everyday, to encounter them as directly and as fleshly as possible, rather than as codified symbolically as language. How might we do this, and why?

I used the unusual word "fleshly" to focus attention on the body as a way of knowing. What humans know and how they organize and reason with that knowledge is "marked by the particularities of our circumstances as embodied human creatures."[19] What are these particularities? Some of these we can assume persist over long stretches of history and across cultures.[20] Humans stand upright and are a certain distance above the ground when they crouch or sit to rest. They walk and run within a certain range of speeds and can reach to touch across a certain distance. Within a certain range, they can retain their balance while moving on slopes and shifting ground. These we could group as proprioception, the sense of bodily knowing in space; kinesthetics, the gait, pace, and posture with which the moving body encounters its surroundings; and proxemics,[21] the emotional comfort with nearness and distance. Some of these change with the lifecycle and over time. A child's sense of "too high" is different from an adult's; the medieval sense of "close quarters" in a dwelling was different from yours and mine. Some are altered by contemporary technologies. Think of the difference in "an hour away" to a walker, a cyclist, and an air traveller, or of "clean enough for comfort" in a household with a washing machine rather than a scrub-board, or a vacuum cleaner rather than a broom.[22]

Much of the bodily knowledge that comes from interactions with the world is not readily captured in words. Michael Polanyi called it "tacit knowledge,"[23] what "we know but cannot tell." Pierre Bourdieu called it "habitus," following on the work of Marcel Mauss.[24] Mark Hansen calls it "experiential excess"[25] – excess because, while it is securely held in bodily experience, it eludes expression through language. In 1992, the eminent environmental historian William Cronon made a disheartened attempt to make the "linguistic turn" in his own work.[26] Respectful though he was of his literary colleagues' insights, he found so much tacit knowledge and experiential excess in the world he wanted to know that he concluded that the narrative form was "dangerous" for his purposes. The ecological senses of non-linearity and randomness, which were the focus of his attention, *by their nature* were synthetic rather than categorical. In their way of being,

they were fluxes and fusions, which the strict linear progression of words, what he called the "rhetorical razor" of discourse and narrative, could not adequately convey.

These sensuous ways of interacting with the world are best distinguished as phenomenological or corporeal embodiments.[27] By their resistance to communication in words, the parts of technologies, environments, and everyday practices accessible through these senses are those most marginalized by the methodological turn to discourse analysis. Because they are so central to the processes of dwelling and work, it is hard not to agree with Cronon that bringing them into the foreground of environmental history and the history of technology and the everyday should be a priority.

Many of the senses that come readily to the conscious mind – sight, hearing, touch, taste, and smell – in our time are readily expressed in words. Sight and hearing are the ways humans interact most externally with the world and, thus, are the most readily verifiable and amenable to the standards of empirical testing and replication that scientists prefer. Comparatively, it is relatively easy to agree that we are seeing or hearing the same thing as the person beside us. These are also the senses cultural critics and science studies scholars are most likely to borrow as they search for bodily metaphors to express socially constructed institutions of knowledge. Think of how "panopticon" is used to convey the power to monitor in many dimensions, or "resonance" to suggest the diffuse meanings that emerge from a source. This is not corporeal embodiment but, rather, epistemological embodiment or embodiment as a figure of speech. This is the way the term "embodiment" has been most commonly used by those practised in the linguistic turn. Some readerly caution is required here to sort out what authors intend because, for those of us who are seeking ways to find out about technologies, environments, and everyday practices materially and directly rather than by depending on metaphors and other figures of speech, embodiment employed as a figure of speech (i.e., epistemological embodiment) is a less capacious concept than the corporeal.[28]

Bodily encounters with technologies, environments, and everyday practices also occur profoundly through the senses of taste, touch, and smell, the senses Barbara Duden separates out as knowledge held "beneath the skin," and those Elaine Scarry, in her studies of pain, characterizes as "resisting representation."[29] These senses, with proprioception, kinaesthetics, and proxemics, are less welcome by scientists seeking evidence and by science studies scholars seeking conceptual analogies specifically because

they resist being represented (and simplified) in symbols and models. Physicians in the early modern period, participants in the making of science in their time, shifted from using internal to using external signs of illness in their diagnoses and came to less often ask their patients "how are you" – meaning what can you yourself sense in changes inside your body – and to more often assert, "I can see how you are." This change was radically elaborated in the twentieth century. Diagnosis by physical examinations that used touch (through palpation), smell, and hearing (through stethoscopes) became less central than electronic apparatus that yielded graphic output that practitioners could see and compare.[30]

But these scientific and science studies simplifications, which attend mostly to the external senses and set aside bodily knowledge in favour of models and ungrounded theory, have come at some cost. For those of us seeking to know the full complexity of the relationships among humans, their environments, and technologies, these material manifestations through the body are indispensable. For us, they are not "experiential excess" but, rather, are key to what we need to know about human interactions with their tools and physical settings.

The processes of corporeal embodiment have histories. As human interactions with environments, technologies, and the everyday have changed, the senses have been tuned, over time, to bring different qualities to human bodies. The most commonly cited example of this is the presence of moveable type, which made people more dependent on their eyes and, as they became less reliant on their ears, less practised listeners.[31] Because the senses have been retuned by human experience with technology and the environment, treating the differences between them as separate, distinct, and persistent over time would be a mistake.[32] Thus, the leading practitioner in the history of the senses, Alain Corbin, after producing elegant monographs on odour and sound, turned to integrated studies of the sensing self in time and place.[33] He wrote ecologically about the full-bodied experiences that nineteenth-century people had with the seaside and embarked upon a multi-sensory project to follow Louis-François Pinagot, a nineteenth-century craftsman,[34] through the "natural and social landscapes" he inhabited, emphasizing not difference but synaesthesia, the qualitative commonalities and shared conduits of the sensing body. Recovering these different ways of recognizing and organizing knowledge of the world, the accumulation of specific actions in specific places,[35] can be particularly valuable to us as students of the relationships among people, technologies, and environments. To do this, we must pay

attention to the "complex specificity of human bodies," in themselves researchable legacies of sensation, "not merely products of discourse or objects of institutionalized power."[36]

The next part of the "how" involves creating more robust material histories of technologies, environments, and everyday life, after we have become aware (1) that bodily interactions with the world include unconsciously embodied senses (such as proprioception, kinaesthesia, and proxemics) organized by the size and capabilities of human skeletons and musculature; (2) that the five senses (sight, hearing, touch, taste, and smell) differ in how readily they can be expressed in words; and (3) that, historically, as they are refined by technologies and activities, we can find a more encompassing way to characterize the complex flow of embodied knowing.

Katherine Hayles built upon the insights of the Chilean cognitive psychologist Humberto Maturana who, before her, had emphasized that "the processes involved in our activities" constitute our knowledge and who recommended attending to the particular "relational and operational spaces" of living systems as material matters of doing rather than separating sensations, perceptions, and cognitions.[37] Hayles characterizes the bodily registering of interaction with the world beyond the skin as a "flux,"[38] as commonly constrained by the physical form into which human bodies have evolved, by the angle and acuteness of human vision, the speed of human pace, and the places and practices experienced by those we study. Hayles' rendering is that we have awareness "before conscious thought forms."[39] This is a stark departure from the conceptual frame of recent studies of the social construction of gender, sex, and race. Rather than postulating, as social constructionists have done, that meaning precedes experience[40] and that humans know the world through the meanings they share symbolically in language, Hayles, Maturana, Francisco Varela, Paul Connerton (with Pierre Bourdieu, Lefebvre, and Maurice Merleau-Ponty)[41] suggest that humans "make sense"[42] of the world, of technologies, environments, and the everyday, directly through their sensing bodies. By storing the consistencies in this awareness, humans become habituated to their habitats, comfortable as practised users of their tools,[43] and share what they have learned directly by imitating one another. In this sense, humans are not first language bearers but, to use Varela's term, embodied minds.[44]

If I have been doing my job well, you now have some understanding of why we as readers and writers of environmental history, the history of technology, and the everyday, have much to gain by attending to how

bodies learn and reason about their habitats and tools. Embodied perspectives allow us to tap into more of the knowledge humans have and to learn more about the reasoning they employ as they use technologies in the places where they dwell, work, and play. Their tacit knowledge – Douglas Harper calls this "working knowledge" in his fine study of a skilled Saab automobile mechanic in upstate New York[45] – is key to capturing the complexly intermingled texture of human experiences and technologies. Similarly, humans' sense of place, how they come to feel at home and sense danger, how they adapt so as to be competent when moving through the environment and being attuned to its changes, comes from the processes of corporeal embodiment. These are the ecological senses that William Cronon recognized were being marginalized by the "rhetorical razor" of the linguistic turn.

Science and technology proceed "hand in hand" – this, I hope, you'll now recognize as a use of embodiment as a figure of speech – but they are not the same. As readers and researchers in environmental history, the history of technology, and the everyday, we have much to learn from hydrology and metallurgy, from biochemistry and soil science. But many of the simplifications these disciplines employ to design empirically verifiable experiments and to organize their findings through theories derogate knowledge and reasoning not readily represented in symbols and signs. Thus, these practices set aside too much of the robust materiality humans learn from direct bodily interaction with environments, technologies, and the practices of everyday life. To reclaim a more complete understanding of these common and profound parts of daily human experience, we need to open interpretive and analytical space for the corporeally embodied knowledge that resists representation in language. My argument is that, if we do this, our environmental histories and our histories of technologies and daily life will be more rich, complex, nuanced, and useful.

The next part of the "why" concerns an absence that the reader may already have suspected. William Cronon's 1992 concerns about the "rhetorical razor" have prompted caution among environmental historians employing discourse analysis. Adam Rome, in one of his last writings as editor of *Environmental History*, urged more attention to research on the senses as ways of knowing the environment.[46] Two recent articles in that journal, one by Peter Coates and one by me,[47] are evidence of some opening up to work that attends to corporeal embodiment. But the scholars who have done the most cogent thinking about the processes of corporeal embodiment – to my mind, Hayles and Hansen – have not explored its

historical manifestations. Hayles even castigated Hansen, in her foreword to his first book, for the "remarkable absence of particular technologies used either as examples or as occasions for analytical exploration."[48]

Writing in 1995, Isabel Hull, a former editor of the *American Historical Review,* argued that the knowledge and reasoning I've been calling "corporeal embodiment" were particularly amenable to exploration by "self-reflexive, scrupulous historicism,"[49] and that following the practices of the historian's craft we could reclaim these important but recently marginalized elements of human experience. The second part of the "why," then, is that historians are particularly well equipped, thanks to the closely textured integrating and contextualizing conventions of their craft, to open up this interpretive terrain for our own purposes, to model practices that colleagues in environmental and technology and broader social science studies might emulate. And so, the theory dispatched, let us turn to some examples from the recent literature that focus upon what corporeally embodied experiences with technologies and environments can reveal.

For the sense of safety, corporeal embodied knowledge is particularly important. True, people in the last century learned how to be safe at home, work, and play by reading manuals. Governments and firms developed occupational health and safety documentation for many workplace processes, and manufacturers provided instruction booklets to accompany the domestic appliances and home gardening equipment they sold.[50] These were textual ways for employees at work to augment their shop floor knowledge and for novice users at home to protect themselves from injury in their houses and yards. But this participation in what discourse scholars call "interpretive communities" was not sufficient protection against hazards.

Keeping safe, at root, is a matter of tuned bodily practice. Especially in risky environments, made dangerous by the presence of potentially toxic technologies,[51] well-honed, unconsciously held reflexes are key to human safety. In order to be effective, these responses to warning sensations must be embodied and automatic. Barbara Allen describes the embodied knowledge of place among families who had lived along the Mississippi since their great-grandparents had been emancipated from slavery. During their grandparents' time, these places had been altered by the advent of oil refineries, petrochemical plants, and aluminum smelters. These people understood the land as "constitutive of who they [were]," and they knew their survival depended upon practised physical proficiency in traversing the landscape in order to escape. These were their bodily legacies of

persistence. When alarms in the night signalled a chemical leak, a gas release, or an imminent explosion, safety depended upon residents' intimate visceral knowledge of the night landscape sensed underfoot. By following the route, copying the gait and carriage of a leader, staying upright and moving forward, they practised a bodily tactic, using embodied knowledge to resist a bodily threat.[52]

Some embodied knowledges are particular adaptations to specific bodily work histories, the corollary being occupational demands on households. If learning an occupation is, in part, the development of reflexes that tame industrial hazards into definable threats, the rhythm of the workday and the work year require emotional and logistical accommodations on the part of families. The households of workers develop an emotional compass honed to flexibly, or at least stoically, accommodate dad's being away or mom's being on night shift. These habits, skills, senses of comfort or dis-ease make recompositions of the household variously supportable or unsustainable. They can be material influences of moments in histories of technological change, even as they elude the "human resource" evaluations of credentials.

Miriam Wright found that planners for the modern offshore fishery in Newfoundland sought out young men from communities where the household-based inshore salt fishery was in decline. They expected that the high levels of literacy, specifically the ability to learn from technical manuals and familiarity with the pace of factory work, governed by clock time, found in these communities would be key to trainees' successful transition to the trawlers of the new industrialized frozen fish sector. However, Wright discovered, if their book-learning was an advantage, the senses of self these men embodied as workers and fathers/husbands made them unsuitable candidates for the technologies and environments of the new offshore fishery. The workplace dangers they had learned to handle were the proximal threats of inshore waters, of near rocks and winds deflecting around a ragged coast. The hazards of the open seas of the offshore challenged their proxemics, more unconsciously than consciously held, and their learned sense of appropriate spatial scale in their work environment. Moving from the inshore to the offshore meant exchanging the comfortably near for the threateningly far, and it entailed a fundamental rupture in their embodied sense of space.

These sources of unease were amplified by the stresses upon the gender and household division of labour caused by men being away for weeks at a time. The workers who fit readily into the new industry were older

Banksmen, who often had little schooling but who were long accustomed to working offshore on the high seas and who came from communities long adapted to the absence of men for extended periods. These men recognized themselves in the relational and operational spaces of the offshore fishery; their wives had been raised in traditions that managed the boundaries of psychological, physical, and intimate space so as to accommodate the departure and return of adult men. It was these customary, often unconsciously held embodied affordances, key to manly and womanly competence, that distinguished former inshore fishers from former Banksmen (and their families too) as differently adapted to the new industrial environment.[53]

Sensuous tuning, like the inshore fishers' assimilation of the winds and currents of the coast and the offshore fishers' adaptations to the routines of the trawlers and to the storms of the high seas, is referred to by Thomas Csordas as "modes of somatic attention."[54] Raymond Smilor finds,[55] similarly, that humans who moved from rural areas into towns were initially beset by sensuous challenges that required new modes of somatic attention. The country person who, in order to live off the land, had mastered a quite finely honed discernment of bird and animal life, and a refined awareness of subtle changes in the sky and the shifting winds, was overwhelmed by the sensuous barrage of the city. Rural migrants adapted to the city by developing sensory calluses – in effect, physical habits of inattention – in order to bear hubbub and function satisfactorily amid the surrounding roar. These new, and higher, bodily tolerances for the noise, stench, dirt, and shadow of congested neighbourhoods were gradually learned "shifts in perception," adaptations to losses that were made acceptable by the promise of material gain. In the technological and ideological regimes of the late nineteenth and early twentieth centuries, this sensory rehabituation passed into symbolically codified regulatory regimes that set down the tolerances of the "person of ordinary sensibilities" as the standard. Such municipal and state initiatives were recognitions that citizens had honed differing habituated sensitivities. If diverse populations were to work, live, and play together in closer quarters than they did in the countryside, such a median sensuous standard needed to be defined. Once these standards were established, landuse zoning was implemented to spatially cluster activities that posed similar sensory challenges. Additionally, acknowledging that the bodily assaults and pleasures of urban life were varied and that the money-making or pleasure-seeking of some might unreasonably discomfit the "ordinary sensibilities" of others, municipalities

developed scales of fines based on rankings of how loud, stinky, or dirty activities were in comparison to what a reasonable citizen should be obliged to bear within urban boundaries.

In our own time of personal sound technologies, money can buffer these differing embodied tolerances. Those who want loud music can clamp speakers directly onto their ears, and those who want silence can choose to use noise-cancelling earphones against the rising din and the increasing deafness of their neighbours. But declining air quality and rises in global temperatures are different. These pose sensory challenges to the embodied routines and postindustrial quality of life expectations, and for them we have to turn to social, regulatory solutions rather than to individual remedies.

Technologies, too, form and frame the sensuous flux that flows through bodies. Virginia Scarff has written widely and with elegant gusto about how access to automobile technology changed human senses of the western American states from places to be in to places to pass through. She makes us feel the differential impact of access to transport on the lives of women and men, what registered of the places at speed, from the seat of the car, perhaps with the radio on. Then she parks and shifts focus and scale. If being in the vehicle gave female drivers access to more places, Scarff notes, being fashion conscious about footwear and underwear constrained how they moved and how they breathed, intimately reordering their perceptions of distance and slope, of the surface beneath their soles, of what they could bend to reach, of what a flirtatious impulse exposed and what modesty forbade.[56]

Isaac Asimov argued that if the automobile had not been invented, modern life would be far more different than it would have been had Einstein not articulated the theory of relativity.[57] Scarff's work gives texture and force to his contentions. We make sense of our habitat through the sensations our technologies and actions allow, at least as much as we do through conceptual frames, symbols, and signs. By contrast with Scarff's women drivers in the American west, consider what walkers learn about their environment. To amplify this contrast, imagine a walker who is not wearing earphones.

There are two fine books about the history of walking that I recommend, but my own research may also help make the point.[58] To make room for the St. Lawrence Seaway, eight colonial hamlets were relocated back from the St. Lawrence River. They were designed and resettled as three modern villages. Almost everyone with whom I spoke in the new village

of Iroquois claimed that the nineteenth-century settlement they left in 1958 was more interesting than the modern streetscape of crescents and cul-de-sacs, the plaza, and open parkland planners designed for them 1.6 kilometres north, beyond the reach of the flood. People walked in the old village; in the new village they drove. Can I know, then, whether there was less texture and variety in the modern town than in the Loyalist village or whether a change in the technologies through which they moved about the former separated them from the sensuous contact that in the latter would have given variation to their daily lives? I think this is a good historian's question, especially for those of us interested in environments, technologies, and the everyday. It is a bigger query than our customary historiographical questions, for it goes beyond analysis of the content of the discursive form, and the message in the medium of the technologies we use,[59] to take the full-bodied sensation of being in and moving through place, mirroring the scale and qualities of the location, as direct experiential evidence of the content of cognition and structure of reasoning.

Consider how a road system, surveyed before the railways upon a square grid, might function as another technology constraining bodily encounters with the environment. Travellers on these roads meet the place through its property relations. Their route follows not the topography but the road allowances, not the most breathtaking or the safest route, but the route least likely to prompt charges of trespass. Whereas the crow flies, the stream flows, and the wind blows in movements responsive to the lay of the land, travellers respecting private property cannot follow either the shortest or the least physically demanding route. They move not in bodily reciprocity with the landscape but along a path that minimizes their intrusion upon the rights of property owners.[60] Perhaps they learn more of the township from their journey along the surveyed road allowances than an air traveller passing through an O'Hare terminal learns of Chicago; perhaps the person transiting through O'Hare is merely more conscious of the technologies that bring the world from beyond the skin into human bodily understanding of near and far, fast and slow, hostile and homey.

If movement from the nearby countryside leads inhabitants resettling in town to develop sensory carapaces, literally hardened sensory shells to armour themselves against the assaults of their new habitat, people leaving home to cross continents and oceans find their knowing and being in place assaulted in at least as many dimensions. Studies of migration and resettlement, at their best, recapture the "sense of physical vulnerability"

of newcomers struggling with a somewhere they have had not yet viscerally embodied, where familiar habits do not serve and accumulated tacit knowledge cannot connect.

Sometimes, as Thomas Dunlap finds in studies of British settlers in Australia at about the same time, populations "could not even think what they wanted," so disparate was the place where their bodies were from the place their bodies knew. They were deracinated, their roots taken from the soil upon which they had learned to thrive. And thus they embarked upon a project, using imported plants, animals, technologies, and building forms from the continent they had left, to remake the threatening new territory of Australia into a simulacrum of the English countryside. Like the artifices made virtually by aficionados of the contemporary computer game SimCity, the result was a copy for which there never had been an original, a fantasy made by longing for a different space rather than by scrupulous close encounters of a daily kind. Some among the first generation were made abject by the loss of visceral correspondence between self and place. Yet humans can, and do, habituate to new "natures." They develop new reflexes and embodied understandings of nature to mirror their changed environments. To the children of the second generation, Dunlap notes, "Shelley's nightingale and English hedges were as alien as the woollen school uniforms they wore in Sydney's heat," for the familiar these daughters and sons had embodied as natural was not their British-born parents' first familiar but, instead, the ordinary of their part of the southern hemisphere.[61]

Carolyn Merchant notes a similar difference in what Native Americans and Euro-Americans recognized in North America. She argued that Native Americans knew their environment as a tame and bountiful dwelling place. They experienced the earth as "an agent of regeneration," where women planted the corn, beans, and squash in forest gardens, and the produce of these activities sustained life. They reasoned about nature as an ascensionist and progressive force in their lives. Euro-Americans, by contrast, encountered the New World through the seventeenth-century concepts of Christian religion, modern science, and capitalism, which led them to consider the environment as "postlapsarian," a desert made when Adam took Eve's poor advice in the Garden of Eden. People's job, thereafter, was to seize control of nature and recover what had been lost. The manner in which Euro-American traditions epistemologically embodied nature made them think of their harvests as the fruit of their own labour and proof that God favoured them rather than as the product of a partnership

between human and non-human nature in which humans by corporeal embodiment had discerned nature's autonomous ways.[62]

Partners function best when they openly attend to one another. Equally, in the wilderness and in the garden, William Cronon urges us as humans "to recognise and honor nonhuman nature" as a world with its own independent, non-human reasons for being, "whose otherness compels our attention."[63] This means recognizing not only nature as represented in models of empiricist science and theological doctrine but also nature as the autonomous force that sensing humans corporeally embody as "a feeling for the organism."[64]

Scholarship on the social construction of gender relies heavily on embodiment as a figure of speech, and it is framed to understand the meaning of gender formed in power relations and institutional structures. This is how Judith Butler analyzes the aetiology of "gender trouble" in her book of the same name, and, in *Bodies That Matter,* it is the basis for her insights into how contemporary gendered assumptions constrain the research questions modern geneticists ask about sex.[65] Joan Scott traces the discursive history of "gender as a category of historical analysis" from similar epistemological premises.[66] But gender is also created by active experience, by the differing corporeal embodiment that flowed from the different labour women and men have performed historically, the differing places in which they lived, worked, and played, and what their daily lives taught them about the nature of their environments as active forces or terrains to be mastered.

Consider how, in *Silent Spring*, Rachel Carson's depiction of nature as active and responsive altered conceptions of biology, culture, and environment.[67] Through her texts, Carson provided a way for urban moderns to share a sense that planters and gleaners had long embodied through their techniques[68] – that selves existed in reciprocity with nature, that humans were not nature's masters, that nature could bite back.

When humans develop gendered sensibilities, they do so through "species specific, culturally formed and historically positioned" experiences.[69] Vera Norwood notes that, among both birds and humans, gender roles differ. Men are more likely to chase, capture, and signal, while women are more likely to watch, nest, and mend. These gender roles are critical to understanding how humans construct nature. "Nature is used to define human nature" and, thus, to endow as "natural" the questionable privilege "granted to some embodied positions over others."[70]

The same gendered relationships between doing, understanding, and being emerge in some histories of toxic technologies and the environment.

In a wide-ranging 1992 review of research on environmental concern, for example, Paul Mohai noted a "gender gap" between the activism of women and men.[71] When Phil Brown and Faith Ferguson followed Mohai's work with a study of women's work and women's relationships in toxic waste activism, they found patterns of doing and knowing best explained as outcomes of differently corporally embodied experience and knowledge.[72] Brown and Ferguson begin by confirming that "grassroots activists who organize around toxic waste issues most often have been women, led by women." They then note that women's situations in family, work, and place positioned them daily and concretely to perceive environmental effects, particularly on the health of family members whose physical care in time of illness was often a female responsibility. Through intimate contact, feeding, bathing, and toileting the distressed; through the internal revelations that arose through these direct bodily contacts – touching, smelling, and hearing – they tracked the presence, process, and growing intensity of the environmental body burden. The knowledge they gained was corporeally embodied, the experiential product of monitoring internal changes, and it was not manifestly comparable or readily shared. The very relational capacities that made them open to the flux of suffering disqualified them as autonomous sources of knowledge and discounted what they learned as being empathetic rather than objective.[73] The challenge for these lay toxic waste activists, both women and men, was to "blunt the rhetorical razor" and insist that what they knew was not "experiential excess" but crucial to understanding how the toxic outputs of some contemporary technologies was altering the environments in which they lived, worked, and played.

If embodied histories are key to understanding how humans have kept themselves safe, how they have honed skilful practices in order to interact with the world through technologies, how they have recognized the environments they entered and subsequently reorganized (in the process remaking themselves as sensing beings), bodies are also places and repositories of histories of practice in place. Three recent books in environmental history elaborate upon these relationships. Gregg Mitman concludes his study of allergies by affirming, "Place matters: in the making, in the experience, and in the knowledge of illness and health."[74] Thus, he challenges the commonplace notion that health is centrally about the absence of pathogens and the accessibility of miracle cures. He asks us to also consider health as an ecological relation, to make conceptual space for the aspects of well-being that elude the linearity of medical models, that emerge from the diffuse meeting of the body with what Duden calls

the world "beyond the skin," what Hayles refuses to partition by her choice of the term "flux." Linda Nash calls these relationships between physical human bodies and the larger world "inescapable ecologies."[75] She shows how European Americans felt so out of place in late nineteenth-century California, so unable to resolve the discrepancies between the natural order they had embodied and the "nature of things" where they now were that the pioneer imperative "to conquer nature" was incomprehensible. This was territory to be discerned and "completed," which could then be only imitated rather than remade, but which twentieth-century industrial agriculture remade so thoroughly into hydrids so complex and unstable that they eluded the "reductionist methods" of scientific expertise. Her histories of the Imperial Valley reveal instances in which laypeople, less forcefully disciplined to discount or "forget" awarenesses learned and made useable by daily dwelling, continued to have access to the ecological relationships in their industrialized bodies and the industrial environments beyond their skin. Similarly, most of the people about whom Conevery Valencius writes,[76] nineteenth-century inhabitants of the Arkansas and Missouri borderlands of the American South, recognized that "the external world and the human body were not as separate as they are now" and acknowledged the "constant interplay between human agency and human lack of control, rather more frankly than we moderns." Valencius calls corporeal embodiment "physical citizenship," changes through which the bodies of migrants "would be 'acclimated' to new climate and topography" in a struggle "both crucial and perilous," which simultaneously accommodated external geographies and forged anew the "complicated interior geography of sensation movement and flow" that "determined well-being." She describes how the migrants to the borderlands retuned their sensing bodies to the sounds, tastes, textures, and spaces, the "lived realities of the terrain," learning to make sense of "the nature of soil, water and situation," remaking the embodied minds that connected them, individually and collectively, to the world beyond their skin.

These processes of corporeal embodiment, forged individually in practice and collectively by imitation and shared practice with technologies and environments in the routines of everyday life, are the focus of the six case studies that follow. Often corporeal embodiment and embodiment used as a figure of speech exist in a tandem circuitry. Henri Lefebvre described this relationship as a masque of "reciprocal implication and explication," in which the material and the social body converge and then separate, presenting alternately as real and illusory, palpable and absent.

Sensuous knowledge, ecological awareness, can be told. It sometimes withstands the operations of the rhetorical razor and defies derogation as experiential excess. But in our times, embodied histories are often repressed or forgotten. The task here is, through the interrogation of several vibrant and vital instances, to reclaim them.

http://
megaprojects.uwo.ca/Gagetown

This site contains the new media work associated with the creation of the Gagetown NATO base upon the former farmlands and woodlots in the Nerepis Valley in New Brunswick.

The aerial and satellite imagery on the website make starkly apparent the landscape changes in the Nerepis Valley since the opening of the Gagetown base. Using satellite imagery from Google Earth, topographical maps, and aerial photos from the National Air Photo Library in Ottawa, this site shows vehicle mazes appearing and tank tracks crossing the land of the Scotts and their neighbours, succeeding earlier roads and paths. Equally striking are the tree lines and land distinctions *persisting* as physical registers of prior landuse practices.

There are also photographs and audio material that portray the local residents and their former ways of life: Lydia and Raymond Scott, their farmlands, Jerseys, and the hooked mats they made together. Multimedia material gathered from the anniversary tour of the area held in 2003 is available, including images of the barren lands visible from the bus with white placards standing in for places since removed as hazards. Lastly, there are audio and videos of music and dances collected by Greg Marquis and Donn Downes of the University of New Brunswick, Saint John. These are enduring signs of continuity amid the disruption of the ways of life of the Scotts and their contemporaries in the Nerepis Valley.

—JV