Barometric Books: The Atmosphere in Nineteenth-Century English and French Novels

by

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A thesis submitted in conformity with the requirements for the degree of Doctor of Philosophy

Centre for Comparative Literature
Collaborative Program in Book History & Print Culture
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Abstract

“Barometric Books: The Atmosphere in Nineteenth-Century English and French Novels” examines how popular print culture mediates representations of the atmosphere in nineteenth-century English and French novels that were published within a twenty-five year span. Charlotte Brontë’s *Jane Eyre* (1847) and *Villette* (1853), Elizabeth Gaskell’s *North and South* (1854), Charles Dickens’s *Hard Times* (1854), and Jules Verne’s *Vingt Mille Lieues sous les mers* (1869-70) were informed by documents, such as almanacs and serials, that define the atmosphere in terms of its ubiquitous fluidity. Explained as an overarching liquid presence, the atmosphere becomes the primary medium of existence. It is invested with the capacity to unite humans to their environment, to each other, and to sensory experiences. As the nineteenth century progresses, the atmosphere’s literary representation shifts. Its chemical composition is simultaneously altered by unprecedented industrial development, and its perception changes following developments in meteorology, a newfound science that emerges at the midpoint of the century. Over the course of these transformations, the atmosphere’s planetary presence erodes—once perceived as an invisible fluid shared by every living thing on Earth, the atmosphere is gradually transformed into a commodity, its finitude forgotten and its permeating presence thrust to the background.
This project recuperates popular and ephemeral print materials. In doing so, “Barometric Books: The Atmosphere in Nineteenth-Century English and French Novels” shows how current resistance to the idea of climate change is informed by a shift that fundamentally altered how the atmosphere is represented in literature.
Acknowledgments

Those who know me best are all too familiar with my love for J.R.R. Tolkien’s *Lord of the Rings* series. I have often compared graduate studies to Frodo’s quest to bring the one ring of power to Mount Doom. Like Frodo, I had a lot of help along the way. It is a pleasure to thank the many people who accompanied me, in some way or another, on this journey.

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Introduction

Rien de plus culturel que l’atmosphère, rien de plus idéologique que le temps qu’il fait.
- Roland Barthes (1975)

This project began in Toronto, Canada’s largest urban centre, during a summer that beat all previous temperature records. Smog kept residents indoors and became a lethal threat to vulnerable citizens. Bright red heat alert warnings, creeping UV indexes and surging humidity indicators introduced new ways of thinking about the environment. As the sun rose, the haze would begin to emanate from the pavement. From a distance, a dome of greying, dense air could be seen hovering over the city. Global heat records have been smashed in every subsequent year.¹

This project also began in a field in rural Québec. My grandparents, who live in a small community near the banks of the Saint Lawrence River (St-François-de-Montmagny-de-la-Rive-Sud, to be exact), always seem to be on the lookout for invisible signs in their environment. On a January morning, I have heard my grandmother declare, “the air looks cold.” My grandfather approaches his surroundings as a network of information that reveals new sides of itself in small moments—but you have to know how to make the right connections. To do so, one must pay attention to little things that can quickly disappear: birdsong, rainclouds, smokestacks, and caterpillars are significant.

¹ Data support this. In the year 2015, the earth weathered the hottest month of July on record since such records began being kept, roughly two hundred years ago. NASA and the Japan Meteorological Agency predicted that it will also be the hottest year overall (their predictions were accurate and confirmed in 2016). As the Toronto Star points out, “rising concentrations of manmade greenhouse gases are taking temperatures to new heights.” See Jason Samenow, “July looks like the hottest month ever on Earth,” Toronto Star (Toronto, ON), August 18 2015. https://www.thestar.com/news/starweather/2015/08/july-looks-like-the-hottest-month-ever-on-earth.html.
This project took root, as many do, in the Thomas Fisher Rare Book library at the University of Toronto. It is unlike most of the other rare book libraries I have visited, where collections are hidden in a temperature-controlled environment and kept far from natural light. The Fisher’s high walls are covered in books. From the reading room’s lower floor, you can peer up to the stacks and look at the spines of countless old volumes. Unsurprisingly, the Fisher smells like musty paper and leather. The scent is of the books’ gradual decomposition, what Jesse Oak Taylor describes as that familiar “‘old book’ smell through which used bookstores, libraries, and archives seem to be redolent of time itself” and which is “actually the atmospherics of decomposition in action.” It was there that I first encountered a set of three-hundred-year-old almanacs. The documents before me spanned the eighteenth and early nineteenth centuries; over a week’s worth of afternoons, I began to read these fascinating compendia of poems, household management tips, astronomical events, and weather predictions. Familiar proverbs about rain and shine reached out from the pages of these cheaply produced documents, which had survived through the centuries and seemed to me to show a very human, very practical, and very persistent concern with the weather.

It was in the Fisher Library that I found a copy of John Henderson’s *Meteorography or the Perpetual Weather Almanac*, which remains one of the most intriguing documents I have ever read. It is a small book bound in brown leather, squat and square, no larger than the size of a paperback novel in today’s relative terms. It was printed in 1841 in London and Edinburgh and, according to at least one antiquarian bookseller, only four copies remain

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worldwide. Unlike many almanacs, however, *Meteorography* spends little time predicting the weather. It does not explain how different phases of the moon will influence future harvests, as was common in nineteenth-century almanacs. Instead, its author rebukes such forecasts. Henderson positions his work as a contribution to the ongoing discourse surrounding weather studies, but simultaneously disavows ancient forms of interpretation alongside their newfangled elite counterparts: he notes that such enterprises “only produced gloomy superstitions… and at present, how many false and unfounded ideas are those which are believed, even in the most enlightened class of society! How absurdly people talk about good and bad weather—about the influence of the moon in meteorological phenomena, and about the predictions of the barometer!” In one fell swoop, the knowledge that relies on the interpretation of signs or on the readings from an instrument is dismissed as being inaccurate. He refuses to follow in the footsteps of those who have predicted the weather before him, but also finds that scientific instruments and popular theories are unreliable—he admits that he used to believe in these theories, too, but after many years of observation found them to be untrue and decided to remedy the situation.

Henderson proposes that his book corrects a long history of bad forecasting practices. *Meteorography* contains over thirty hand-painted colour plates that illustrate the sky in its many different states. These pictures of the sky were carefully chosen. They are the result of “many observations on the subject of which it treats. […] These [plates] have been invariably

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taken from the volume of nature.” These pictures were not meant to be studied and memorized; rather, the book is meant to be “held over [the spectator’s] head.” The reader must match the hand-painted illustrations to the sky above them, account for variations in the wind, and then be in a position to determine what the weather will be like the following day. Henderson insists that his plates will provide “uniformly correct” results, the advantages of which “must be obvious at a glance.” Meteorography proposes to mediate its reader’s surroundings and to interpret the atmosphere’s variations. It shows how print culture has been used to explain the atmosphere to audiences for hundreds of years.

I have returned to the Fisher Library many times over the years and often visit the little Meteorography book. I hold its plates up and compare the illustrations to the sky outside the window. I mostly enjoy holding it up the way its author would have wanted me to. It doesn’t matter much to me if the picture matches the forecast. The book invites its reader to use it as an extension of their own body, as a new kind of interpretive apparatus. It precedes smartphones by over a century but the principle that informs the technology is the same in both cases: our atmosphere presents itself as something that, to be understood, must be mediated by something beyond our own bodies. This dissertation examines a short but crucial moment. It shows how, from 1845 to 1870, the atmosphere’s mysteries were solved in the pages of popular print. Correspondingly, its presence in literary texts evolved and the

5 Ibid., 7.
6 Ibid., 27.
7 Ibid., 7.
8 Meteorography precedes Apple’s “Stargazer” application by over 170 years, but the kernel idea remains the same: lift a device up to the sky, compare, and learn for yourself what the future holds.
atmosphere, which once represented the sign of things to come and united all living beings within its fluid force, was transformed into a commodity.

1 Signs of the Times

Why Atmosphere?
The term “atmosphere,” which stems from the Greek *atmos* for vapour, appears in the early seventeenth century to designate the gaseous emanations from the planet. By the turn of the eighteenth century, the atmosphere stands for the “mass of aeriform fluid” that emanates from and subsequently wraps itself around the earth. Its obsolete meaning, which designates a “supposed outer envelope of effective influence surrounding various bodies,” underscores how it is also taken as a governing force. It does exert a measurable pressure upon the earth’s surface, but its quantifiable presence is obfuscated; a secondary meaning reminds us that the atmosphere is also a “surrounding mental or moral element, environment, […] a prevailing psychological climate [or] a pervading tone or mood.” Over the course of the last century, technology and communications have adopted the term in order to describe the combination of “background sounds that evoke a particular mood, impression, [or] setting in a broadcast.” Its meaning has since grown to include affective, physical, and sonic undertones. In all of these definitions, however, the atmosphere is both something that encompasses objects, big or small—it surrounds the planet, after all—and something that ceases to exist beyond its own envelope.

Beyond an expanding understanding of scientific principles, what does this evolving definition show us? How are the many overlapping and interlacing concepts at the heart of

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the atmosphere mediated? In other words, how do we understand our surroundings? What documents decipher the atmosphere and how have they changed over the years? Do these materials, in turn, shape the ways in which we have explained the atmosphere to ourselves in popular literature? In her evocative reading of the weather in Marcel Proust’s fiction, Eve Sedgwick describes how paying attention to the atmosphere, especially by means of calculating the pressure it places on surfaces by means of barometric pressure, is a complex process:

Compared to the much more obvious alternatives—temperature, wind, precipitation, even humidity—air pressure is a subtle, invisible, and indivisibly systemic index of weather. [...] The measure of barometric pressure [...] means nothing at all outside a dynamic interpretive context: it requires a full sense of how changes in the weight of a given column of air, relative to the weight of other near and distant columns of air, will affect both the vertical movement of heat and thus the air’s temperature and ability to hold moisture, and also the horizontal travel of air masses that circulate “fronts” of pressure difference, and thus major weather systems, across the earth’s surface. Attending to air pressure to any extent at all seems to presume an expert sensitivity.10

The atmosphere “means nothing outside a dynamic interpretive context.” It requires a wide range of corresponding measures and enlists an unspoken history that carries its meaning from a distant past into a changing present. In literature, invoking the atmosphere calls upon an audience’s shared knowledge of the weather, the human experience of moving outside. In fiction as well as in reality, the atmosphere establishes itself as a site of significant cultural exchange. It demands that we pay attention to it in relation to other things, to other beings. In every possible way, the atmosphere cannot exist in a vacuum. Despite this, its presence in

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literature has been overlooked. This project is part of a growing field of literary studies that bring the atmosphere into focus.

In an article that was published in the *New Yorker* magazine, Kathryn Schulz succinctly notes how the weather had slowly disappeared from literature—only to re-appear recently, in these times of rapid climate change. Schulz traces the history of the weather’s representation and finds that the rise of meteorology in the mid nineteenth century “occasioned a revolution in the representation of the weather” for visual artists such as John Constable and J.M.W. Turner but states that a “commensurate shift notably failed to take place in literature” and suggests that while meteorology “had constructed a new story about weather, down to the vocabulary used to tell it, […] writers seemed unable or unwilling to make use of it.” Schulz proposes that the weather in literature lost its metaphorical weight and became a cliché. Over the course of the twentieth century, she argues, the atmosphere receded into the background or was altogether evacuated from literary fiction. It no longer played a significant role in determining human activity until it resurfaced in the last decade or so, once more carrying with its presence signs of impending doom and disaster. Only this time, the “atmosphere really does reflect reality,” and that reality is one of imminent climatological catastrophe.

I agree with Schulz for the most part, but I think there is more to literary representations of the atmosphere than meets the eye. Charlotte Brontë, for instance, perceived the weather in terms that no longer circulate in popular parlance. Her descriptions

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11 The eerie similarities between Schulz’s name and my own did give me pause. See Kathryn Schulz, “Writers in the Storm,” *New Yorker*, November 23 2015, 105.
13 Ibid, 110.
of weather phenomena are complex and historically rooted in the print culture of her time, but Schulz—along with many other critics—associates the Brontës’ weathered landscapes to gothic aesthetics. It is reductive to state that nineteenth-century authors resisted or were unaware of developments in meteorology, especially when writers such as Charles Dickens and Elizabeth Gaskell published their novels in the pages of a serial journal, *Household Words*, which included essays about scientific advancements and openly drew readers’ attention to London’s changing climate. As a close reader of popular scientific materials, Jules Verne certainly paid a good deal of attention to new technologies and to developments in geology, marine biology, and chemistry. Meteorology would have been one of many exciting new domains that were being opened up by scientific exploration. The atmosphere did not disappear from literature.

**Why Now?**

Every summer I spend in Toronto, the increasingly hot, humid, dense air reminds me of lines from J.R.R. Tolkien’s *The Return of the King*. They are spoken at the end of the narrative by the tree-shepherd Fangorn, who protects the forests, to Celeborn and Galadriel, the elven rulers of Middle-earth. Ancient beings that once populated the world are losing their power, while mankind is rising and gaining control over the world: “The world has changed. I see it in the water. I feel it in the Earth. I smell it in the air.”¹⁴ What Fangorn describes—the sense of the overarching environmental shifts sensed physically as well as emotionally—captures

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¹⁴ J.R.R. Tolkien, *The Return of the King* (London: Harper Collins, 1999), 313. Peter Jackson’s adaptation of the novels transfers these lines to Galadriel, and adds: “Much that once was is lost, for none now live who remember it.”
the current scholarly shift toward the Anthropocene, the chronological period now defined by humans’ impact on the planet. Largely popularized by Paul Crutzen’s work in chemistry, the term and the ideas often associated with it, such as ecology, archiving, decay, mortality, and perception, has spilled over into the humanities. It is succinctly described as “the geologic epoch in which a single biological agent, Homo sapiens, has in short order altered the Earth’s atmosphere, thus reshaping the climatic conditions of planetary life” and over the past five years, it has occasioned a broad shift in the scholarly approaches to philosophy, art, culture, and literature.

The markers used to delineate the Anthropocene are still matters for debate; however, we know that the industrial revolution, which was in full swing by the mid eighteenth century, ushered in a series of wide-ranging planetary changes. For example, increased traces of carbon dioxide in Arctic ice cores are directly linked to the mid nineteenth century’s spike in coal consumption. The smoke that spewed out of chimneys in London rose to form clouds that travelled around the world, eventually releasing their dusty water above the frozen plains of the Great White North. These layers continue to build upon previous deposits, as we continue to release additional levels of harmful gases into the atmosphere. Tobias Menely has remarked that, since we pump out “more carbon dioxide and methane to the atmosphere than is removed by the carbon and methane cycles,” the resulting “accumulative principle poses a problem for the conventional model of crisis as rupture, modernity as historical discontinuity. The catastrophe of the present is not its break with the

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16 Among geographers, especially, there is some matter of contention as to when the Anthropocene begins, and if it is even a valid category in marking human history. I am grateful to Professor Heidi Bohaker for pointing this out.
past but its accretion of the past, a thickening of the air.”\(^\text{17}\) This thickening air is felt physically, but it also imposes itself upon the ways that we read texts written at the dawn of this Anthropocene age.

The gradual warming of the oceans and of the earth’s atmosphere has altered global weather phenomena, such as La Niña, which is a phase in a “cycle that is marked by cooler than average sea surface temperatures in the central and western Pacific Ocean” that often increases rainfall in parts of the southern hemisphere.\(^\text{18}\) It is usually expected to occur once every twenty-three years. Human-caused carbon pollution, which accelerates “the rate at which the land is warming relative to the oceans,” is expected to cause La Niña to manifest itself once every thirteen years.\(^\text{19}\) This is but one of many large-scale atmospheric phenomena.

On a smaller scale, interest in the Anthropocene suggests a profound desire to confront the impermanence of human lives and the paradoxical power human energy has to influence its environment. As Taylor notes, the term Anthropocene “foregrounds human agency at the same time as it renders any human act inconsequential.”\(^\text{20}\) It certainly seems paradoxical that while gatherings of international scientists continue to sound the alarm for our species’ survival, few large, nation-led practical steps are taken to address the ever-mounting list of ecological disasters that await us if we continue to do nothing and to ignore the signs that are present in the atmosphere.

\(^{17}\) Menely, “Anthropocene Air,” 100.
\(^{19}\) Ibid.
\(^{20}\) Taylor, “Auras and Ice Cores,” 75.
The atmosphere “both enables and delimits the entity’s existence”, and in this way, thinking in terms of the atmosphere “emphasizes agency; it considers how bodies of all kinds influence the conditions of possibility in their vicinities.” The atmosphere leaves its mark in physical space, in chemical reactions, in our bodies, and in cultural texts. It is “not a state of dissipation but one of ongoing material presence,” and despite its invisibility, its presence fundamentally enables life on earth. Its changing composition, the result of human industry and its concurrent chemical output, is of primordial concern for our survival as a species.

While it may be true, as Menely points out, that “humanistic theorists of the Anthropocene […] have said little about the object of our enlarged agency, the atmosphere,” certain trends suggest a growing tendency towards a scholarly move towards “conceptual models in the Anthropocene [that] recognize the air that surrounds us.” In the past five years alone, the atmosphere has become a growing matter of interest among literary scholars.

In recent years, intersecting interests in material culture, media studies, and literary theory have spurred urgent conversations about the atmosphere and its representation in film, literature, painting, and other art forms. In the closing paragraphs of *Air’s Appearance: Literary Atmosphere in British Fiction, 1660-1794*, Jayne Lewis nods to how quickly one

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21 Taylor, 77.
22 Ibid., 77.
24 It seems that when Richard Hamblyn first published *The Invention of Clouds* over ten years ago, people took note and turned to their surroundings. In ever-widening scholarly circles, the atmosphere is the focus: Justine Pizzo has recently defended her dissertation, which reads the atmosphere in nineteenth-century novels as a representation of Victorian discomforts with female bodies. In a similar vein, Jesse Oak Taylor’s forthcoming monograph turns to Dickens as a master creator of greenhouse effects in literature: texts that seem closed in and perpetuate controlled atmospheres in order to dictate affective responses. See also Tobias Menely’s upcoming study, *The Climatological Unconscious: Poetry and Political Economy in the Early Anthropocene*. At a recent reading group meeting of the British Association of Literature and Science, Peter Garratt hosted an evening discussion on “The Science and Art of Atmosphere.” Peter Adey published *Air*, a history of air and atmosphere in western culture. A call for papers circulated in March 2016 asked for submissions on *Climate Realism: The Aesthetics of Weather, Climate, and Atmosphere*. 
may take the “expressive atmospheric effects so interwoven with Anglophone writing”\textsuperscript{25} for granted. As Lewis notes, the atmosphere renders “the inevitably mediated nature of what we call experience”\textsuperscript{26} visible. The atmosphere mediates human existence. How have humans understood the atmosphere? How do we mediate something that is invisible, but that manifests itself in ways that have a direct impact on our lives?

While disciplines in the humanities turn towards the Anthropocene, a concurrent critical eye is set upon material objects. As industrial capitalism increased its production and distribution of material goods throughout the late nineteenth century, objects proliferated. Yet just as things came to clutter more and more of the world, the environmental impact of producing so many new objects—and of distributing them around the globe—became apparent. How did the changing climate influence literature, itself tied to revolutionary new modes of production that dramatically reduced printing times and costs and allowed for unprecedented distribution around the world? Books, after all, are objects—reading them as textual objects, as well as analyzing their literary contents, is imperative when ecological questions are at play.

Naomi Klein suggests that our society resists discussing large-scale climate disasters because, as a frog sitting in a gradually warming pot of water, we come to believe that the temperature is not climbing at an alarming rate.\textsuperscript{27} Does literature contribute to this? How do literary atmospheres inform the way we currently perceive ourselves in relation to our surroundings? The texts at the core of my analysis are canonical and, as a result, are still

\textsuperscript{26} Ibid.
\textsuperscript{27} Naomi Klein, \textit{This Changes Everything: Capitalism vs. the Climate} (New York: Simon & Schuster, 2014).
widely read. Many of them fall into the category of realist fiction. Others, like Jules Verne’s novel, are often referred to as proto-science fiction, though they contain elements of realism: “Les romans de Jules Verne ont indéniablement une dimension réaliste. Mais chacun sait que le lien entre la réalité et un univers artistique est loin d’être simple. Faisons donc à la notion d’effet de réel, effet ressenti par le lecteur lorsque, devant un roman, il croit être en présence du réel. Cet effet repose, entre autres, sur la mention d’objets.”28 [“Jules Verne’s novels undeniably possess a realist dimension. But everyone knows that the links between reality and an artistic universe are far from simple. Let us call upon the idea of the reality effect, an effect that the reader experiences when, while reading a novel, they believe that they are in the presence of something real. The effect relies, among other things, upon objects.”] The most accessible objects that mediate the atmosphere in the nineteenth century are print-based: they range from a variety of affordable, ephemeral, didactic, and encyclopaedic documents. These materials are contained in canonical literary fiction, which continues to shape the way its readers conceive of the atmosphere.

2 Literary Environments

The methodological framework for this project relies on the overlapping concerns of literary ecocriticism, materialist studies by way of book history, and the emerging field of sound studies. This project, like the atmosphere, resists unilateral explanations and expands as bridges between different fields appear. It answers Oak Taylor’s call for an approach that

attends to “dimensions of scale” while also taking into consideration how the present “ecological crisis is wrought out of the accumulated trivial acts of everyday life.” 29 I would add that accumulated trivial things, the disposable print objects at the core of this project, further contribute to a deepened understanding of current cultural and ecological climates.

2.1 Reading Nineteenth-Century Novels Ecocritically

Many of the foundational layers of this project began in a seminar, “The Bourgeois,” that Franco Moretti gave during his tenure as the Northrop Frye visiting professor at the Centre for Comparative Literature. Moretti’s tools for analyzing literary texts help frame the atmosphere as something that both resists and shapes our understanding of space and how space is represented in literature. The atmosphere is always a highly spatial term. It is both local and global. We can talk of the atmosphere in a specific town, park, house, or bedroom just as much as we can point to the planet’s atmosphere and its spiking carbon and methane levels, or its psychological and affective influence. Mapping the use of the term, however, shows how the atmosphere in nineteenth-century novels shifts. It does so in an inversely proportional way. While its definition expands, its representation as a global force gradually shrinks. Scientific advancements in England and in France helped a wider public understand its environment; at the same time, the atmosphere was increasingly represented in terms of its impact on an individual scale. Moretti explains how between “Home and the World, a new spatial reality […] wedged itself, subordinating them both: the national market, whose immediate distance is traversed every week, if not day, by those regular novelties—books, newspapers, politics: all plurals—which […] keep multiplying throughout the industrial

nineteenth century.” 30 The proliferation of mediating objects like newspapers, books, magazines, pamphlets, and broadsides perpetuates the abstract conception of a world that is vast, connected, and reducible. The atmosphere does not escape this process, which was facilitated by the dissemination of knowledge in popular print. Indeed, the practice of capturing the atmosphere in writing is alluded to in the title of Henderson’s book, Meteorography, which speaks to the author’s desire to pin down the ephemera of the sky above with paper and ink.

The decline of atmospheric metaphors in literature corresponds with the rise of realist fiction and the erosion of popular forms of weather knowledge. The decline of folkloric explanations of atmospheric phenomena and the concomitant rise of realist fiction and scientific understanding is no accident; as Fredric Jameson explains, “Realism as a form (or mode) is historically associated […] with the function of demystification.”31 Mediating the atmosphere involves describing how it is perceived, physically, as well as aesthetically and emotionally. And yet it is always a biased description:

Realism […] is a hybrid concept, in which an epistemological claim (for knowledge or truth) masquerades as an aesthetic ideal, with fatal consequences for both of these incommensurable dimensions. If it is social truth or knowledge we want from realism, we will soon find that what we get is ideology; if it is beauty or aesthetic satisfaction we are looking for, we will quickly find that we have to do with outdated styles or mere decoration (if not distraction). And if it is history we are looking for—either social history or the history of literary forms—then we are at once confronted with questions about the uses of the past and even the access to it which, as unanswerable as they may be, take us well beyond literature and theory and seem to demand an engagement with our own present.32

32 Ibid., 5-6.
This is significant for the project of reading nineteenth-century English and French novels because it establishes the difficulty of separating the atmosphere from its historical context, as well as its historical present. Growing concerns with the atmosphere, with ecocriticism, with the Anthropocene, and with material culture are part and parcel of the same phenomenon; namely, that of having to face the very real fact of climate change. Realist fiction, in this light, engages the present by showing how we have been dealing with questions about the mediation and representation of our environment for nearly two centuries. Jameson notes, “the realistic novelist has a vested interest, an ontological stake, in the solidity of social reality, on the resistance of bourgeois society to history and change.”

Certainly, this reality is the result of the very consumption that defines bourgeois life in the West, but it is represented as a fixed presence rather than a changeable factor. Part of this solidity is based on the integration of print objects into literary forms. For Jameson, the “heterogeneous materials that somehow end up coalescing into what we call the novel—or realism!—include the following: ballads and broadsheets, newspaper sketches, memoirs, diaries and letters, the Renaissance tale, and even popular forms like the play or the folk- or fairy-tale.”

The scope of this project limits me to the study of a small fraction of these motley materials; specifically, those that were produced in order to explain the atmosphere to a wide and growing readership. Such objects and the information they disseminated, reproduced in realist fiction, continue to mediate perceptions of the atmosphere. The relationship between literature and the environment, in this light, forms an overarching pattern.

33 Ibid., 5.
34 Ibid., 8.
2.2 Reading Acoustically

Throughout “Barometric Books: The Atmosphere in Nineteenth-Century English and French Novels,” I analyze the ways that sound recuperates the atmosphere’s immersive capacities. Sound and atmosphere are imbricated in their most basic structures—as was understood at the dawn of the nineteenth century, and as is now taken for granted, sound requires the atmosphere in order to be heard. In my archival research, I found it very difficult to find a description of the atmosphere, or of instruments built to measure the atmosphere, without finding a related explanation of sonic phenomena.

The philosopher and literary critic Hans Gumbrecht comments on the relationship between sound, emotion, and atmosphere. To engage with texts more fully, Gumbrecht proposes that we read according to a third position, which he calls “stimmung.” This German word refers to “climate” and also connects to “Stimme” and “stimmen,” which mean “voice” and “to tune an instrument,” respectively. Gumbrecht is quick to say that he is “most interested in the component of meaning that connects Stimmung (climate) with music and the hearing of sounds.”35 As he explains, this position involves the entire body as well as the entire being:

Hearing is a complex form of behavior that involves the entire body. Skin and haptic modalities of perception play an important role. Every tone we perceive is, of course, a form of physical reality (if an invisible one) that “happens” to our body and, at the same time, “surrounds” it. Another dimension of reality that happens to our bodies in a similar way and surrounds them is the weather. For this very reason, references to music and weather often occur when literary texts make moods and atmospheres present or begin to reflect upon them. Being affected by sound or weather, while among the easiest and least obtrusive forms of experience, is, physically, a concrete

encounter (in the literal sense of *en-countering*: meeting up) with our physical environments.\textsuperscript{36}

The atmosphere links the environment, mood, and bodies within an overarching invisible physical reality. Reading nineteenth-century novels with this in mind transforms descriptions of the atmosphere, which are generally bound to descriptions of sound, into an experience that has the potential to link the reader to an environment that is otherwise inaccessible. The anthropologist Tim Ingold similarly suggests that we use weather terms to describe the embodied phenomenon of hearing. The intersecting paths where bodies, sounds, and texts meet exists within the broader system of weather, since sound “is not so much *what* we perceive as what we perceive *in.*”\textsuperscript{37} In other words, “sound is not the object but the medium of our perception. It is what we hear in.”\textsuperscript{38} Since the medium of our perception is enabled by the very existence of the atmosphere, itself described as a medium, considering sound alongside descriptions of the atmosphere in literature allows for a greater range of interpretive possibilities.

Gumbrecht goes on to answer what readers may be asking at this point: don’t music and weather provide metaphors for these things that we know as tone and atmosphere? “My point,” writes Gumbrecht, “is the fact that such tones, atmospheres, and Stimmungen never exist wholly independent of the material components of the works [...] Therefore, texts affect the ‘inner feelings’ of readers in the way that weather and music do.”\textsuperscript{39} The material components of the works serve to mediate the exchange between our bodies and the

\begin{footnotesize}
\begin{enumerate}
\item Ibid. Emphasis in original.
\item Ibid.
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atmosphere. In this sense, the atmosphere is always already mediated by the physical reality of our existence.

3 Barometric Books

In Chapter 1, I read Charlotte Brontë’s novels against the psychoanalytical grain of previous interpretations that depict moments of weather interpretation as projections of psychic premonition and fantasy, or of an over-reliance on the pathetic fallacy. I suggest that Jane Eyre, Villette, and Shirley recuperate the language of prognostication that was found in popular almanacs across England. The study of almanacs allows us to understand how people once made sense of the world. Throughout the country, life on Earth was being conceived in terms that were laid out on the pages of almanacs; these documents are not just containers of knowledge. They also structure knowledge, and frame the way people perceived their environment. Almanacs explained the atmosphere in terms of its fluidity. In their terms, the atmosphere is an invisible fluid that expands, contracts, and ties together all living beings within its overarching presence. This fluid atmosphere complicates literary scenes that would otherwise appear as instances of the pathetic fallacy.

Almanacs have long been overlooked in literary studies. They were cheap, portable, and perpetuated folkloric knowledge. I suggest that Brontë owned almanacs and used their language in her fiction. Chapter 1 reads canonical English novels through a forgotten populist lens. Though they were ephemeral documents meant to be replaced at the end of each calendar year, the traces of almanacs in Brontë’s fiction show how the atmosphere and its mediation are rich sites of cultural contestation.
In Chapter 2, the atmosphere is altered by industry. In urban cores, the signs of the weather that were once understood and explained in almanacs are no longer visible or decipherable. It is in this smoky context that Charles Dickens’s *Household Words*, an affordable weekly serial, first appears in 1850. Its pages featured novels, such as Dickens’s *Hard Times*, as well as Elizabeth Gaskell’s *North and South*. The serial also published articles that explained natural phenomena to a growing middle-class audience. One such article by Dickens, “Smoke or No Smoke,” deplores the atmospheric conditions in urban London. Yet the material conditions that allowed *Household Words* to be printed and distributed across the city contributed to London’s smoky atmosphere due to the incredible amounts of coal required for the steam engine, which revolutionized printing practices in the mid nineteenth century. That coal left its marks on pages, both literally and figuratively, as well as in the atmosphere. In this chapter, the atmosphere is perceptibly altered by human activity for the first time. Folkloric explanations of the weather are mocked, as natural philosophy is perceived as the only way to understand the changing environment. The period’s increasing separation of branches of knowledge, of spaces, and of classes occasions an attempt to separate individuals from the shared atmosphere.

This separation deepens until the atmosphere becomes a commodity. In Chapter 3, Jules Verne’s *Vingt Mille Lieues sous les mers* shows how the atmosphere’s mediation through popularizing scientific documents causes a paradox. The atmosphere is understood according to an expanding definition that maintains its fluidity and aggregates its affective, gaseous, and technological meaning. This didactic expansion introduces a turn towards the individual. The atmosphere no longer unites humans to their environment on a global scale. Instead, its sphere of influence shrinks to the individual. Nemo’s separation from land
occasions a failed separation from the atmosphere, which can never be truly divided. Aboard the Nautilus, the atmosphere joins a catalogue of objects that are meant for private consumption.

Discussions of climate change sometimes bemoan an idyllic past wherein humans were more attuned to their surroundings and simpatico with the elements. In a radio broadcast on the CBC’s “Metro Morning” program last spring, listeners were asked if they believed in long-range weather forecasts. One woman had heard that farmers use the length of the stripe on caterpillars’ backs to determine how late the winter will last. Another man said that a science report he had written in the sixth grade showed that, statistically, half of the predictions made by long-range weather forecasts were inaccurate. He trusted himself and looked outside before leaving the house, but had not read a weather report in over a decade. These interviews speak to a persistent skepticism about meteorology’s ability to interpret the atmosphere. This doubt is echoed in recent advertisements posted in the Toronto Transit Commission’s subways that show a plane leaving traces of white clouds across a blue sky. Text at the bottom of the image asks: “Look up. Is your weather engineered?” The poster decries chemical trails, or “chemtrails.” Those who believe in the existence of chemical trails suggest that airplanes operated by secret corporations shed vapour that has been laced with different toxic chemicals into the sky, thereby causing weather disruptions over key areas. David Suzuki, one of the world’s pre-eminent ecologists, has debunked chemtrails. Still, Suzuki is disturbed by the relationship he notices between belief in an unscientific theory and climate change denial. He asks: “why do so many people accept a theory for which there is no scientific evidence while rejecting a serious and potentially catastrophic phenomenon that can be easily observed and for which overwhelming evidence
has been building for decades?"\textsuperscript{40} The belief in chemtrails reminds me of John Henderson’s invectives in his preface to \textit{Meteorography}, worth repeating here: “how absurdly people talk about good and bad weather—about the influence of the moon in meteorological phenomena, and about the predictions of the barometer!”\textsuperscript{41} For Henderson, as for the CBC radio callers who shared their own weather wisdom and the people who believe that what they see in the sky holds more weight than what modern science has to offer, the only accurate interpretation of the atmosphere is that which is based on observations.

I propose that resistance to climate change, with a belief in the authenticity of folkloric environmental knowledge, speaks to the resistance towards the atmosphere as a shared global substance. The banality of daily life—its small actions, its familiar objects—seems wholly divorced from the overwhelming totality of the atmosphere. How can coal mining in India impact the air someone breathes on the shores of Lake Superior? The atmosphere’s scale is understood, but its relationship to individual lives is dwarfed by this magnitude. In my reading of the following novels, I discern how the ways in which the atmosphere was explained in popular print media influenced its representation in literature. As scientific knowledge deepened the understanding of the atmosphere, its presence as an active force in literary texts gradually diminished. It was no longer seen as an invisible fluid that united humans to one another and tied their fates to planetary motions. Paying attention to the objects that mediate the atmosphere tells us more about the broader context in which canonical texts were read and understood.

\textsuperscript{41} Henderson, \textit{Meteorography}, 6.
Chapter 1
“I know some signs of the skies”:
Reading the Weather in Charlotte Brontë’s Novels

No matter who you are, the weather will impact you.  
-Harrowsmith’s Almanac for 2016

…Happily for all parties the east wind no longer prevails. During its continuance she  
Charlotte complained of its influence as usual. I too suffered from it in some degree, as I  
always do, more or less…  
-Anne Brontë in a letter to Ellen Nussey, October 4, 1847

In Charlotte Brontë’s novels, the atmosphere connects the entire world as a decipherable  
cosmology of planets that bask within the same fluid. Messages are present for those who  
know how to pay attention to the signals—be they visual or aural—and who can interpret  
atmospheric variations.

Almanacs framed the way nineteenth-century audiences perceived the natural  
world—and influenced how Charlotte Brontë wrote about it. In addition to sermons, novels,  
poems, and periodicals, almanacs—in their prophetic language, sayings, and fusion of  
religious and folkloric beliefs—give Brontë the vocabulary to articulate her complex vision  
of the atmosphere, which represents perceptions of the natural world that circulated  
throughout the early nineteenth century. Overlooking almanacs and other ephemera, such as  
pamphlets and broadsides, removes Brontë from the broader historical context of print  
distribution in early Victorian England. Simply put, these documents were widely circulated,  
readily available, and culturally significant. Their elision over the course of a century  
contributes to their ongoing invisibility; worse still, their status as ephemera, paired with
their predominantly working-class audiences, cements their position as texts held outside the sphere of literary fiction.

1 Charlotte Brontë and English Skies

1.1 Placing the Weather

In the summer of 2012, Rebecca Chesney’s exhibit, *Hope’s Whisper*, was unveiled at the Brontë Parsonage Museum. It was the result of a lengthy project that was inspired by the weather in the Brontë sisters’ novels. Chesney, a visual artist based in Preston, England, spent a year recording weather patterns in Haworth. She installed a weather station at the parsonage and recruited volunteers to keep track of daily temperatures and meteorological events every day for twelve months.

Her collaboration with local residents was paired with the Brontës’ textual archive. Over the course of the year, Chesney cross-referenced the collected data with descriptions of the weather in *Jane Eyre*, *Wuthering Heights*, and *The Tenant of Wildfell Hall*. She also compared her findings to evocative passages of the weather in the sisters’ correspondence and journal entries. One of the resulting pieces is a triptych of colour wheels that represent the frequency and nature of weather events in the three novels. Eighteen different phenomena are accounted for, including thunder and lightning, wind, mist, rain, dew, drizzle, and drear. The wheels highlight how the weather varies in each text, and underscores the fact that the sun, as well as “fine [or] beautiful” days, appear as nearly as often as the rain and drizzle. More importantly, Chesney’s quasi-scientific arrangement of literary data shows how the weather “influenced the [Brontës’] creative fictional writings as well as their personal
lives.” As an art project, *Hope’s Whisper* represents the weather’s affective and aesthetic significance in the Brontës’ literary corpus.

Charlotte Brontë’s attentiveness to the weather is sharply demonstrated in letters that describe rainfall, cold, and wind in great detail. Similar patterns are repeated throughout her fiction, where the terms Brontë uses to describe the atmosphere and its changes are specific and even technical. Closer investigation into the print culture of early nineteenth-century England indicates that Brontë was alluding to a common lexicon drawn from the language from popular texts. Her generation read publications such as Bewick’s *A History of British Birds* that influenced their knowledge of fauna. What is less known, but equally important, is that they also read materials that shaped the way they perceived the atmosphere. In light of recent historical reconfigurations of Brontë’s work, it behooves us to consider the ephemeral elements of print culture when considering the material context that influenced and was represented in Brontë’s fiction.

The frequent and persistent descriptions of the weather in Brontë’s novels are often associated with the pathetic fallacy, the process of granting “human traits to inanimate nature” in a manner “less formal and more indirect than in the figure called personification.” This has recently been complicated by historical studies of Brontë’s life. For example, efforts to position Brontë in her specific geographical and cultural context have introduced a series of illuminating perspectives on her psychological knowledge. Still, there persists a tendency to overlook Brontë’s ecological awareness—especially the kind of

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environmental knowledge that rests beyond the bounds of gardening and scrapbooking, and
instead finds its origins in popular print documents that circulated widely among workers,
clergy members, and upper classes. In Brontë’s novels, descriptions of the atmosphere and its
effects go beyond the pathetic fallacy by harnessing terms that were circulated in popular
print culture, and in almanacs in particular.

Much ink has been spilled on the Brontës’ relationship to weather, specifically to the
Yorkshire moors surrounding their homestead. Jenna Holmes, the Brontë Parsonage
Museum’s Arts Officer, introduces Chesney’s exhibit by noting that the “Brontë novels are
rooted in the landscape of the Yorkshire moors, and its turbulent weather is vividly
represented throughout their literary worlds.”

Matthew Arnold’s elegy, “Haworth Churchyard, April 1855,” concludes in a cry that only the powerful natural forces at play on
the moors could ever revive the departed authors:

> Sleep, O cluster of friends,
> Sleep! or only, when May,
> Brought by the West Wind, returns
> Back to your native heaths,
> And the plover is heard on the moors,
> Yearly awake, to behold
> The opening summer, the sky,
> The shining moorland; to hear
> The drowsy bee, as of old,
> Hum o’er the thyme, the grouse
> Call from the heather in bloom:

> Sleep; or only for this
> Break your united repose.

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Nothing short of a glorious spring could bring the sisters back—the flowers, open sky, and birds must clamour for those who once walked the moors on a daily basis. The relationship between the heath and the Brontës was further strengthened by Elizabeth Gaskell’s account in *The Life of Charlotte Brontë* (1857), a biography of her friend that places a premium on Haworth’s geography in relation to the broader British countryside: “I understood [Charlotte’s] life the better for seeing the place where it had been spent.” Beyond evocative descriptions of the landscape and Charlotte’s passion for it, Gaskell melds the Brontës and Haworth in the cultural imagination when she suggests that the town’s air infiltrated the sisters’ bodies, contaminated their lungs, and brought them to their early graves.

Gaskell was correct in suspecting that a contaminated shared substance made the town’s inhabitants sick; however, it was not the air. The church and parsonage are located at the top of a steep hill from which the surrounding towns and distant hills are visible. Groundwater from Haworth cemetery would trickle down to the village drinking supply and infect those who used the main pump. Gaskell was horrified by the thought of the polluted water seeping downhill and making the inhabitants who lived in the lower part of town sick. Gaskell’s impression that the atmosphere and the water were fundamentally tainted cemented her perception of Haworth as an unhealthy place. She noticed constant reminders of death;

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47 For more information about Haworth during Charlotte Brontë’s lifetime, see S. R. Whitehead, *The Brontës’ Haworth* (Haworth: Ashmount Press, 2006). Patrick Brontë was actively involved in the campaign to provide Haworth residents with a clean supply of drinking water. See also Emily Morris, “‘For her very life’: Duty, Health and the Poisonous Atmosphere of Haworth in Elizabeth Gaskell’s *The Life of Charlotte Brontë*” *Brontë Studies* 38 (2013): 185-94.
Haworth had a high mortality rate, and its history is marked by frequent outbreaks of deadly diseases, when funeral bells would fill “the heavy air with their mournful sound.”  

Nearly fifty years after Gaskell’s biography was published, in November of 1904, Virginia Woolf was struck by the cemetery’s proximity to the parsonage. It wraps around the property, and a small plaque announces that there are an estimated forty thousand burials in the graveyard. The haphazard and almost endless rows of gravestones impressed her: “There is no hand’s breadth untenanted; indeed, the economy of space is somewhat irreverent. In old days a flagged path, which suggested the slabs of graves, led from the front door of the parsonage to the churchyard without interruption of wall or hedge; the garden was practically the graveyard too.” The moors and the cemetery emerge as salient components in the critical responses to the Brontës. The wild winds, dreary nights, and untamed moors shape the biographical focus that has framed many literary analyses. The interconnections between the moors and the Brontës have become so commonplace that signs along the twisted highways leading up to Haworth proclaim that you are entering “Brontë Country.”

Still, psychoanalytically inflected criticism of the early twentieth century continues to inform much of the discourse surrounding the Brontë sisters and their relationship with nature. Psychoanalytical literary critics found ample materials for study in *Jane Eyre* and *Villette*, though *Wuthering Heights* quickly became a favourite. Herbert Rosengarten points

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50 The roots that tie places and people seem especially deep in Haworth; the town maintains an aspect of frozen historicity that perpetuates the association between the moors and the Brontës. The local economy depends on literary tourism, which is helped by English literature curricula that continue to teach the Brontës’ works by introducing, first and foremost, Yorkshire’s landscape. For a good example of this association, see the British Museum’s online video clips, in which Brontë scholars talk about the sisters’ lives while standing, wind-blown and red-faced, in the moors.
to Lucile Dooley’s article, “Psychoanalysis of Charlotte Brontë,” published in 1920, as the text that unleashed a flurry of connections between biographical details and hidden desires in the Brontës’ novels. The early influence of psychoanalytical literary readings persists among instances of prophecy within Charlotte Brontë’s novels. Sandra Gilbert and Susan Gubar’s seminal *The Madwoman in the Attic: The Woman Writer and the Nineteenth-Century Literary Imagination* (1979) reads hidden struggles against overwhelming power structures at play in Emily and Charlotte’s novels. Foretelling and foreshadowing—especially as they are associated with nature—are attributed to the author’s psychoanalytical genius. Angela Hague follows Gilbert and Gubar in stating that Brontë was a “trance writer” who “believed that her artistic gift was based upon an intuitive relationship with the world around her, and *Jane Eyre* and *Villette* embody her theories about how intuition affects the connections between human beings and the actions they take.” Hague, like Gilbert and Gubar, Robert Heilman and other scholars, reads Brontë’s fiction along lines that tease out psychoanalytical meanings from otherworldly moments in the text.

In the late 1970s, a return to psychoanalytical theory, now interpreted through a feminist lens, opened texts to new avenues of interpretation along gendered axes. Terry

52 In the middle of the twentieth century, previously unpublished materials such as Emily’s poetry and much of the siblings’ juvenilia became available and showed that their novels did not emerge fully-formed, but were rather the result of years of practice and work. The advent and spread of New Criticism turned academic focus towards more detailed readings of the texts, allowing for new perspectives on elements such as imagery, structure, and narrative roles. Renewed biographical interest sparked an academic interest in Anne’s novels, whose contributions had been dismissed shortly after her death. As Marxist, feminist and postcolonial turns influenced literary analyses, the Brontës’ novels were interpreted in a new light; regardless, the persistence of psychoanalysis continues to influence the way many of their key developments are understood.
54 See also Elaine Showalter’s *A Literature of Their Own: British Women Writers, From Charlotte Brontë to Doris Lessing* (London: Virago, 2009).
Eagleton’s *Myths of Power: A Marxist Study of the Brontës* examines the class structures at play in the three sisters’ body of works. Methodologies such as these, especially in the case of Marxist literary analysis and postcolonial approaches to nineteenth-century literature, necessarily beckon to the historical background in which the texts are written. Over the course of the last decade, archival research and interdisciplinary concerns in literary studies have allowed for more flexible readings of the Brontës’ novels, readings which do not claim to hold a “key” to understanding the text. As Alexandra Lewis points out, “appreciating the intelligent use of particular registers of language in [Charlotte] Brontë’s work allows much that has been regarded as awkward, random and disruptive to be differently perceived, as speaking of a multifarious early nineteenth-century world.” Sally Shuttleworth is among those who first challenged the “tendency to regard Charlotte Brontë in a historical vacuum” by focusing on the author’s relationship with psychology as it was understood during her lifetime.

The recent turn towards an interdisciplinary and historically contextualized framing of Charlotte Brontë’s writing allows for connections between popular print, realist fiction, and the literary representation of the environment. Studies of the land in *Jane Eyre* tend to expand along the lines of a hyper-local/global dialectic. These approaches certainly highlight Brontë’s perpetual fascination with her surroundings and with the fantastic

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potential that harsh and unwelcoming locations held for her. More significantly, they show an author who was attuned to her environment and connected to a wide web of cultural production.

Barbara T. Gates’s recent exploration of the Brontë sisters’ botanical practices certainly demonstrates how the siblings were attuned to the catalogue of flora that surrounded them on the Yorkshire moors; allusions to their encyclopedic knowledge of plants and flowers are included in all of their novels.58 Visual descriptions of nature highlight Charlotte’s extensive environmental knowledge. Other critics have pointed to her lush portrayals of flora throughout her writing, likely inspired from her sketches of flowers and trees surrounding the parsonage; similarly, repeated references to different natural history texts underline her familiarity with such topics as botany, zoology and geology.59 In addition, much Brontë scholarship showcases natural forces as loaded symbols: water, fire, air, snow, the moon, and trees have all served to focalize various studies, most notably in and since David Lodge first established connections between emotions and environment in Brontë’s fiction.60 Like Shuttleworth, Jen Hill finds clues in book history to draw the connection between literary text and cultural knowledge. Young Jane Eyre’s copy of Bewick’s *A History of British Birds*, for example, underscores Brontë’s fascination with natural history and geography—a link further supported by materials in the family library.61 Yet for all the

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61 For example: Bingley’s *Practical Introduction to Botany ... second edition, with some account of The History of the Science ...* (London: Baldwin, Cradock and Joy, 1827), Sir Humphrey Davy’s *Elements of chemical philosophy* (London: J. Johnson, 1812), Reverend J. Goldsmith’s *A Grammar of general geography for the use*
research on the Brontës’ botanical interests, connections to the weather are rarely closely examined; rather, they are often dismissed as instances of the pathetic fallacy, or of individual psychic power.

By keeping nineteenth-century print culture in mind, Brontë’s descriptions of the weather and her heroines’ reactions to natural phenomena are shown to hold an additional dimension of historical complexity. These are not simply moments of “intuitive consciousness” that reveal “nonrational, unconscious modes of knowing.” Such interpretations flatten Brontë’s understanding of natural phenomena and reduce her descriptions of complex weather phenomena to idiosyncratic interpretations that fuse religious discourse with vague psychic abilities. According to Hague, Brontë’s descriptions of the natural phenomena and her characters’ knowledge of its signs require a “psychic openness, a sympathetic relationship of identification and interaction.” But, I would argue, it also requires a familiarity with almanacs.

In attending to almanacs’ unchanging tables and formatting guidelines that framed the profusion of data laid out on their pages, we can begin to find interconnections with Brontë’s novels. In these, a sense of cohesion is imposed by atmospheric cadences. Before moving to a more detailed reading of the atmosphere in Jane Eyre, Villette, and Shirley, the relationship

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63 Ibid.
64 Ibid.
between descriptions of natural phenomena and human emotion merits attention as it is often associated with the pathetic fallacy, a term coined by John Ruskin.

1.2 The Pathetic Fallacy
Ruskin’s *Modern Painters* was published in 1856, a year following Brontë’s death. In it, the art critic and author defines the pathetic fallacy as the unhappy result of the “influence of emotion” that leads an author to produce “falseness in all [their] impressions of external things.” The text that emerges from this state relies heavily on metaphors that, while they may be pleasing to the reader, are inaccurate. A writer must, according to Ruskin, resist succumbing to the kind of error that “the mind admits when affected strongly by emotion.” This insistence on factual accuracy stems from a sustained effort to sever affective ties to nature while promoting a rational, measured, and scientific approach that reverberated across different fields of enquiry, from literature to the emerging branch of meteorology.

In the first half of the nineteenth century, the atmosphere became a crucible for competing forms of knowledge instruction, distribution, and development. The interpretation of weather phenomena was increasingly polarized. Centuries of weather lore, which often took the form of rhyming couplets or proverbs and circulated in almanacs, were deeply ingrained in cultural practices. Natural science provided a new, fashionable, and culturally valid hobby. It was also supported by newly founded societies for standardized units of measure. Standardization quickly spread across England in the early nineteenth century. In

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66 Ibid., 1431.
less than twenty years, multiple acts established the necessity for normative forms of knowledge: the Weights and Measures Act was passed in 1824, shortly before the establishment of the Statistical Department of the Board of Trade (1832) and the Observatory of the British Association of the Advancement of Science at Kew (1842). At the same time, folkloric knowledge became something that middle-class individuals could collect and discuss, but not something that they would adopt in their daily lives. This shift from the folkloric to the scientific “gradually converted the symbolic economies of different regions into a coin of exchange among literate men of leisure,” the same men who deplored the “absurdities and indecencies” found in almanacs.

One of these men was Charles Knight, one of the key players in the Society for the Diffusion of Useful Knowledge (the SDUK, which operated from 1826-1848). The existence of such a society in the early to mid-nineteenth century speaks to the broader cultural shifts that occurred during the same period, and helps to explain why readers continue to dismiss any manifestation of the weather in literature as a sign of the pathetic fallacy. Knight developed almanacs for the SDUK. His aim was not to force lower classes to stop thinking about the atmosphere; rather, it was to tell them how to think about it—in rational terms rather than those of prophecy or weather-lore, and in “standard English” instead of in dialect. The companion to the 1830 British Almanac explains that the weather, which is the result of

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“those incessant variations in the atmosphere,”\(^{70}\) is often used as a means to confuse those readers who may think they are weather-wise, but lack the discerning minds to evaluate prognostication for what it is worth:

> The desire of information and [...] uncertainty prevail in the deliberations upon the more important and extensive operations of man, wherever the action of the atmospheric agents may assist or interfere; so that the cunning cheat, who could make a parade of abstruse learning sufficient to mystify the uninformed, has, for centuries, found the sale of predictions as to the state of the weather an abundant source of profit.\(^{71}\)

The SDUK and Charles Knight fought fire with fire, or in this case, fought almanacs with almanacs. Theirs contained an abundance of scientific information written in order to curb enthusiasm for the predictions and beliefs propounded in mainstream publications. The explanatory notes for an edition of the *Companion to the British Almanac* stress that the measures provided in the weather table are averages “deduced from long observation; and that, as such, they are not to be mistaken for prophecies, but are simply to be regarded as the basis of useful anticipations.”\(^{72}\) The panel of esteemed editors—who were featured in lieu of the mysterious and seemingly immortal prophets usually featured in such publications—add, “when people have been accustomed to believe in the absurdities of weather prophecies, it is difficult to satisfy them with common sense.”\(^{73}\) For Knight and other men of his ilk, “science would affirm that what had been taken for centuries as ‘wonders’ and ‘marvels,’ when

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\(^{70}\) *The British Almanac*, 69.

\(^{71}\) Ibid., 68.

\(^{72}\) Ibid., 3. We can only imagine that the editor had received a great number of complaints from individuals who were used to reading prophetic, rather than proto-scientific, almanacs.

\(^{73}\) Ibid.
examined empirically and without reliance on revelation, would be explicable in terms of uniform natural laws.”74 There would be no shared planetary influence here—only facts.

Knight’s declaration echoes Ruskin’s invective against literary descriptions that impart human characteristics to things such as flowers, trees, winds, and rivers. Ruskin deplores the “false appearances” that are “entirely unconnected with any real power of character in the object, and only imputed to it by us.”75 The pathetic fallacy hinges upon the difference between “the ordinary, proper, and true appearances of things” and the “extraordinary, or false appearances”76 that result from a state of emotional passion. Knight abhors prophetic content, which is drawn by reading nature and drawing irrational conclusions from its signs. Similarly, Ruskin disparages authors who would describe natural phenomena in terms that are “untrue.”77 Though Ruskin is primarily concerned with literary descriptions of nature, and Knight is interested in weather forecasting practices, both writers share a common fact-propagating mission.

Brontë’s novels represent nature, and especially the atmosphere and its manifestations, in ways that, for Ruskin, are invested with emotional (irrational) dubiousness. For readers familiar with almanacs and their prophetic contents, however, such associations are neither unusual nor misrepresentative—a fact that would surely irk Knight. The tendency to pigeonhole Brontë’s references to nature as examples of the pathetic fallacy undermines

76 Ibid.
77 Ibid.
the complicated ways in which the author writes her environment, particularly as a writer who was exposed to and informed by a wide array of often overlooked print culture.

For instance, in *Shirley*, the ominous sounds of bad weather do not echo the eponymous character’s psychological state, but oppose it:

> A western wind roared high round the hall, driving wild clouds and stormy rain up from the far-remote ocean: all was tempest outside the antique lattices, all deep peace within. Shirley sat at the window, watching the rack in heaven, the mist on earth, listening to certain notes of the gale that plained like restless spirits—notes which, had she not been so young, gay, and healthy, would have swept her trembling nerves like some omen, some anticipatory dirge: in this her prime of existence and bloom of beauty, they but subdued vivacity to pensiveness.78

The atmosphere does not always represent the character’s emotional state; rather, it foreshadows important life events. It functions not as a mirroring of the inner self but as a forecasting presence. More specifically, Brontë’s heroines understand the atmosphere—they see its signs and listen to its messages—as a way to anticipate future events. As an exteriorized reality, the weather complicates an attribution of the pathetic fallacy. Brontë does not succumb to a moment of weakness, overwhelmed by emotion, to describe nature in terms generally reserved for human feeling. Rather, her symbolic language repositions the atmosphere as a fluid and uncontrollable but often predictable presence.

> In Brontë’s understanding, presentiment is an embodied feeling that precedes a meteorological manifestation, a physical reaction and foreshadowing that reaches beyond pathetic fallacy. The physical is just as important as the mental. Reading the sky involves more than visually decoding its messages, as it presupposes a belief in a cosmology wherein planets directly influence the atmosphere, which unites all living things. In Brontë’s novels,

weather phenomena signal a predetermined course of events that, to those well versed in the astrological content of almanacs, would have appeared clear as day.

The difference between the pathetic fallacy, which associates an affective state with nature, and the interpretation of the environment is slight but meaningful. It is the contrast between reflection and anticipation. For instance, after Jane Eyre first encounters Rochester and accidentally causes him to be thrown from his horse, the young governess is keenly attuned to the sky in a scene that resists the pathetic fallacy’s narrow categorization:

Both my eyes and spirit seemed drawn from the gloomy house—from the gray hollow filled with rayless cells, as it appeared to me—to that sky expanded before me—a blue sea absolved from taint of cloud; the moon ascending it in solemn March; her orb seeming to look up as she left the hill-tops, from behind which she had come, far and farther below her, and aspired to the zenith, midnight-dark in its fathomless depth and measureless distance; and for those trembling stars that followed her course, they made my heart tremble, my veins glow, when I viewed them.79

Jane is entranced and physically connected to the firmament: her body throbs with its energy and she reacts strongly to the moon’s ascent. Her heart beats much faster, and Jane is keenly aware of the network of veins in her entire body—the “glow” in her veins suggests both heat and radiant light. This complicates the pathetic fallacy; nature does not simply represent the heroine’s emotional state. Rather, the natural and the personal run parallel to one another, immersed in the same atmosphere—when one is struck, the other vibrates in response to its neighbour’s movement. Jane’s presence immerses her in the “blue sea” she and the moon share as they move alongside one another. Jane connects to the atmosphere; she can interpret the elements and is charged with the same current that dictates meteorological phenomena.

Gaskell surmised that her friend paid close attention to the atmosphere because of her frail constitution, a connection that is often explicitly commented upon by Brontë herself. In a letter to Gaskell written in February 1850, Brontë draws parallels between her psychological state and the approach of stormy weather:

I do not know what heaviness of spirit has beset me of late, made my faculties dull, made rest weariness and occupation burdensome… I attribute this state of things partly to the weather. Quicksilver invariably falls low in storms and high winds, and I have ere this been warned of approaching disturbance in the atmosphere by a sense of bodily weakness and deep heavy mental sadness such as some would call presentiment—presentiment indeed it is but not at all supernatural…

Brontë keeps atmospheric measures in mind as one who knows how to read the signs of oncoming weather trouble. This is “presentiment,” but it is not of the supernatural kind. There are no precognitive abilities associated with understanding that the weather and the larger disturbance in the atmosphere imprint themselves upon her body. In fact, Brontë’s reaction echoes the very kind of language that Knight sought to eradicate from popular print documents, namely, the language of prognostication.

2 Signs and Portents: A History of Almanacs

Almanacs were undoubtedly available in Haworth, and it is very likely that members of the Brontë family, or their servants, purchased and read almanacs. Josephine McDonagh lists the different novels, periodicals, treatises, plays, and other materials that the young Brontës would have been exposed to. McDonagh openly refers to their “immersion in the print culture of [the] time […] especially [their] acquaintance with these more ephemeral forms of

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80 Gaskell, The Life, 334-5, in a letter written in February of 1850.
magazines and albums.”

Even though textual evidence points to the ways in which almanacs influenced the Brontës, very few critics have studied this relationship. Among those who have explored how almanacs appear in the Brontës’ novels, A. Stuart Daley has suggested that Emily “based the more intricate time sequences in *Wuthering Heights* on almanacs originally associated with the Young Men’s Play,” as these would provide “convenience and accuracy in constructing elaborate time sequences for her narratives.”

All the moons in *Wuthering Heights*, according to Daley’s calculations and comparisons with almanacs for the years 1826 and 1827, are chronologically accurate.

Still, much current scholarship is inflected with the perception that the Brontës were literary geniuses. Relying on the trope of genius aggravates the distance between authors and popular contemporary forms. Such a conception forecloses the possibility of imagining a creative process that, gifted and original as it is in the case of the Brontës, nevertheless relies on the banality of everyday things. Few things are more mundane than a calendar, and almanacs were more common in the nineteenth century than twentieth-century audiences may realize. Given the fact that they shared close quarters and regularly consulted one another on their literary endeavours, it is probable that Anne and Charlotte were aware of

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82 A. Stuart Daley, “The Moons and Almanacs of *Wuthering Heights*,” *Huntington Library Quarterly* 37 (August 1974), 352. See also Peter Nockolds, “Midsummer Moon: The Lunar Structure of *Jane Eyre*,” *Brontë Studies* 29 (2004): 159. Nockolds states that though there is little evidence of almanacs being present in the Parsonage, it would have been easy for the sisters to calculate the lunar cycle. I applaud Nockold’s thorough analysis of the different moons in *Jane Eyre* and his careful pairing of the lunar calendar with the Christian one, something that would have been laid out just as clearly in an almanac. Although there are, as of yet, no material traces of almanacs at the Parsonage, their influence is palpable.
Emily’s use of almanacs. It is likely, too, that Charlotte Brontë’s writing was influenced by these ephemerides.

Almanacs were once so commonplace that their present status as whimsical and amusing (if not entirely reliable) documents, nearly a century after their gradual decline, stands out. In the early nineteenth century, at the peak of their distribution and popularity, almanacs were found across different countries, in the houses of upper and lower classes, and were even stitched to different pieces of clothing for easy access. The word “almanac” is now used to describe a seemingly miscellaneous collection of factoids, jokes, stories, and statistics about a wide variety of different topics. For centuries, however, almanacs were the constant companions and reliable sources of information to countless individuals.84

2.1 The British Context
Almanacs contain vital information; they are important cultural documents. Their production, distribution patterns, audiences, and contents are indications of the knowledge that was privileged for centuries. Yet almanacs are also paradoxical; they once proliferated beyond all accounting, but as ephemera meant to be replaced annually, titles that were once ubiquitous are now extremely rare. In his analysis of bibliographic records, Michael Suarez notes how “evidence […] makes it clear that, for most of the years during which the publication of Goldsmith’s Almanack was firmly documented by the printer’s records, not a single copy

survives.” The thousands of almanacs that are currently held in rare book collections only represent a fraction of what was once available, as almanacs have existed for centuries.

In England, some of the earliest remaining almanacs were produced in the Middle Ages in manuscript form. At the Wellcome Collection in London, a physician’s almanac from the late fifteenth century contains the information required to determine lunar cycles for nineteen years. As it was meant to last nearly two decades, this almanac was a considerable investment—and one that could be passed down. Its manuscript pages are laid out in red and black ink. Special feast days were indicated in red ink (hence the expression “red letter days”). This process requires painstaking efforts on the part of the printer. These labours would eventually be lessened by the hand press, but the exacting nature of printing detailed numerical information in tabular form ensured that the almanac’s format remained stable over the course of the following four centuries. Michael Twyman explains that, much like the physician’s almanac from the fifteenth century, sheet almanacs were organized “in tabular form, and often printed in small type in red and black. [They] would have presented one of the most demanding tasks for the jobbing printer, and this may well account for the survival of what was essentially the same design idea over many years.” With the advent of the printing press in the late fifteenth century, producing such rote material was simplified, and made printed texts more affordable to a broader audience.

86 The same collection features another manuscript almanac, a “girdle almanac” (so-called because it was designed to be hung from a belt). It is beautifully illuminated with gold leaf detailing, and was likely another expensive, custom-made almanac. It’s estimated it was also produced in the mid-fifteenth century, at a time when a revolution in printing technology would soon transform almanac production.
By the sixteenth century, almanacs generally contained a calendar for the upcoming year with a table for Christian feast dates, information about the phases of the moon, a description of seasonal labour and corresponding weather, a list of key fairs, and miscellaneous health advice. In the seventeenth and eighteenth centuries, almanacs and bibles were the only print documents many people would have read, or have read to them. As Louis James notes, “even cottages without a broadsheet or chapbook would be likely to have a sheet almanack pinned to the wall.”  

In farming villages, almanacs were purchased by a few literate families, who would then share the information on crop planting, lunar phase, or political predictions with their neighbours by reading aloud or repeating the lessons, poems, and recipes distributed within its pages. By the nineteenth century, an almanac’s wide distribution became a point of pride and a source of revenue for printers, who secured advertisements by flaunting vast circulation numbers.

As printing practices evolved and standardized, the almanac’s contents became more regular, too. In 1557, the British government granted a monopoly to a printers’ guild in

88 Louis James, *Print and the People, 1819-1851* (London: Allen James, 1976), 53.
89 Such usage shows up, for example, in Thomas Hardy’s *The Return of the Native*, where Christian, the town’s simpleton, bemoans his ill-timed birth:

“‘Mother know’d ‘twas no moon, for she asked another woman that had an almanac, as she did whenever a boy was born to her, because of the saying, ‘No moon, no man,’ which made her afeard every man-child she had. Do ye really think it serious, Mister Fairway, that there was no moon?’

‘Yes. ‘No moon, no man.’ ‘Tis one of the truest sayings ever spit out.’”

Christian’s mother’s concern for the lunar cycle highlights how moonlore, or the belief that the moon influenced human behaviour, played an important role in understanding meteorological phenomena. See Thomas Hardy, *The Return of the Native* (Oxford: Oxford University Press), 24.

90 At the British Library, the *West Riding Almanac* is accompanied by a booklet that flaunts its vast marketing potential: “John Fox and Son, Respectfully solicit the attention of all persons to the decided and excellent advantages offered to them, by their Advertising Appendix.—It is attached to, and Given away with every Almanack, Pocket-Book, Annual, &c., sold by them; AND A CIRCULATION OF 1500 is thereby guaranteed, WHICH WILL BE SEEN BY AT LEAST NINE THOUSAND PERSONS. As it is added to the Almanacks, which are books of daily reference, it finds its way into the houses of all classes of the Community, and it is noticed at every time the Almanack is consulted; and as it is PRESERVED FOR at least TWELVE MONTHS, it will be found the most advantageous mode of advertising, to all persons in Trade or Profession, to citors, Schoolmasters, &c.”
London, the Stationers’ Company; this granted the Company rights over almanacs, which were lucrative documents because they were consistently replaced at the end of each year. During the course of its centuries of control over almanacs, the Stationers’ Company tried to maintain absolute power over the production and distribution of almanacs. Part of their strategy for ensuring supremacy in the almanac market involved the carefully timed release of new issues every year—a practice that would remain until the nineteenth century. 91

Saint Cecilia’s Day, in the third week of November, was devoted to almanac distribution across England. Thomas Frognall Dibdin, a nineteenth-century bibliophile, describes groups of booksellers rushing across the main courtyard of the Stationers’ Company: “Within three minutes, I saw an eight-feet cubical pile of these annual lucubrations […] disposed of, and taken home; and was informed, by one of the partners, that, before St Paul’s clock would strike eight, every country bookseller’s order would be despatched to him by the coach!” 92 Speed was of the essence to secure a profit, as illegal and much more affordable versions of these almanacs—their illegal status evident in the conspicuous absence of a government stamp marking the price of duty—would soon appear and erode profits.

In Yorkshire, as well as across other regions that were removed from large urban centres, specialized printers distributed their own (often pirated) versions of popular almanacs. This practice increased after the Crown abolished the Stationers’ Company

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monopoly on almanac printing in 1775. The loss of these exclusive rights led to an unprecedented flood of pirated almanacs, many of them based on famous and well-received models altered to highlight regionally specific information, dialect, jokes, or folklore. For example, *Old Moore’s Almanac* was one of the most popular publications in the country, but multiple variants existed in different parishes and counties.\(^9^3\) This is largely due to the fact that almanacs were the bread-and-butter of many small-scale operations. While presentation styles remained steady, there were wide variations in terms of content—especially in what Maureen Perkins calls astrological almanacs, which sought to predict the weather a year in advance by predicting planetary courses.

2.2 “On the phenomena of astrological bodies”: Almanacs, Planets, and People

It is difficult to classify almanacs. Once the Stationers’ Company lost their exclusive rights, a flurry of new publications emerged. Some almanacs further ventured into prognostication, while others focused on mathematical games and puzzles, or gender-specific activities, advice, and information.\(^9^4\) Over the course of the century, different titles appeared and broadened the categories of information almanacs contained. An almanac could also include weather predictions, an illustrated prophecy about the political state, jokes, quotations from different literary works, information about the British monarchy, tide tables, and a history of

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\(^9^3\) In 1800, “a total of 571,350 almanacs were printed of which 55,525 remained unsold—less than 10 per cent. Old Moore, with 353,000 copies, accounted for no less than 62 per cent of this total, only 13,250 of its copies being left unsold—less than 4 percent of the number printed.” See Myers, *The Stationers’ Company*, 85.

England. Publications such as *Vox Stellarum* (the “voice of the stars”) and *Time’s Telescope* mixed religious weather lore with anecdotal evidence, proverbs, pictures, and poems to teach their readers how to interpret the weather. These different blends of popular knowledge proposed that planets influence the human body in mysterious ways, as the celestial bodies and human bodies were intimately connected despite great distances—they all shared the same atmosphere. As documents designed to inform their readers about the weather, almanacs were crucial in mediating the environment. They were useful for farming purposes and were also important to the quintessential act of survival in a threatening world. At a time when a sudden cold snap could eradicate one’s crops and pose a serious health risk, being able to predict the weather would afford a certain amount of protection against arbitrary environmental forces.

In European almanacs, a picture of a naked man—known as the Zodiac Man—was prominently featured as early as the fifteenth century. The Zodiac Man illustrates how rival interpretations of natural forces were negotiated in print. On his body was a map of the Heavens: planets (or their zodiac symbols) were tattooed upon the different organs these satellites were thought to influence. In the almanac’s calendar pages, these same symbols were then repeated according to the planets’ predicted orbits. Literate readers were able to

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95 Across Europe and North America, almanacs were adjusted to meet their audiences’ demands. An almanac from Upper Canada (now Ontario) shows how almanacs, though they may vary regionally, are consistently varied in terms of content. The *Upper Canada Farmers’ & Mechanics’ Almanac for the Year of Our Lord 1825*, was printed by Charles Fothergill in York (Toronto). It is thirty-one pages long and pocket-sized. Its first twenty pages contain common notes, miscellaneous information (such as the weight of a barrel of anchovies) and detailed monthly calendar pages featuring holidays, lunar cycles, and forecasts. Arranged throughout these pages of useful information are poems about the weather, which are followed by original patriotic short stories. Finally, passages from Shakespeare’s *Othello* precede a cure for toothache. Practical content blends with literary material, suggesting that almanacs in colonial settlements provided both means of survival and means of solidifying community. See *Upper Canada Farmers’ & Mechanics’ Almanac for the Year of Our Lord 1825* (York, Upper Canada: Charles Fothergill, 1824).
determine when they would be vulnerable to, for example, Mars’s influence, and could adopt protective measures to safeguard themselves against the associated diseases (in this case, anything related to the head). Illiterate individuals who still wanted to decipher the visual clues presented on the Zodiac Man’s body could recognize the twelve astrological symbols and determine their impact through association. Natural philosophers were not the only ones to consider planetary movements; individual readers of almanacs saw the planets as forces capable of altering human lives. Even after the Zodiac Man gradually disappeared from almanacs—an elision that has been attributed, in part, to Victorian discomforts with representations of nudity—planets were perceived as weighty forces capable of shifting the earth’s atmospheric balance. Crucially, almanacs introduce the atmosphere as a presence that is understood by paying attention to one’s body and its signals.96

For centuries, planets were perceived as uncontrollable and powerful agents of physical change—traces of these beliefs linger in the word “meteorology,” which used to refer to “meteora,” or passing phenomena in the heavens: comets, aurora borealis, thunder clouds, lightning, hail, and so on. These were local, remarkable events that were noted above very specific locations. Meteora were believed to be the direct manifestation of divine power. The classical frame of thought—always mindful of Plato and Aristotle’s views of the Universe—held these occurrences to be unique, isolated, and purposeful in terms of their

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96 Under the section “An ASTROLOGICAL Judgement of the Four Quarters of the Year 1832, from the Influx and Influences of the Planetary Orbs, with respect to the Affairs of the World,” an ominous warning states: “With respect to the atmospheric influence on the state of our health during this quarter; my opinion is, that Saturnine complaints will be very common, and in many cases extremely obstinate, especially where the patient has plenty of ready rhino for the doctor!” Vox Stellarum, or, A Loyal Almanack for the Year Human Redemption 1831 (London: Printed for the Company of Stationers), 45.
capacity to deliver a message to the human population below. As the eighteenth century’s natural philosophers began to experiment with electricity and chemistry, emerging patterns shattered classical theorems and tied aurora borealis, for instance, within a broader, connected system of atmospheric shifts. Almanacs were meant to interpret these meteora and to broadcast interpretations to those who, living beneath the vault of the heavens, were influenced by the messengers above.

Almanacs connected readers to distant planets and placed individuals within an overarching atmospheric context by blurring boundaries between astrology, moonlore, folklore, and religion—sometimes within the same publication. Different prognostications situated the personal within the cosmological, as evidenced by the “Rules for Predicting Changes in the Weather” announced in *Time’s Telescope* where biblical references buttress weather wisdom:

[...] A south wind or great heat in summer portends whirlwind, Job. xxxvii.9. Cold, or fair weather, is indicated by the north wind, which drives away rain, Job. xxxvii. 9, 22. A red sky in the evening foretels [sic] fair weather; in the morning, foul. Matthew, xvi.


99 The almanac’s full title offers a good example of the different types of information included within a single volume: *Time’s Telescope for 1814; or, Complete Guide to the Almanack: containing an explanation of Saints’ Days and Holidays; with illustrations of British history and Antiquities, and Notices of Obsolete rites and customs. Astronomical Occurrences in every month; comprising remarks on the phenomena of the celestial bodies, and a popular view of the solar system. The naturalist’s diary; explaining the various appearances in the animal and vegetable kingdoms; and meteorological remarks. Accompanied by Twelve descriptive Wood Cuts of the different Months, engraved by Mr Clennell.* (London: Printed for Sherwood, Neely, and Jones, 1814).

100 Ibid.
Despite their ideological variations, competing almanacs shared a common goal: to explain something invisible and seemingly omnipresent to their readers. Early nineteenth-century almanacs speak to the ways in which their audiences were deeply attuned to their environment and its physical impacts.

By the beginning of the nineteenth century, almanacs were everywhere—some printers even made special formats that could be popped into a man’s hat.\textsuperscript{101} As Nicholas Pickwoad points out in a survey of eighteenth-century bookbinding, the almanac was a “printed book which was almost always designed to be carried around […]], frequently bound as a pocket or memorandum book.”\textsuperscript{102} Up to the early nineteenth century, almanacs were available in a range of styles and sizes, suitable for every kind of reader and their respective budgets. These were intimate documents that were so frequently consulted that their form, by year’s end, would be altered by the inevitable accidents of wear and tear.

3 Popular Print Culture and Charlotte Brontë’s Fiction

3.1 Signs of Material Culture

Thus far, scholars have yet to consider printed ephemera, such as almanacs, when interpreting Brontë’s complicated relationship to the atmosphere. And yet almanacs, in their folkloric (and sometimes superstitious) approach to atmospheric phenomena, contribute to

\textsuperscript{101} There are many hat almanacs, but \textit{Tilt’s Almanack for the Hat, 1839} is representative of the genre. It is a circle with twelve “spokes” arranged counter-clockwise with each calendar month, dates, days of the week, holidays, and boxes with the moon’s changes. Published by Charles Tilt, on Fleet Street, the almanac also advertises others of its kind: the “\textit{National Almanack}, on a whole sheet, in colours, with a handsome frame border” or the “\textit{Paragon Almanack}, comprising, besides the Calendar, a mass of valuable Commercial Information.”

the affective tone that defines Brontë’s fiction. There is evidence that Charlotte Brontë’s knowledge of popular forms of prognostication stems from a familiarity with ephemeral print culture.

Consider one of the most overt examples of premonition in *Jane Eyre*. Shortly before hearing of her Aunt Reed’s ill health and imminent demise, Jane explains that she has had recurring dreams about a small child; she knows, from overhearing her nurse Bessie discuss such dreams with Martha Abbott, the Reed family’s servant, that “to dream of children was a sure sign of trouble, either to one’s self or one’s kin.”

In their reading, Gilbert and Gubar contend that these are psychological projections of Jane’s problems; Hague, however, argues that such an interpretation “fails to acknowledge […] Jane’s intuitive capabilities.” Hague attributes Jane’s dreams and her aunt Reed’s death, shortly thereafter, to her “precognitive abilities.” It is certainly tempting to invest Jane Eyre with supernatural powers. Still, for a nineteenth-century British reader of popular print documents, dreaming of a small child would be taken as a bad omen as a matter of course. This belief was widely circulated in pamphlets; among them, the popular *Dreams & Moles, with their Interpretation & Signification*, printed and sold across England, warns that for a woman “to dream she is with child, denotes sorrow and heaviness.” This is representative of the materials that were

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105 Ibid.
106 John Kendrew, a printer who operated in York for much of the first half of the nineteenth century and whose products were distributed across the West riding of Yorkshire, including Haworth, collected copies of popular texts that he sold “so that in case of the Stock being sold clean out; a copy would still be retained.” *Kendrew’s York city and county almanack for 1844* (York: Printed by J.L. Kendrew, 1843), n.p. His compendium of printed materials includes *Dreams & Moles, with their Interpretation & Signification, made far more manifest and plain than any published, to the very meanest capacities. By the most Ancient as well as Modern Rules of Philosophy* (York: Printed by J. Kendrew, Colliergate, n.d.) Steven Connor cites a very similar
peddled across England and perpetuated specific beliefs about dreams and other mysterious, alluring phenomena.107 Such cheap pamphlets, broadsides, and almanacs repeat and reinforce a specific set of cultural beliefs. While Jane Eyre’s ability to foretell the future through her dreams may strike a contemporary audience as the sign of psychic prowess, it is nevertheless the case that such folkloric knowledge circulated at the time of the novel’s publication and would have been dominant in Yorkshire, where Charlotte Brontë was raised.

Almanacs enrich interpretations of the atmosphere in nineteenth-century realist fiction. Brontë’s novels reproduce modes of understanding nature that were typically contained in almanacs.

It is notoriously difficult to determine the sources of an author’s inspiration, even if textual references are available. These difficulties grow when it comes to almanacs, which were increasingly affordable and progressively more disposable after the rise of machine-press printing in the early nineteenth century. Brontë source scholarship often stems from the same primary texts, namely Gaskell’s biography, early works from the turn of the century, edition, printed in London circa 1750, in his Book of Skin. This shows how widespread and how abidingly popular such beliefs were: multiple editions in disparate parts of the country suggest that there was consistent demand for such texts.

107 Kendrew’s York city and county almanack . . . for . . . 1844. The holographic introduction, written by Kendrew’s descendant, James Hattersley Carr, states: “This Book was used in the printing office of my Grandfather, Mr. J.L. Kendrew; who commenced business in Colliergate, York, about 1803. […] He did an extensive business in them, as well as in Pamphlets (Lives & Histories of Celebrated & Notorious Characters) Calenders [sic] & Dying speeches of criminals; Primers, Battledores, ½ & 1d Toy Books for children, &c. My Uncle John Lofthouse Kendrew succeeded to the business in 1841 and about 1848 disposed of the Printing Plant to Mr Wm Allenston; selling among other goods, a cartload of Songs to Mr. Wm Dalton (died 1875) of Walmgate. This Book being then in a very battered condition Uncle & I commenced to restore it; adding to it other Souveniers [sic] of our business, both of us taking a pride in enlarging its collection. Soon after the death of my Uncle Feb’ 1874 Aunt Jemima Kendrew (the last of his sisters) presented it to me, since which has been added the Copy Book Covers, Specimens of Copper Plates (still in my possession) of Valentines, Race Horses &c. The Valentines and plates for Pamphlets were coloured, by hand, by my Mother and Aunts, in their Leisure Hours when at home from school. I entered on the business Jan’ 1869. [Signed] James Hattersley Carr’
and interviews with Haworth inhabitants happy to share stories with curious journalists. A common misconception, for instance, has the Brontë children walking down the “long road to Keighley” in order to borrow books from the Mechanics’ Institute that was located there, as their father, the Reverend Patrick Brontë, was a member.\textsuperscript{108} However, there seems to have been some confusion between the town’s circulating library—which may very well have been used by the Brontës—and the Mechanics’ Institute library, which would not have been accessible to anyone other than Reverend Brontë.\textsuperscript{109} While it is impossible to tell which texts were read by whom, the information contained in different library histories and records of sales at auction remind us that even though Haworth was geographically distant from the capital, it was connected to a vast distribution network of printed materials that also included other large cities such as London, Manchester, York, and Leeds.\textsuperscript{110}

In fact, the small town’s important dates are listed in almanacs that were printed in larger neighboring cities.\textsuperscript{111} This suggests that almanacs printed in York circulated across the West riding of Yorkshire, all the way to Keighley and Haworth. Looking beyond canonical literary sources helps to elucidate the many ways in which Charlotte Brontë developed a multi-layered understanding of the atmosphere that weaves together religious, scientific, and folkloric elements. The regrettable absence of almanacs in the Brontë Parsonage Museum does not in any way represent the influence their content once had—it only highlights the

\textsuperscript{108} Gaskell, \textit{The Life}, 196.
\textsuperscript{110} In his detailed study of the different likely and unlikely literary sources accessible to the Brontës, Bob Duckett examines the catalogue listings from different private and public institutions that may have loaned their materials to family members. Bob Duckett, “Where Did The Brontës Get Their Books?” \textit{Brontë Studies} 32 (2007): 202.
\textsuperscript{111} For instance, a “List of Fairs for MDCCXXL-XLI” (1840-41) printed in York includes a listing for Haworth. See \textit{Kendrew’s York city and county almanack}, n.p.
difficulties in establishing the importance of materials that were once so ubiquitous that they were rendered inconspicuous.\

3.2 The Fluid Atmosphere of Almanacs

Almanacs were inescapable in early nineteenth-century England. Whether they were astrological or not, almanacs disseminated knowledge of the atmosphere as a fluid and the related cosmological implications; namely, that immersion in an invisible liquid connects planets, individuals, and all living beings on earth.

Nineteenth-century Britain understood the atmosphere as an elastic fluid. This belief pervades print materials for specialized and lay audiences. For example, in a short explanatory text on meteors printed within the calendar pages of a popular astrological almanac, the author supposes they move faster higher in the sky, where it is “such a rare and thin medium, than in ours, so much denser and thicker” and later adds, by way of final elucidation, that he does not know of any “mechanical power, that in such a fluid medium as the air, can cause so sudden, and so prodigious a collection of fiery vapors.”\

Even the British Almanac, created in an effort to root out superstition among a growing reading public, confidently notes that the fact “that the atmosphere is a fluid completely surrounding the whole earth needs no demonstration,” adding that the atmosphere, a “wondrous envelope”

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112 While the Brontë Parsonage Museum once held a copy of The Edinburgh Almanack or Universal Scots and Imperial Register for 1830, my visit to their archives in November, 2013 led to their discovery that the almanac has been lost for over a decade. It is therefore impossible to determine whether there was any marginalia or evidence of use (though I would bet that there was!). A copy of the Belgian Almanach de poche de Bruxelles, pour l’année bissextile 1844 contenant les indications les plus utiles aux étrangers et aux habitants, is kept in the archives to show readers features of daily life that would have been familiar to Charlotte Brontë during her time at the Institut Héger (1841-43).

that surrounds the entire planet, is like the ocean: “Air is also generally considered to be invisible, but it is certain that, like water, it is a coloured fluid; it is naturally blue, as that of the latter is green, but both colours acquire intensity only from the depth of the transparent mass.”114 A lifetime on earth is spent basking in a “rare medium” with properties that are understood in terms of “elasticity, expansibility [sic], transparency, and insipidity.”115 The atmosphere suspends the world in a fluid that envelops, reverberates, pushes, and infiltrates. In the early nineteenth-century understanding of the atmosphere, existence entails constant immersion.

This overarching atmospheric ocean is the ultimate pervasive force. As the atmosphere “appears to consist of a combination of two distinct expansible gases, the interstices of which are penetrated by ever-varying proportions of condensible [sic] elastic vapour,”116 it leaves no empty space behind. This atmosphere does not merely abhor a vacuum; it fills it with its presence, negating the possibility of a void by its very characteristics. If Earth and all of its inhabitants are buoyed in a liquid, immersion becomes a quality of daily life as well as the burden of existence. As a fluid, the atmosphere’s influence expands beyond the realm of the meteorological and acts upon physiological and affective states. It is omnipresent. It immerses bodies, uniting people, animals, and things in shared currents.

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114 The British Almanac of the Society for the Diffusion of Useful Knowledge for the Year 1830 (London: Published by Charles Knight, n.d.), 68.
115 Ibid.
116 Ibid.
In *Jane Eyre*, when Mr. Rochester tells Jane of his unhappy days in the West Indies, he describes his breaking point in terms that may strike modern readers as mundane, but that carry the fluid significance attributed to the atmosphere:

> It was a fiery West Indian night; one of the description that frequently precede the hurricanes of those climates. […] The air was like sulphur-streams—I could find no refreshment anywhere. Mosquitoes came buzzing in and hummed sullenly round the room; the sea, which I could hear from thence, rumbled dull like an earthquake—black clouds were casting up over it; the moon was setting in the waves, broad and red, like a hot cannon-ball—she threw up her last bloody glance over a world quivering with the ferment of tempest. I was physically influenced by the atmosphere and scene, and my ears were filled with the curses the maniac still shrieked out.117

The air, thick as streams of sulfur, overwhelms the entire space and is clotted by an array of heavy sounds: the “buzzing” and humming of mosquitoes overlap the sea’s “dull” rumblings. The moon itself is suddenly a heavy red mass that does not float through the sky but falls ponderously over the water, dripping from one viscous fluid into another. The atmosphere overflows with the different smells, sights, and sounds that physically oppress Rochester. He cannot escape its presence; it penetrates his senses, submerging them in a series of currents that are beyond his control. As the moon slips beneath the sea, Rochester further abandons himself to the “aërial ocean”118 around him.

A shift in a planet’s course through the sky was thought to bear on political and social actions, bringing about a negative effect on human lives. Such beliefs dominated popular discourse. When the moon sets outside Rochester’s window, it compresses different fluids and places undue force upon the atmosphere, pressing down on those who live below it. This pressure is an inevitable consequence of a life spent suspended in fluid, affected by the forces

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118 *The British Almanac of the Society for the Diffusion of Useful Knowledge*, 68.
that press upon all sides of the submerged object or person. This is evident in the language
the *British Almanac* uses to describe electric activity in the atmosphere: “To electricity may
be principally attributed the more splendid phenomena of lightning, the aurora-borealis, and
the other igneous meteors. And the effect of these causes, variously combined and infinitely
modified by other agents, is felt in those currents of atmospheric air…”¹¹⁹ The term “current”
carries the parallel relationship between the air and water. Moving through fluid releases a
series of currents that ripple through the liquid and, in turn, shift the other objects that are
also suspended within it.

A similar pattern is evident earlier in *Jane Eyre*. After Jane’s teacher Miss Temple
marries and leaves Lowood School, Jane undergoes a “transforming process,” as her old
friend and mentor “had taken with her the serene atmosphere [she] had been breathing in her
vicinity,” and as Jane returns to her “natural element,” she begins to “feel the stirring of old
emotions.”¹²⁰ Without the presence of a steady, calming disposition, Jane is reminded of her
admittedly passionate nature. Miss Temple alleviates the atmospheric pressure that Jane
senses. The atmosphere applies a direct force to her body, which reacts strongly and suddenly
to imbalance.

This force makes itself known when, sensing she needs a change, Jane pleads with an
ever-present natural power: “I desired liberty; for liberty I gasped; for liberty I uttered a
prayer; it seemed scattered on the wind then faintly blowing. I abandoned it, and framed a
humbler supplication; for change, stimulus; that petition, too, seemed swept off into vague

¹¹⁹ Ibid., 71.
space.”\textsuperscript{121} The “vague space” and the “faintly blowing” wind are humbling and quiet, but familiar. Jane perceives the atmosphere, an all-encompassing but invisible presence, as a messenger that is equally receptive to her own emanations (her name, Eyre, homophonically points to this relationship). Unable to predict the air’s path, and disconcerted by the lack of options available to her, she later sits up in bed and ponders until, “feverish with vain labour,” she walks about her bedroom: “[...] undrew the curtain, noted a star or two, shivered with cold, and again crept to bed.”\textsuperscript{122} Under the covers, Jane thinks that “a kind fairy [...] had surely dropped the required suggestion” into her pillow—solutions to her problems appear suddenly.

### 3.3 Almanacs and Charlotte Brontë’s Novels

Brontë’s novels render, in literary fiction, the contents of early nineteenth-century almanacs; their protagonists read the atmosphere according to the way that certain types of almanacs, notably those that focus on natural astrology, taught readers to decipher cloud patterns, the phases of the moon, the meaning of dew in the morning, or the message hidden in the sunset’s colouring. \textit{Jane Eyre}, \textit{Villette}, and \textit{Shirley} bear the traces of almanacs in their lines, especially in their representation of the atmosphere; namely, as a liquid presence that can be disturbed by planetary motion, and that alters human lives in ways that are forewarned in the sky’s shades, unusual weather phenomena, or the sounds of the wind.

In Brontë’s fiction, the atmosphere permeates bodies as well as established spatial divisions. This function is at the forefront of \textit{Villette}’s critical moments. The novel was first

\textsuperscript{121} Ibid., 102.
\textsuperscript{122} Ibid., 103.
published in 1853 and is based on Brontë’s experience as a student in Brussels. *Villette* opens with a description of a home, which the protagonist Lucy Snowe remembers in atmospheric and materialist terms: “The house and its inmates specially suited me. The large peaceful rooms, the well-arranged furniture, the clear wide windows, the balcony outside, looking down on a fine antique street, where Sundays and holidays seemed always to abide—so quiet was its atmosphere, so clean its pavement—these things pleased me well.”¹²³ These things (the rooms, furnishings, windows, balcony, street, and pavement) both exude and contain the atmosphere. It lingers beyond the windows and floats above (or does it emanate from?) the clean pavement, yet it still frames the memory of a serene time. The atmosphere retroactively seeps into the rooms and settles, tranquil, over the entire abode. Possessions are at once separate from and attached to the atmosphere; it deposits a weighty silence over the house and its placid inhabitants, which do not and cannot resist its overarching presence. While different objects inhabit the atmosphere, only bodies attuned to it can mediate its influence. Lucy in particular is aware of the invisible changes that leave traces upon her body, causing a ripple effect that shifts her moods.

Brontë’s correspondence highlights how psychological ailments are repeatedly attributed to atmospheric fluctuations. In a letter to Elizabeth Gaskell written November 6, 1851, Brontë admits that a change of seasons gives her great discomfort: “For a month or six weeks about the equinox (autumnal or vernal) is a period of the year, which I have noticed strangely tries me. Sometimes the strain falls on the mental, sometimes on the physical part of me; I am ill with neuralgic headache, or I am ground to the dust with deep dejection of

spirits.”\textsuperscript{124} For almanac readers such a strong reaction to shifting seasons was expected, as it corresponded to the world’s own turbulent changes. For example, an early nineteenth-century edition of \textit{Time’s Telescope} explains that the equinox brings with its advent a series of storms: “The autumnal equinox happens on the 22\textsuperscript{nd} of September, and, at this time, the days and nights are equal all over the earth. About this period, heavy storms of wind and rain are experienced, as well as at the vernal equinox.”\textsuperscript{125} These tempestuous changes recur throughout Brontë’s writings, where the atmosphere’s transitional period functions as a pivot for characters’ instability—and, in some cases, demise.

Lucy Snowe is forced to leave England after her employer, a sickly elderly woman, dies. Lucy travels to the town of Villette, where she is hired to teach English in an all-girls boarding school at the heart of town. Madame Beck and her cousin, Monsieur Paul Emmanuel, are in charge of the school (the \textit{Pensionnat}). Over the course of the year, Lucy begins to accustom herself to her new life—until the long vacation approaches. She is left alone in a house that is “left quite empty, but for [her,] a servant, and a poor deformed and imbecile pupil” who cannot return home.\textsuperscript{126} Here begins a two-month period of lonely caretaking in a city empty of its inhabitants, who are all away on holiday, and in a school full of empty rooms. These conditions are exacerbated when the weather changes nearly halfway through the summer break:

Three weeks of that vacation were hot, fair, and dry, but the fourth and fifth were tempestuous and wet. I do not know why that change in the atmosphere made a cruel impression on me, why the raging storm and beating rain crushed me with a deadlier paralysis than I had experienced while the air remained serene; but so it was; and my

\textsuperscript{124} Gaskell, \textit{The Life}, 393.
\textsuperscript{125} \textit{Time’s Telescope for 1817; or, Complete Guide to the Almanack} (London: Printed for Sherwood, Neely, and Jones, 1816), 273.
\textsuperscript{126} Brontë, \textit{Villette}, 180.
nervous system could hardly support what it had for many days and nights to undergo in that huge, empty house.\textsuperscript{127}

The atmosphere makes a “cruel impression” in many ways: not only does it precipitate an emotional change, but it also bears down upon Lucy’s body and crushes her beneath its weight. This shift makes the atmosphere known affectively, but its physical importance is foregrounded by Lucy’s paralysis and the pressure she feels in her nervous system, which controls her body and begins to crumble underneath the sheer force of the atmospheric weight that she can never fully escape.

After a kindly relative comes to collect her sole patient, Lucy is left completely alone in the house. She wanders across town and in surrounding fields and wooded areas, imagining her colleagues and companions who are in distant locales but who share the same sky. While Lucy imagines that the harvest moon and September sunshine bring joy to Ginevra Fanshawe, she does not share in their benevolent powers. Instead, she “almost wished to be covered in with earth and turf, deep out of their influence.”\textsuperscript{128} Alone, atmospheric forces overwhelm Lucy. The atmosphere penetrates the body as well as the mind; it draws an emotional reaction that its crushing weight exacerbates.

This response to the atmosphere is especially visible in times of crisis. In almanacs and in popular culture, the equinox was understood as a dangerous, unpredictable moment during the year—a slip in the earth’s reliable seasonal changes threatened to burst through the atmosphere, causing untold chaos in the weather and in human lives. As Lucy’s mental decline continues in tandem with the increasingly inclement weather, a change of seasons

\textsuperscript{127} Ibid.
\textsuperscript{128} Ibid., 181.
precipitates her total psychic collapse: “About this time the Indian summer closed and the equinoctial storms began; and for nine dark and wet days, of which the Hours rushed on all turbulent, deaf, disheveled—bewildered with sounding hurricane—I lay in a strange fever of the nerves and blood.” One critic associates this cyclical pattern (and Brontë’s own fear of seasonal change) with the autumnal equinox that ushers in Mr. Paul’s death at the end of *Villette*. And while it may be true that the “account of Mr. Paul’s return and the effects of the unchained elements are vital lines in Charlotte’s works,” they are critical for more than their association with the author’s perception of and physical reaction to atmospheric changes.

*Villette*’s closing scene explicitly points to the practice of reading the world as an open book and interpreting its signs. Lucy eagerly awaits Mr. Paul. She relies on her readings of the sky and the wind to determine his progress across the Atlantic. The final scene is worth citing at length:

> It is Autumn; he is to be with me ere the mists of November come…The sun passes the equinox; the days shorten, the leaves grow sere; but—he is coming.
> 
> Frosts appear at night; November has sent his fogs in advance; the wind takes its autumn moan; but—he is coming.
> 
> The skies hang full and dark—a rack sails from the west; the clouds cast themselves into strange forms—arches and broad radiations; there rise resplendent mornings—glorious, royal, purple as monarch in his state; the heavens are one flame; so wild are they, they rival battle at its thickest—so bloody, they shame Victory in her pride. *I know some signs of the sky; I have noted them ever since childhood*. God, watch that sail! Oh! Guard it!

The wind shifts to the west. Peace, peace, Banshee—“keening” at every window! It will rise—it will swell—it shrieks out long: wander as I may through the

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129 Ibid., 182.
130 Claude Legangneux, *The Brontë Sisters and the Weather* (n.p., n.d.), 32. Legangneux’s study is held at the Brontë Parsonage Museum but is otherwise unpublished and undated.
131 Ibid., 18.
house this night, I cannot lull the blast. The advancing hours make it strong; by midnight, all sleepless watchers hear and fear a wild south-west storm. The strong wind is an agent invested within a global frame of disaster, as it is paired with other disruptive weather patterns. As her personal universe is shaken, so too is the whole world. Lucy is rarely alone in her despair, since “other watchers” may read the sky and its portents. Nature is a terrifying and terrific presence that both threatens and comforts Lucy throughout her life—although she is attentive to the signs of the sky, they provide little solace as she understands the atmosphere’s message. Compare the different signs to the “Observations on the Weather” included in an 1829 copy of Moore’s Almanack that was circulated in Yorkshire: “A red evening portends fine weather; but if it spreads too far, upwards from the horizon in the evening, and especially morning, it foretells wind or rain, or both.” The red sunset that comes up as a bloody sunrise, though beautiful, is suddenly ominous. And “if the wind veers about, much rain is pretty sure. […] Whistling or howling of the wind, a sure sign of rain.” The wind shifts and howls—suddenly, all the signs of the sky point to a sad ending. A storm does rise, “frenzied, for seven days,” and it doesn’t end until “the Atlantic [is] strewn with wrecks.” The narrator here stops, hoping to “trouble no quiet, kind heart; leave sunny imaginations hope.” And though optimists may decide to imagine a different, unwritten ending, those who can interpret the signs of the sky know that

133 *Moore’s Almanack for the Year 1829, with a List of Fairs for the Counties of Nottingham, Derby, Leicester, Lincoln, Rutland, Northampton, Warwick, and York* (West Gate, Mansfield: R. Collinson, Printer, Bookseller, and Stationer): np. See Appendix V.
134 Ibid.
135 Brontë, *Villette*, 573.
136 Ibid.
though they may be ephemeral (like almanacs), clouds and sunsets nevertheless may hint at unalterable consequences.

Additional biographical evidence further establishes the link between *Villette*’s final pages and the practice of consulting an almanac to interpret the atmosphere. The Reverend Patrick Brontë famously preferred happy endings, and expressed a desire that Charlotte’s new novel’s conclusion should end on an uplifting note. In an effort to placate her father without sacrificing the vivid conception of her characters’ lives, Brontë chose “to veil their fate in oracular words, as to leave it to the character and discernment of her readers to interpret her meaning.”\(^{137}\) Brontë’s familiarity with almanacs gave her the vocabulary required to mask direct meaning in prophetic language, and her susceptibility to the weather only served to heighten the descriptions of her own tendencies to decipher atmospheric clues.

Gaskell quickly noticed how important the atmosphere was to Brontë, how closely she studied its signs, and how such interpretation was closely linked to the practice of reading. After they first met, Gaskell wrote to a few friends to describe her encounter with the author of *Jane Eyre*. As they walked through fields near their host’s home, Gaskell “was struck by Miss Brontë’s careful examination of the shape of the clouds and the signs of the heavens, in which she read, as from a book, what the coming weather would be.”\(^{138}\) Brontë confessed to what extent the sky became “a companion […] to any one living in solitude, —more than any inanimate object on earth, —more than the moors themselves.”\(^{139}\) In this light, the variations in the sky become more than an overarching presence. They turn into a series of portents that the author has to interpret and that she includes in her novels as


\(^{138}\) Ibid, 353.

\(^{139}\) Ibid.
references understood by those who recognize the language of almanacs. In Jane’s life, significant changes are foretold by minute fluctuations in the atmosphere and announced by the sounds that can be deciphered as signs.

3.4 Atmospheric Immersion and Sound

The nineteenth-century explanation of sonic phenomena highlights the atmosphere’s immersive and overwhelming presence. Sound builds one of the multiple sensory bridges that link sensory perceptions, embodied existence, and the pressure felt from living within a fluid medium. As the atmosphere encapsulates the world, the multiple “emanations” from humans, animals, and objects are absorbed by this permeating fluid and carried within it until they are dissolved in a blue haze. The wails, sobs, and happy swells are likewise picked up and transported across the fluid medium, where they join invisible but perceptible forces that commingle in the atmosphere’s “aërial ocean.”

Sound was understood as a direct consequence and proof of the atmosphere’s fluidity. Nineteenth-century medical textbooks explain that the atmosphere produces a snapping effect against eardrums, which is how sound is heard. Reverberations across the fluid thereby reach the ears and push up against it in sudden bursts, lending weight to the fact that we cannot shut our ears against noise—not even in our sleep. The “flow of currents” the ear feels reveal a synesthetic experience that blends touch and sound. Perceiving the atmosphere as a fluid that carries sounds transforms even the most banal phenomena into a sign invested with particular meaning that must be deciphered by the listener.

140 The British Almanac of the Society for the Diffusion of Useful Knowledge, 68.
The winds that sweep the Brontë parsonage howl as they pass—on “autumnal or winter nights, the four winds of heaven [seem] to meet and rage together, tearing round the house as if they were wild beasts striving to find an entrance.”\(^{141}\) The wind is experienced as a force trying to enter the house and as an uncontrollable sound. For Charlotte, the sound of the wind bears negative associations that Gaskell found simultaneously silly and eerie: “All the grim superstitions of the North had been implanted in her childhood by the servants who believed in them. […] On windy nights, cries, and sobs, and wailings seemed to go round the house, as of the dearly-beloved vainly striving to force their way to her.”\(^{142}\) Even before her siblings had died and left her even more isolated, the sound of the wind was troubling to Charlotte.\(^{143}\) In a letter written in the fall of 1836 to her school friend Ellen Nussey, she writes: “It is a stormy evening, and the wind is uttering a continual moaning sound, that makes me feel very melancholy. At such times—in such moods as these—it is my nature to seek repose in some calm tranquil idea.”\(^{144}\) The sound of the wind in the parsonage was, like the weather, a constant companion. And its sounds would have indicated oncoming changes in the seasons, the advent of a storm, or a profound disturbance to the course of her life.

Such change is signalled by the sounds that surround Jane while she thinks about her future course of action, shortly after Miss Temple’s departure. The only noises that interrupt  

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\(^{141}\) Elizabeth Gaskell, *The Life*, 49.  
\(^{142}\) Ibid, 337.  
\(^{143}\) The sound of the wind features prominently in Brontë’s childhood writings. Notably, it appears in the *Tales of the Islanders* as a force that is equally enchanting and disturbing: “Listen, there is a faint sound like the voice of a dying swan but now a stronger breeze sweeps through the strings and the music is rising. Hark how it swells! What grandeur was in that wild note, but the wind roars louder. I heard the muttering of distant thunder, its drawing nearer and nearer and the tunes of the harp and swelling till, all at once, amidst the roaring of thunder and the howling of the wind it peals out with such awful wildness, such unearthly grandeur that you are tempted to believe it is the voice of spirits speaking. This is the storm.” Charlotte Brontë, *Tales of the Islanders* (London, Hesperus, 2011), 24.  
\(^{144}\) Gaskell, *The Life*, 115.
her are human ones: first, a bell “ringing the hour of supper” summons her away from the window; later, Miss Gryce’s incessant chatter—stopped only by the sound of her snoring, those “habitual nasal strains”\textsuperscript{145}—delays Jane’s meditations. This suggests that in order to hear her own thoughts properly, Jane requires profound silence. The scene’s volume is referred to in great detail, as it is understood that Jane’s soliloquy is a noiseless one. She ponders her fate quietly, exploring the sounds of different words “mentally, be it understood; [she] did not talk aloud.”\textsuperscript{146} Jane notes that the “delightful” resonances in words like “Liberty, Excitement, [and] Enjoyment” are nothing “more than sounds” for her, as they are “so hollow and fleeting that it is mere waste of time to listen to them.”\textsuperscript{147} This reveals her ability to ignore, if only temporarily, the sounds of things beyond her grasp in this lifetime—and signals Jane’s extremely selective hearing. The sounds that are not worth listening to are promptly dismissed; meanwhile, other aural cues are deftly noted, even when they appear to be immaterial or impossibly distant.

The relationship between sound, atmosphere, and pressure re-emerges to signal Jane and Rochester’s first encounter. On her way to the town of Hay, Jane pauses in the quiet late afternoon and listens closely to her surroundings. Or do her surroundings press themselves against her?

[…] It was yet a mile distant, but in the absolute hush I could hear plainly its thin murmurs of life. My ear, too, felt the flow of currents; in what dales and depths I could not tell: but there were many hills beyond Hay, and doubtless many becks threading their passes. That evening calm betrayed alike the tinkle of the nearest streams, the sough of the most remote.\textsuperscript{148}

\textsuperscript{145} Brontë, \textit{Jane Eyre}, 102.
\textsuperscript{146} Ibid.
\textsuperscript{147} Ibid.
\textsuperscript{148} Ibid., 132. Emphasis added.
In the stillness of the atmosphere, the flow of currents carries the sonic reverberations of rivers clearly across great distances. Jane does not hear the rivers; rather, her ear feels the pressure of the atmospheric currents pressing against it. Since she conceptualizes the atmosphere as a fluid, Jane feels the force of the sound directly. The liquid’s ability to carry sound farther adds to the physical intensity of atmospheric weight. For Jane, walking through a quiet forest is akin to walking across a temporarily stilled aqueous substance. The murmurs, tinkle, and sough echo the muted sounds of her mind, which delights in the solitary pleasures of a winter’s afternoon walk.

Yet it is a sharp sound that pulls Jane from the hushed tones of her surroundings. The peaceful soundscape, with its “fine ripplings and whisperings,” is broken by a “rude noise […]: a positive tramp, tramp; a metallic clatter, which effaced the soft wave-wanderings.”\(^{149}\) Like ripples on a still pond, sound undulates across the watery atmosphere until splashy interruptions disrupt its meandering course. Such moments are examples of the aural pattern that announces key turning points in *Jane Eyre* and in other Brontë novels. The heroine perceives quiet rustlings and finds all to be peaceful, if monotonous… until sudden noises, often textually anticipated by descriptions of sudden atmospheric variations, overflow and signal a major psychological event.\(^{150}\)

In the moments before Jane first meets Rochester, seemingly insignificant details are dwelled upon with an eerie precision. The time of day is indicated by the sound of the church-bell, and the world seems frozen in quiet anticipation: “if a breath of air stirred, it

\(^{149}\) Ibid.
\(^{150}\) Stevie Davies connects Rochester’s loud approach to a daydream Charlotte describes in her journal, kept at Roe Head in 1835: “I now heard the far clatter of hoofs on the hard & milk-white road… Never shall I Charlotte Brontë forget… how distinctly I sitting in the schoolroom at Roe-head saw the Duke of Zamorna… the moonlight so mild & so exquisitely tranquil… I was quite gone… I felt myself breathing quick & short.”
made no sound here; for there was not a holly, not an evergreen to rustle, and the stripped
hawthorn and hazel bushes were as still as the white, worn stones which causewayed the
middle of the path.” ¹⁵¹ As water freezes into ice, so too does the atmosphere solidify in the
cold, obstructing the flow of sounds that can no longer spring from their conduit’s elastic
manifestations. The atmosphere is frozen, and only the bells’ clamour—a human sound—can
break through the barrier of its solidified, icy weight. Even the forest is silent: the trees are as
“white” and “worn” as the stones, and equally unmoving. Nature itself seems to pause on the
edge of twilight, and elements of sight and sound form a sensory tapestry where Jane Eyre is
the only warm and mobile being.

While Jane is unable to predict the future, her understanding of the atmosphere allows
her to interpret different signals and react accordingly. Jane’s emotions are contained within
an all-encompassing natural schema, as Brontë weaves the reality of nature into patterns that
would have been evident to readers who were familiar with almanacs—as we have seen, at
the time of the novel’s publication, such readers represented a majority of the British
population. In *Villette* as well, awareness of the atmosphere allows for deeper knowledge.
Catalytic events are intrinsically tied to remarkable atmospheric phenomena, just as the latter
would have been understood according to popular almanacs.

Like Jane Eyre, Lucy Snowe moves through a fluid medium populated by echoes that
guide her along hidden routes. Before she moves to Belgium, Lucy finds herself bereft of
living relations and unemployed. She walks alone at night and finds hope in her otherwise
bleak surroundings. Significantly, she begins to develop her own relationship with the

atmospheric shifts—in particular, with those considered to be bad omens, such as comets and
Northern Lights. Such bright flashes were believed to denote signs of imminent strife and
hardship. For Lucy, they are a new and unusual source of inspiration:

I should have quailed in the absence of moonlight, for it was by the leading of stars
only I traced the dim path; I should have quailed still more in the unwonted presence
of that which to-night shone in the north, a moving mystery—the Aurora Borealis.
But this solemn stranger influenced me otherwise than through my fears. Some new
power it seemed to bring. I drew in energy with the keen, low breeze that blew on its
path. A bold thought was sent to my mind; my mind was made strong to receive it.

Popular understandings of the Northern Lights took this phenomenon as a sign of impending
doom. Lucy knows this, as she “should have quailed” at their unexpected appearance. Not
only do the sweeping lights direct Lucy along the walk home—they literally inspire her,
breathing upon her a new sense of purpose. She is connected to the environment by virtue of
her receptivity, but she is also well versed in the language laid out by natural phenomena.
She reads the signs in the sky and accepts their meaning, allowing a gentle wind to carry its
message to her. Lucy perceives the material signs in the atmosphere and understands them.
The night sky communicates “bold thoughts” to her open, accessible, and lively mind. Lucy’s
openness to nature facilitates her communion with the atmosphere, and allows her to take life
from the very elements that are, in the case of the Northern Lights, associated with change
and disturbance.

For scholars who read this passage through a psychoanalytical lens, this reaction
demonstrates the extent to which Lucy Snowe is guided by forces “that require a passivity of

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152 As Jan Golinski writes in his history of British weather during the Enlightenment, “Unusual atmospheric
phenomena—including storms, auroras, peculiar cloud formations, and other heavenly wonders—had
traditionally been interpreted as portents of dramatic political events or admonishments of a punitive God.” See
Jan Golinski, *British Weather and the Climate of Enlightenment* (Chicago: University of Chicago Press, 2007),
4.
153 Brontë, *Villette*, 47.
consciousness that in turn infuse her with power, energy, and strength.”

154 Lucy’s encounter with the aurora borealis becomes a vague metaphorical manifestation of her intuitive consciousness: “More coy than Jane Eyre, Lucy Snowe uses the Aurora Borealis and the abstractions of ‘Providence’ and ‘Fate’ as the ostensible agents of her own inner intuitional voice,”

155 Hague contends. While this interpretation certainly lends itself to the repeated pattern of natural phenomena as catalysts for important decisions, it further obfuscates Brontë’s almanac-driven language. Lucy is not passive in the face of the aurora borealis; rather, her reaction actively counters the commonly held belief that the Northern Lights were bad omens. Thus, what has been taken as the “emphasis Brontë places on nonrational sources of knowledge and intuitive capabilities of her heroines”

156 is, in reality, a fictionalized account of the kind of knowledge that was widely circulated in almanacs, broadsides and pamphlets throughout England. And because it was circulated in popular documents, believing in such kinds of knowledge would not have appeared to be irrational, but rather common. The “absolute validity which Brontë grants these events” is shown, as Hague points out, by the fact that these occurrences “determine the future courses of action for Jane and Lucy.”

157 Their position as lynchpins throughout Jane Eyre and Villette also points to the fact that for centuries, an almanac’s primary purpose was prophetic; it is no coincidence, then, that significant weather phenomena govern these heroines’ actions.

The Northern Lights are not the only atmospheric phenomenon to influence Lucy Snowe. Nearly a year after her first exposure to the aurora borealis, she is once more in a

155 Ibid.
156 Ibid., 588.
157 Ibid.
transitional state; uncertain about her future, Lucy buries her correspondence with (and her grief over) Dr. John Bretton in a sealed jar in the school’s “allée défendue,”\textsuperscript{158} the liminal space between the building and the garden wall. There, like Jane Eyre in her bedroom, she considers the options available to her and responds to the shifting atmosphere: “In this air, or this mist, there was some quality—electrical, perhaps—which acted in strange sort upon me.”\textsuperscript{159} Suddenly, Lucy is empowered by the same feeling she experienced earlier in her life, as she had “felt a year ago in England—on a night when the Aurora Borealis was streaming and sweeping round heaven, when […] I had paused to watch that mustering of an army with banners—that quivering of serried lances—that swift ascent of messengers from below the north star […]. I felt, not happy, far otherwise, but strong with reinforced strength.”\textsuperscript{160} A mysterious and familiar electrical current charges the atmosphere and simultaneously re-charges Lucy; while others may perceive the Northern Lights as an enemy force, they renew her sense of purpose. Visually, Lucy can read the signs in the sky as well as any other weather watcher. Her physical response to the shifting currents, however, allows her to interpret the different pressures that make themselves known to her sense of touch and to her sense of hearing.

Stormy weather accompanies the upheavals in Lucy Snowe’s life, and she learns to forecast inner psychological and exterior physiological changes. For one critic, these patterns emerge from the series of scarring events in Brontë’s life, and influenced the sisters’ novels: “nearly all the important events in [their] lives happened in the months of dreary weather

\begin{footnotes}
\item[158] Brontë, \textit{Villette}, 342.
\item[159] Ibid., 343.
\item[160] Ibid.
\end{footnotes}
(ranging from September to March) during which winds, rain, snow and frost prevail; natural elements which invariably herald important stages in the lives of their characters and in the unfolding of the plots of their novels.”  

Here, gauging the atmosphere becomes a matter of life and death—interpreting its signs correctly can help one prepare for the oncoming difficulties. No wonder, then, that Lucy is attuned to the “accents” in the wind, to the changes in the atmosphere. She makes connections between natural elements and individual life events:

Three times in the course of my life, events had taught me that these strange accents in the storm—this restless, hopeless cry—denote a coming state of the atmosphere unpropitious to life. Epidemic diseases, I believed, were often heralded by a gasping, sobbing, tormented, long-lamenting east wind. Hence, I inferred, arose the legend of the Banshee. I fancied, too I had noticed—but was not philosopher enough to know whether there was any connection between the circumstances—that we often at the same time hear of disturbed volcanic action in distant parts of the world; of rivers suddenly rushing above their banks; and of strange high tides flowing furiously in on low seacoasts.

Lucy is effective only insofar as she is attuned to the atmosphere and knows its signs. The Northern Lights are “messengers” and Lucy speaks their language, understands their essence, and thrives as a result. Jen Hill notices similar patterns in Jane Eyre, when the protagonist “inserts herself into these geographical spaces via the imagination.” While Hill focuses on Brontë’s use of Arctic imagery and the nineteenth-century drive towards polar exploration and conquest, it remains that the relationship that Jane and Lucy share with the atmosphere is an open system of exchange, understanding, and respect: they are alert to its fluidity, and their lives fluctuate together alongside surrounding currents.

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162 Brontë, *Villette*, 41.
Lucy establishes links according to her understanding of the atmosphere’s clues, but only a natural philosopher (or, as they would later be known, scientists) could claim to note a causal effect. It is not enough to be familiar with folkloric weather-lore; one has to wield instruments with precision and deduct verifiable conclusions from repeated patterns. The narrator admits that she is not well versed in the relationship between the sounds she hears and the terrifying phenomena that follow. Natural philosophers would perhaps draw different conclusions; regardless, the atmosphere’s messages are inscribed within the larger context of folkloric knowledge (which include the legends of the Banshee) and upon the pages of popular almanacs, ready to be interpreted by those who know how to pay attention to the signs and interpret them, using their bodies—rather than scientific equipment—as instruments.

4 Cultural Climate Changes

As the Brontë children grew, so did the area surrounding Haworth: manufacturing expanded and brought unprecedented changes to the Pennines, the moors were soon connected to the network of railway stations zigzagging across the country, and big brick factories were built in nearby towns such as Keighley. Reading the skies was, by the time of Brontë’s death in 1855, increasingly discouraged. The rise of natural philosophy and increasing standardization led weather-watchers to measure the atmosphere with standardized scientific instruments, such as hygrometers and thermometers. Rather than keeping track of daily weather changes in their almanacs, interested individuals were encouraged to maintain logbooks with specific entries made regularly, and at the same time each day.
Over the course of the nineteenth century, prophetic understandings of atmospheric changes—based on observation, close listening, moonlore, and biblical interpretations, among other things—were suppressed in favour of repeated and measurable data about the weather.

In almanacs, seemingly endless lists of legal figures, government offices, naval officers, postal timetables, and term dates replaced the hieroglyphics, poems, and oracular pronouncements of the past. Facts about geological finds and recent developments in industry, however, were soon paired with descriptions of products. Vendors realized that the almanac, a staple among households and read by women, men, and children alike, offered prime advertising potential. Gradually, publishers looking to increase profits turned to almanacs as vehicles that carried information to audiences that relied, or had relied, on the same publication as a source of practical knowledge and amusement for decades—if not generations.

By the late Victorian period, almanacs were overrun by announcements for household goods, pharmaceutical products, and various local services. Efforts to evacuate the mystical from almanacs gained momentum; in the latter half of the nineteenth century, almanac publishers aligned themselves with the encyclopaedic rather than the prophetic, while meteorologically based astrological knowledge was swept into the realm of entertainment for the middle classes. For Katharine Anderson, the growth of meteorology as a valid enterprise broadened divisions between scientific approaches and the people who practiced different kinds of enquiry: “One of the most important of these was the division between the elite and

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164 Almanacs’ increasingly regimented content ensured their success in an economy increasingly dependent upon train schedules, work shifts, regulated timetables and deadlines.
popular knowledge about nature, the former associated with observatories, precision instruments and the accumulation of data, the latter associated with weather prophecy.\textsuperscript{165} Gradually, almanacs moved from the centre of a print-based culture to their periphery. In Maureen Perkins’s view, “The reform of almanacs is not just a story of élite domination and social control. In each change, the topic which had been expressed in almanacs actually continued, although in different form.”\textsuperscript{166} This helps to explain why almanacs are rarely taken up as an object of study; they are now associated with promotional tactics rather than vital information. This, combined with the fact that they were annually replaced and predominantly catered to popular audiences, serves to explain why nineteenth-century almanacs and their cultural significance remain undervalued.

The technological innovation that permitted the facilitated printing and distribution of almanacs across wide geographical areas gradually expanded, and England’s economy shifted ever more swiftly towards industrialization. Such changes are described in \textit{Shirley}. In the novel’s final scene, Caroline Helstone looks upon the woods and valley that surround her home and condemns her new husband’s industrial desire to harness the land’s natural resources in order to increase his profit margin. Gerald Moore, however, is unperturbed. He describes his visions, which transform the bosky dell into a thriving mill. The forest turns to firewood and the “rough pebbled track shall be an even, firm, broad, black, sooty road.”\textsuperscript{167} Politely shocked, Caroline reprimands him for wanting to “change our blue hill-country air into the Stilbro’ smoke atmosphere.”\textsuperscript{168} The novel’s narrator confirms that in the fifty years

\textsuperscript{165} Ibid., 305.
\textsuperscript{166} Ibid., 11.
\textsuperscript{167}Brontë, \textit{Shirley}, 540.
\textsuperscript{168} Ibid.
since the young couple first looked out upon the landscape surrounding their home, Moore’s plans have come to fruition. The countryside’s hills, “once green, and lone, and wild” have since been transformed by the addition of “substantial stone and brick and ashes—the cinder-black highway, the cottages, and the cottage-gardens; [...] a mighty mill, and a chimney, ambitious as the tower of Babel.” Industry has transformed the countryside beyond recognition and has even driven some of its oldest inhabitants away. The narrator’s “old housekeeper” describes how her very own mother had seen a fairy shortly before the town mill was built, “the last fairish ever seen on this country-side (though they’ve been heard within these forty years).”

A similar event was recounted to Gaskell, who met with the Brontë family’s long-serving housekeeper, Tabby. A very old woman by the time of Gaskell’s visit, Tabby hinted at the increasing industrial changes taking place when she speaks of how she “had known the ‘bottom,’ or valley, in those primitive days when the fairies frequented the margin of the ‘beck’ on moonlight nights, and had known folk who had seen them. But that was when there were no mills in the valleys; and when all the wool-spinning was done by hand in the farm-houses round. ‘It wur the factories as had driven ‘em away,’ she said.” In *Shirley*, in Tabby’s mind and in reality, Yorkshire’s unprecedented industrial growth transformed the blue-tinged air into a polluted atmosphere filled with the clang of industry. The atmosphere’s changes are quantifiable and they have always been physically observable—as these changes intensified, they were rendered in literary fiction.

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169 Ibid., 541.
170 Ibid., 542.
An almanac is inherently ephemeral. At the end of the calendar year, once a new edition had been bought from a local bookseller or travelling almanac vendor, the old version—tattered, stained, endlessly consulted over the past twelve months—could be disposed of. It is likely that many an almanac was used unceremoniously in an outhouse. It is also plausible that old almanacs were used as kindling in household fireplaces, their pages ripped up and used to revive dying embers every morning. As it crumpled and burned, an almanac would go up in smoke and join the atmosphere it sought to elucidate. Brontë’s novels recuperate the language of almanacs and, in so doing, point to a conception of the world that connects those who know some signs of the sky to their wider surroundings. As growing industrial development altered the British landscape, almanacs were relegated to the status of curious ephemera, and the signs described in their pages became difficult to detect in the smoky atmosphere.
Chapter 2
Sounding Smoke in Charles Dickens’s *Hard Times* and Elizabeth Gaskell’s *North and South*

There is no reason whatever why the atmosphere of London, and other great towns, should not be as clear, the public buildings as white, and the linen a great deal cleaner than the air, the monuments, and the linen of Paris, or Munich, or St. Petersburg.

-From “Smoke or No Smoke,” *Household Words* (1 July 1854)

The rise of industry in England during the nineteenth century introduced many new substances and sounds that resulted directly from the operation of innovative machinery. The dark scenes that Charlotte Brontë anticipated in the closing pages of *Shirley* came to pass as the steam engine’s power shifted economic and environmental systems. Though many industrialists hailed the steam engine’s power, some politicians began to notice its harmful side effects—especially those of an environmental nature, as they were increasingly apparent in the atmosphere. Smoke was one such harmful consequence. In less than a decade, from 1844 to 1850, six parliamentary bills were brought forth to “compel [private] furnaces to ‘consume their own smoke’” and, in so doing, to reduce citizens’ exposure to harmful substances. Each attempt to change the legislation failed, although the *Smoke Abatement Act* of 1847, which obligated factory owners to burn their own smoke, was successful. At the same time, public complaints about other atmospheric contaminants steadily increased.

Anxieties regarding the volume of urban life were of particular concern and sustained legal

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efforts were made to reduce and to control the sounds of public spaces.\textsuperscript{173} Debates on air quality and the sound of urban life point to a growing unease with a changing atmosphere.

The perception that the atmosphere is a fluid substance that immerses planets and people within a unifying medium shifts over the course of the 1850s. The atmosphere swells from the loud noises and clouds of smoke that industry ushers in; suddenly, the amalgamating powers of an elastic, invisible fluid threaten systems—bodies, classes, spaces—that shun porosity and seek rigid order and structure. Sound and smoke make hidden activities manifest; they can unite individuals while excluding others. In Elizabeth Gaskell’s \textit{North and South} (1854) and Charles Dickens’s \textit{Hard Times} (1854), sound and smoke push against the material, environmental and political boundaries that divide people and allow separately held categories to mingle.

This chapter examines the serial publication of \textit{Hard Times} and \textit{North and South} and considers \textit{Household Words} magazine as a literary repository as well as an atmospheric archive. Although \textit{Hard Times} and \textit{North and South} are now read as paperback novels, their original format hearkens to the material conditions that the pages denounce; the smoke described in both texts, though ascribed to the cotton trade, bears ties to the loud, hazy, steam-operated printing presses that produced \textit{Household Words} in London’s core. The pages the texts were printed on speak to the smoky, noisy history of industrial printing, just as the words on the pages describe and decry these conditions in a fictionalized world.

\textsuperscript{173} The fight against organ-music was especially vehement and broadcast in newspapers and magazines across London. For more details, see John M. Picker, “Embodying Noise: The Leech Case” in \textit{Victorian Soundscapes} (Oxford: Oxford University Press, 2003), 65-77.
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Grimy Smudges: Coal, Smoke and Print Culture

1.1 Material and Immaterial Boundaries of the Book

Charles Dickens’s *Hard Times* was serialized from April 1, 1854 through August 12 of the same year. Elizabeth Gaskell’s *North and South* followed *Hard Times* in the magazine’s pages, beginning its run on September 2, 1854 and concluding on January 27, 1855. The texts mirror one another in important respects: both are industrial novels that take up the conditions of workers in cotton mills, and that feature sickly mothers, a wayward son, a spirited daughter and a wise, working-class man. And yet these are not perfect reflections, as the two novels strike a different tone, as was evident to the critics of the time. *Hard Times* was criticized on the grounds of its caricatured characters, and the unhappy ending—itself compounded by a dire narrative—frustrated readers. Their disappointment was such that a parody appeared, only three years after the novel’s serialization, which sought to correct the story and its “striking want of poetical justice […] wherein none of the good people were made happy, and the wicked were most inadequately punished.” For its part, *North and South* garnered mixed reviews but was praised for its realistic and detailed depictions of factory life in Northern England.

Few scholars take into account the ways that these novels were first read: *Hard Times* and *North and South* were first serialized in the pages of *Household Words*, surrounded by

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174 Dickens’s and Gaskell’s sometimes tumultuous relationship as editor and author is well documented, with Gaskell’s deep frustration towards the compressed nature of serialized publishing—and her resistance to Dickens’s editorial commands—being interpreted as a form of feminist rebellion. See, for instance, Hilary M. Schor’s *Scheherazade in the Marketplace: Elizabeth Gaskell and the Victorian Novel* (Oxford: Oxford University Press, 1992). Her exasperation with the pressures of a weekly publication became all the more evident when *North and South* appeared, in book form, with two new chapters and considerably expanded portions of text, as well as epigraphs and quotations at the beginning of each chapter.

shorter articles or sometimes framed by a poem. Melissa Schaub has argued that both novels would have been considered as the products of a “corporate author,” since they were published sequentially and feature such strong parallel features.\textsuperscript{176} Taking into account the novels’ serial history blurs the boundaries that are often imposed by the format of the book. Although \textit{Hard Times} and \textit{North and South} appeared in novel form shortly after they were printed in the magazine, their first meeting with a growing reading public did not occur under the material conditions that mark our current encounter with these texts.

In novel form, a text appears self-contained. It is neatly bound within a unified whole that does not spill out beyond its casing. The text has a clear beginning, middle and end. There may be advertisements sewn into the final gatherings, but there is no doubt as to when a story concludes—the reader knows, from an announcement that “the end” has been reached, when they are done. When it is published serially, however, a novel’s edges can become blurry. They are no longer firmly held within leather-covered boards, but are somewhat tentatively indicated by thin lines that may divide one article from the next. As Laurel Brake points out, serialization has been “disciplined and stripped out” of many canonical novels “to resemble the comparatively austere \textit{volume} form of reading material of the lettered and traditionally conservative upper classes. This ‘timeless’ format of the volume text has been normalized institutionally by nineteenth- and twentieth-century publishers, libraries, universities and schools.”\textsuperscript{177} The articles that accompanied serial portions of the novel are forced out of the book format, making it more difficult to understand the context in

which these texts first appeared. Articles that emerge next to a serialized novel frame the narrative in more ways than one (and vice-versa), especially if corresponding themes—such as the changing atmosphere—appear throughout the texts, fictional or not.

For book historians, serialization represents an important moment in the cultural evolution of print. A serial publication is written following a set publication cycle that depends on technological innovation and, most importantly, on steam power. The serialized novels of the nineteenth century could not have existed in a preceding era, as the machines required to print quickly and cheaply were not yet invented. And yet serial fiction declined after the nineteenth century, when innovative printing technologies were becoming even more available. This suggests that “literary form [can no longer be seen] as a mere consequence of market and technological forces, but, perhaps more crucially, as itself an articulation of the values of the age.”

This makes the very pages upon which the texts are printed important signifiers of cultural shifts. It is in this way that *Hard Times* and *North and South* not only represent the living conditions of industrial England—they also physically contain them. Coketown and Milton-Northern’s endless plumes of smoke and the roar of their tireless machines are described on the page; yet, the page itself was created thanks to a steam engine, its smoky fuel, and its loud volume. *Household Words* is an archive that contains the material traces of industrial labour while it simultaneously denounces the byproducts of such industry.

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179 John Ruskin noticed this phenomenon and addressed it in his lecture, “The Storm-Cloud of the Nineteenth Century” (1884). In his address, Ruskin speaks of changing weather with the authority of a man who has kept a detailed diary his entire life, tracking not only daily activities but also noting weather patterns with the critical eye of an art historian. Looking back to an earlier time, Ruskin decries the current state of perpetually dirty
As he was writing *Hard Times*, Dickens was also the self-appointed “conductor” of *Household Words*.\(^{180}\) He was writing a good deal of its content alongside his novel, and then publishing it all under the same title in two neat columns of tightly-packed type. Many of the articles that appeared in *Household Words* alongside *Hard Times*, and later next to *North and South*, echo the very themes that emerged in the novels’ pages. Most notably, industrial production, its smoke, and its sounds appear in didactic articles that were paired with literary content.

1.2 A Brief History of *Household Words*

Dickens, like Charles Knight, was interested in supplanting wildly popular reading materials sold to lower class readerships. Having begun his career as a journalist, Dickens established and edited *Household Words* in 1850. The affordable weekly was, when it appeared, the “only publication to offer respectable, good-quality serialized fiction to a middle-class audience, at a low price, under the aegis of a celebrated novelist known in part for his

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\(^{180}\) Dickens was, evidently, the editor of *Household Words*, though he seems to have preferred to call himself its “conductor.” The term certainly conveys a sense of distant yet constant control.
depictions of idealized domesticity.”

By offering middle-class content at lower-class prices, Dickens was able to reach a broader audience, which would allow him to achieve his magazine’s titular purpose: to be “familiar in his [audience’s] mouth as household words.” Part of this mission, however, was motivated by a desire to elevate the lower classes by way of providing them with aspirational literature. As Sabine Clemm explains, Dickens strove to replace the poor’s almanacs, chapbooks, ballad sheets, execution reports and murder descriptions with a “wholesome diet of entertainment and instruction. He tried to achieve this by making Household Words lighter in its moral outlook than most current family journals and by emphasizing humour and “fancy” over their “utilitarian tone” and blunt demand for reform.” Whereas the Society for the Diffusion of Useful Knowledge was straightforward in its call for an educated, moral, and upright working public, Household Words used fiction in order to amuse as well as to instruct.

Household Words situated itself, materially and in terms of content, between increasingly opposing forces. As Huett explains, “As periodical literature grew to pre-eminence, a conflict arose between the older and more established reviews, and the cheap press, which was perceived as a potentially dangerous destabilizing radical influence.”

Formatted like a cheap journal but with pages full of content produced by recognized authors and edited under Dickens’s ever-watchful eye, Household Words emerged between the old guard and the new classes of readers. Household Words and its paper, layout, and distribution

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183 Huett, “Among the Unknown Public,” 65.
networks situated the magazine as a happy medium for the middle class within an increasingly crowded literary marketplace.

Part of *Household Words*’s success is attributed to William Bradbury and Frederick Mullett Evans’ swift adaptation to and adoption of new industrial printing technologies. Nineteenth-century innovations in printing, papermaking, distribution routes, and educational reforms led to an important shift in European print culture. As Robert Patten underscores, “the first thirty-five years of the nineteenth century introduced more radical changes in book production than the preceding 350.” Paper, which for centuries was made by hand, could be produced mechanically thanks to Henry Fourdrinier’s cylindrical paper-making machine, which was patented in 1806 and perfected by the 1830s. Suddenly, paper was quickly available in larger sheets—and these could be used in bigger machines. Changes to the printing press allowed for faster production as wooden hand presses were gradually replaced by the Stanhope iron press, which could print on a greater surface area. Friedrich Koenig’s invention of a double-cylinder steam press further sped up production (it printed at six times the speed of a hand press) wherever the new machinery was used. In addition, the myriad jobs in which an “eighteenth-century bookseller might have been engaged—publisher, printer, stationer, retailer, financier, print seller, agent, editor, newspaper proprietor, and public relations director—began to be subdivided.” For Bradbury and Evans, adapting to such changes as they emerged allowed for greater flexibility in a shifting market.

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186 Ibid., 59.
They were printers first and foremost, having grown in the London printing scene and gained, since their firm’s establishment in 1830, a reputation for being “generally quick, efficient, and accommodating.” Since 1836, Bradbury and Evans had printed Dickens’s works for his longstanding publishers, Edward Chapman and William Hall. As the author’s relationship with his first publishers eroded over disputes concerning profits and ownership, a change increasingly became inevitable. By 1844, Bradbury and Evans were in a position to print as well as to publish Dickens’s novels—in other words, they could take on the production as well as the advertising and distribution side of the business. Their technological readiness meant that from their buildings in Whitefriars, Bradbury and Evans first printed Household Words on presses that were generally used to produce weekly serials, rather than the monthly ones that Dickens was used to. The new publication joined a quickly growing market.

In London during the mid-nineteenth century, every Saturday would usher in a fresh crop of periodicals—beyond the newspapers that were already being issued twice daily. Household Words is estimated to have sold approximately 40,000 copies per week, which represents roughly ten per cent of the perennially popular London Journal’s weekly output. It jostled for position among many other publications:

‘Two literary papers, twelve economic and social journals, fourteen penny and halfpenny magazines, three tracts, five musicals, and thirty-seven weekly sheets forming separate books.’ […] In addition, ‘227 monthly periodical works were sent out on the last day of July 1846,’ and there were a further ‘thirty-eight quarterlies.’ These periodicals represented sports, philosophical, religious, professional and social interests as well as a number of charitable societies.

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187 Ibid., 141.
188 Ibid., 242.
189 Clemm, Dickens, Journalism, and Nationhood, 11.
And the weekly did suffer from its position in a packed market. Although it was aimed at a steady audience made up of educated and relatively wealthy individuals, the owners of *Household Words*—a group that included Dickens, directly linking him to the magazine’s financial success—began to notice a dip in circulation by September 1853. To counter the declining profits, Bradbury and Evans encouraged the author to publish a new novel serially in the magazine’s pages. Surely, this would encourage the public to keep up with new issues—and so *Hard Times* was Dickens’s first novel to be issued on a weekly basis in *Household Words*. The journal’s circulation doubled and the author’s arrangements to have the complete work published cheaply in a portable form—advertised in the magazine’s pages in the weeks preceding the story’s conclusion—sold beyond expectations, paving the way for Gaskell’s novel to be set upon the magazine’s pages.

1.3 Smoke or No Smoke

“Why do a vast proportion of the inhabitants of London, and other dense towns, die of diseases of the lungs?” enquired Dickens in “Smoke or No Smoke,” an article published in the July 1, 1854 edition of *Household Words*. And why were the clean linens stained by the end of the day, or the sheep’s white coats darkened, and how is it that tourists visiting town surely came to believe that the city’s “oldest public edifices are build of coal, and our statues carved in ebony”? The answer lies in the air: plants wither, the elderly die in coughing fits, and the National Gallery’s portraits require regular cleaning because of the

191 Ibid.
smoke pouring out unchecked from the hundreds of thousands of domestic chimneys and their manifold industrial counterparts—despite the Smoke Abatement Act of 1847. This Act compelled factory owners to modify existing chimneys or build new ones that would consume their own smoke by burning it. At an extreme temperature, coal generates fuel with very little smoke. The sooty particles that blacken sheep and soil linens represent so much wasted fuel, but such losses could be reduced with the help of cleverly designed tools that would increase temperatures quickly and evenly; in “Smoke or No Smoke,” these devices are described and their use is strongly encouraged, no doubt because Household Words’s audience represented a significant portion of the many thousand chimneys crowding the London skyline.

By the time of the article’s publication, it is estimated that London’s inhabitants burned the equivalent of one metric ton of coal per year, to say nothing of the parallel use of the fuel in most industries. To be sure, there had always been smoke in large urban settlements—only it had been fueled by wood for centuries. As industry grew, coal became the principal source of heating energy throughout an increasingly deforested countryside. England’s geological makeup is such that coal is readily available at relatively shallow depths—it has been mined since the medieval period and its consumption increased steadily as other fuel sources became scarce and expensive, and as the country’s population migrated towards large urban centres such as London. Of particular note were the problems caused by sea-coal, which was shipped from the Northern shores of Newcastle to the southern port of London; when burned, it emitted a terrible smell. By the end of the eighteenth century,
London imported over a million tons of coal per year.\textsuperscript{192} The quantity of smoke produced by such widespread use of coal was further compounded by the fact that, as decried in “Smoke or No Smoke,” chimney height was not uniformly regulated. What’s more, London’s peculiar geographical emplacement in a low-lying valley by the Thames favours low-lying pressure systems. Upper air currents flow above the city, which traps lower systems and causes fog. Combined, these elements led to an unprecedented amount of smoke in the air. It also made its way into print.

Smoke and sound are integral parts of printing history, but they are rarely discussed, as their traces are lost in the atmosphere. When an object is perceived as ephemeral its material presence often becomes secondary. Tim Ingold criticizes the tendency to “equate the solidity of things with their materiality, [which allows us to] dematerialize the medium in which [we] are primordially immersed.”\textsuperscript{193} Smoke and sound seem to disappear or to fade away, which obfuscates their position as material forces that influence their surroundings. Smoke fills the pages of \textit{Household Words}—most evidently in articles like “Smoke or No Smoke,” but also in descriptions of urban life in \textit{Hard Times} and \textit{North and South}. It also fills the magazine’s pages materially and historically—in between paper fibers and ink smudges—as burning coal provided the energy to heat the boilers and powered the cylinder press that was likely used by Bradbury and Evans’s printers.\textsuperscript{194} Coal is also in the ink, as one

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\textsuperscript{192} Peter Brimblecombe, \textit{The Big Smoke: A History of Air Pollution in London Since Medieval Times} (London: Methuen, 1987), 63.

\textsuperscript{193} Tim Ingold, “Against Soundscape,” 12.

\textsuperscript{194} Stephen Sword, a printer and nineteenth century print historian who regularly hosts workshops at Massey College’s print shop, suspects that Bradbury and Evans had a very large printing facility with a mixture of iron hand presses and a double cylinder press similar to the Applegath model, which used coal in order to power its steam engine. As he explains, such a press “is designed to print both sides of the sheet (referred to as ‘perfecting’). It is only one of the many cylinder press variations that would have been available by the 1840s.
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of the primary materials that allowed for the production of a deep black colour. In addition, the relatively large quantity of printing presses required to operate a business like Bradbury and Evans’s further suggests that theirs was, like most printing houses, a loud place. Along with increased coal consumption, the Industrial Revolution’s mechanical developments ushered in new kinds of sounds: where there is smoke, there is fire—and there is also a lot of clanging and banging, if you happen to be in an urban centre in the middle of the nineteenth century. The material history of Household Words casts a shadow upon “Smoke or No Smoke,” which implores Londoners to seek out technologies that would reduce their chimneys’ output. And yet the magazine’s very production required huge amounts of coal, which was burned in the heart of the city and left its own traces on the linens, the buildings, and inside the books.

1.4 Printing Sounds and Smoke

The emergence of new printing technologies concentrated the shift from the aural to the visual. In Orality and Literacy, Walter Ong notes that with this change, a new cognitive “world was shaping up, spatially organized. In this new world, the book [is] less like and

[The Applegath] has both the register gearing and the improved ink-table distribution (instead of the simple roller pyramid); but, the impression control would still not have satisfied a book printer.” Stephen Sword, email correspondence with the author, February 4, 2016. It would have been satisfactory, however, for a weekly publication such as Household Words. Many thanks to Stephen, who was generous with his time and answered my many questions about Dickens’s publishers and their machines. Stephen’s son suggested laboratory testing could determine which microscopic pollutants are still embedded in the paper. I am grateful for the idea, which may be attempted in the future.

195 My thanks to Alexandra Kordoski, at the Thomas Fisher Rare Book library, for pointing this out.
utterance, and more like a thing.”\textsuperscript{196} Between the book’s presence as an utterance and its qualities as a thing lies a re-positioned definition of sound that considers the printing press as a source of coherent and charged aurality rather than as a noisy, disturbing eruption. The soundscape of book history, in this sense, refuses to divorce the means of production from the product and seeks to consider the aural as it is contained within an object that lends itself predominantly to visual (and haptic) examinations.

In the age of mechanical printing, new sonic markers replaced old ones. In the opening pages of \textit{Les Illusions perdues}, Honoré de Balzac describes the squeak that would have been familiar to generations of printers: “Le vieil Ours abaissa la frisquette sur le tympan, le tympan sur le marbre qu’il fit rouler sous la presse; il tira le barreau, déroula la corde pour ramener le marbre, releva tympan et frisquette avec l’agilité qu’aurait mise un jeune Ours. La presse ainsi manœuvrée jeta un si joli cri que vous eussiez dit d’un oiseau qui serait venu heurter à une vitre et se serait enfuit.”\textsuperscript{197} [“The old ‘bear’ folded down the frisket upon the tympan, and the tympan upon the form, ran in the carriage, worked the lever, drew out the carriage, and lifted the frisket and tympan, all with as much agility as the youngest of the tribe. The press, handled in this sort, creaked aloud in such fine style that you might have thought some bird had dashed itself against the windowpane and flown away again.”\textsuperscript{198}]

\textsuperscript{196} Ibid., 123.
\textsuperscript{197} Honoré de Balzac, \textit{Illusions perdues} (Paris : Flammarion, 1990), 68.
\textsuperscript{198} In \textit{The Machine That Made Us}, Stephen Fry enlists the help of a team of experts and craftsmen to build a functional replica of a wooden one-pull press. The result is impressive, and the first pull of the devil’s tail makes a squeaky sound. Relatively few wooden presses remain in North America. One centuries-old Louis Roy press is located in the town of Queenston, near Niagara-on-the-Lake in Southern Ontario, at the Mackenzie Printery Museum. This particular press, which was used to print Canada’s \textit{Act Against Slavery} in 1793, is kept in a room that does not have tight climate controls. I visited the Museum when humidity levels were high; the wood had expanded and, owing to the machine’s age and condition, listeners were left to imagine the squeak the
iron hand presses and steam-powered cylindrical presses gradually replaced wooden hand presses, certain sounds that had made up the vernacular of book making (such as the lovely cry of the wooden press) ebbed away while machine-press books increased the volume of production. Iron presses allowed for larger documents to be printed and changed the sounds associated with pressing ink to paper, much as the hand press had once overlapped and then overtaken the sound of a monk’s quill scratching on parchment. Although sounds fade shortly after they are made, books, serials, and newspapers remain as quiet testaments that speak to their noisy creation.

London’s urban core was loud because large-scale industries were housed within city limits; printing, for instance, was carried out along Fleet Street for centuries. As John M. Picker states, the Victorian period in England was “marked by an increasing volume and an increased awareness of sound—from the shriek and roar of the railway to the jarring commotion of urban streets, and from the restrained tinkling of the drawing-room piano to the hushed propriety of the middle-class parlor.”199 In this respect, the representation of sound in literary fiction telegraphs a contemporaneous concern about the volume of daily life, which increased as a result of the same industrial activities that blackened London’s sheep.

The atmosphere’s relationship to sound is explained in a short article that appeared in *Household Words* on April 8, 1854. In “A Call Upon Sophy,” a narrator relates information

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exchanged during a pleasant visit with a great thinker. The phenomenon of sound is explained in relation to the earth’s atmosphere, which is no longer understood exclusively as an invisible fluid, but its presence is related in a metaphor that rests upon liquids and their movement. The narrator notes that “if we could live without air we could not talk, sing, or hear any sounds,” and adds that there would “be everywhere an awful silence.” The world would be a desolate place. As it is, “there is less air in the upper than in the lower regions of the atmosphere; the bottom crust of air is, of course, densest.” Sounds made on the surface of the Earth are heard more easily than they are in the higher altitudes. And this is connected to the act of speaking, for “when a man speaks he strikes air with his throat and mouth as a stone strikes water, and from his tongue as from the stone spread undulating circles with immense rapidity.” Air is likened to a “crust,” a solid material that thins out according to its distance from the Earth’s own outer shell. In all of these explanations, sound fundamentally requires the atmosphere in order to exist. Human communication is intricately connected to the atmosphere. Though it is invisible, it allows for the audible to emerge.

As the *Household Words* conductor, Dickens often edited articles to suit his own style. It becomes difficult to determine who authored each individual unsigned piece. The theory of sound outlined in “A Call Upon Sophy” echoes a theory Charles Babbage proposed. Babbage was a polymath and an inventor. Babbage was deeply involved in the development of technological advancements in science. In his *Ninth Bridgewater Treatise*, published in 1837,

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200 The earth’s atmosphere allows sound waves to travel. The absence of atmosphere leads to an absolute silence (as in space) that perturbs most humans. Anechoic chambers, which eliminate the echoes of sound waves and reduce decibel levels beyond ordinary circumstances, are often reported to be unpleasant for those who try to stay inside them for more than twenty minutes.


202 Ibid.

203 He invented the difference engine, a machine that is now widely recognized as a proto-computer.
Babbage proposes a theory of sound that unites his scientific framing of the world with a poetic vision of an eternal connection between humans and their environment. In his view, all sound leaves its trace in the infinite space that surrounds us:

Thus considered, what a strange chaos is this wide atmosphere we breathe! Every atom, impressed with good and with ill, retains at once the motions which philosophers and sages have imparted to it, mixed and combined in ten thousand ways with all that is worthless and base. The air itself is one vast library, on whose pages are for ever written all that man has ever said or even whispered. There, in their mutable but unerring characters, mixed with the earliest, as well as with the latest sighs of mortality, stand for ever recorded, vows unredeemed, promises unfulfilled, perpetuating in the united movements of each particle, the testimony of man’s changeful will.204

This inextricably connects the atmosphere to sound. More than this, however, Babbage’s theory proposes that the flow of output from human beings throughout history is recorded in the air itself until the end of time. This was not unanimously received; various critics who otherwise admired Babbage’s work suggested that this was a rather imaginative understanding of sonic phenomena.205 And yet Babbage’s good friend Charles Dickens was struck by the notion. As Picker remarks, the idea of the air as a perpetual library of all previous sounds bore significant influence on Dickens, who quoted Babbage’s theory in *Dombey and Son* and referred to it again, decades later, during a speaking tour across England. Picker suggests that Babbage’s theory “of aural permanence […] constitutes a framework for understanding Dickens’s development as an author, performer, and publishing innovator.”206 For an author, even a fledgling belief in the theory that all sound remains eternally suspended in the atoms constituting the atmosphere would certainly inflect the

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206 Ibid., 17.
sounds committed to paper with particular depth. It would also alter the way Dickens understood the aural vocabulary of printing. If the air becomes an endless library for the sounds of a human life, then the materials that constitute that library are especially significant. Babbage’s theory also establishes the atmosphere as something greater than an invisible presence: its atoms record human activity in its sensory fullness.

2 Sound and Smoke on the Pages

*Hard Times* and *North and South* were written in the thick of environmental discoveries and debates about air quality; smoke and sound were of particular concern to politicians and members of the public alike. Dickens and Gaskell lived in a period marked by its obsession with air as a vehicle for disease, corruption, and pollution. Many critics have examined how Dickens’s preoccupation with mist, fog, and atmospheric envelopes is crucial to his novels. Christine L. Corton, for instance, links the descriptions of heavy fog that mark the opening pages of *Bleak House* to the notably dreary weather that had afflicted England during the novel’s composition. Dickens’s concern with coal smoke, as it is outlined in “Smoke or No Smoke,” remains understudied despite the fact that, by the middle of the nineteenth century, public reactions against the proliferation of smoke were gaining momentum. This is a curious period in the history of the atmosphere: while some, such as Lord Palmerston, increasingly petitioned the government to take action against industries that

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inefficiently burned their coal, others believed that the smoke itself was a source of nourishment and purified the air. As Peter Thorsheim explains,

By the middle of the nineteenth century coal smoke filled many British cities, yet few people saw it as detrimental to either human health or to the wider environment. In their view, pollution came not from energy use or industry, but from natural biological processes. They blamed disease on miasma, an invisible gas thought to be given off by decaying plant and animal matter. [...] Many people not only considered coal smoke to be harmless, but actually thought of it as an antidote to pollution. 209

The body’s vulnerability to such atmospheric forces appears in one of the companion publications to Household Words, the Household Words Almanac, which printed information that was meant to be practical and practicable. 210 One of its entries, titled “Serviceable Information,” specifies that “diseases caused by exposure to putrid effluvium from decayed animal matter” can be prevented by “the most determined habits of cleanliness, and by escape whenever possible into fresh air.” 211 The atmosphere’s fluidity is implicitly referred to in the flow of invisible substances, but its impact no longer reverberates on a cosmic scale; rather, individuals must strive to protect their bodies from the invisible contaminants that surround them. By thickening the atmosphere, sound and smoke put pressure on boundaries

210 Dickens also ventured into another supplement publication, namely the Household Narrative of Current Events. This project, as well as the Almanac, was less successful than the magazine. The Household Words Almanac was only published twice (for the years 1856 and 1857) and was abandoned thereafter. It is worth noting that Dickens did not conduct the Household Words Almanac. Its editor, Henry Morley, only published two editions before it was deemed to be a failure. Its purpose was similar to that of the SDUK’s British Almanac. Both were explicitly created in order to discourage the kind of folkloric beliefs that circulated in other almanacs like Vox Stellarum and Time’s Telescope. The Household Words Almanac looked down at such publications and mocked them openly. In its explanation of the calendar for the month of February, under the header “Remarkable Predictions,” the narrator asks its audience if there is such a reader for whom there “lingers a halting faith in the predictions of Astrologers? Does anyone desire his Almanac to be prophetical; [...] or teach him on what days he must needs look with special care to his own back, arms, or legs!” Such a reader would be disappointed by this almanac, which instead proposes to explain the world in clear, scientific terms and spurns the purported “foresight” of those who look “only for information to the movements of the stars!” See Household Words Almanac for the year 1856, 4.
that are meant to divide humans from their surroundings, but that crumble in the face of such constant and uncontainable forces.

This is the smoke of *Hard Times* and *North and South*, a hyper-present cloud that transforms everything it infiltrates. Smoke pervades *Hard Times* and lingers, “languid and monotonous,”212 over Coketown. The city’s dense smoke cloud separates it from the sky and from the surrounding fields, forests, and seashore. Similarly, the town of Milton-Northern in *North and South* is wrapped in an enduring pall of smoke. It constantly reminds its inhabitants of its presence by sullying their window-dressings, marking their clothes, filling their lungs, and even pressing upon their emotional states. The smoke seems to serve as a fortification against natural forces; indeed, wind cannot penetrate the haze—it simply moves it from side to side, but cannot break through. In these novels, smoke fills the atmosphere and separates humans from each other as well as from their environment.

Milton and Coketown’s sounds are influenced by their industry; while smoke prevents the sky from indicating the time of year or even the time of day, the aural compensates for the visual darkness: bells ring throughout the day, summoning workers to their posts and relieving them from their work. As much as these towns’ aesthetics are based on their industrial nature, so too are their sounds a product of the factories’ constant working: “the measured motion of their shadows on the walls, was the substitute Coketown had to show for the shadows of rustling woods; while, for the summer hum of insects, it could offer, all year round, from the dawn of Monday to the night of Saturday, the whirr of shafts and wheels.”213 Coketown’s sounds are only abated overnight and on Sunday, whereas Milton’s silence

213 Ibid., 86.
emerges as the result of labour conflicts. There are no weekend breaks or overnight pauses. The only interruption to the smoke’s outpouring and the mill’s loud noises comes with a strike, which in turn creates a new assortment of sounds—but where the absence of smoke is a threat rather than a respite.

2.1 Industrial Sound Infinitely Repeated: *Hard Times*

*Hard Times* opens with Thomas Gradgrind’s declaration that the children in his school should be taught only facts: “Facts alone are wanted in life.”\(^\text{214}\) Facts are all that are needed to live in Coketown, a very “triumph of fact” with identical red brick houses, aligned in identical streets—a veritable “town of machinery and tall chimneys.”\(^\text{215}\) Gradgrind’s belief in facts is shared by Josiah Bounderby, a man “as near being Mr. Gradgrind’s bosom friend, as a man perfectly devoid of sentiment can approach that spiritual relationship towards another man perfectly devoid of sentiment.”\(^\text{216}\) The town is entirely devoted to manufacturing. The factories’ run-off blackens the river, a constant cloud of smoke darkens the air and its sounds are those of industry and profit. There is a regular clattering of hooves upon the pavements, the sounds of crowds hurrying across the streets to make it to their shift on time, and the bells only ring to indicate the time of day—the sky can no longer serve as an indication of the weather to come.\(^\text{217}\)

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\(^{214}\) Ibid., 5.
\(^{215}\) Ibid., 20.
\(^{216}\) Ibid., 15.
\(^{217}\) These bells are quite different from those that Alain Corbin and Jean-Pierre Gutton study in their analyses of sound in the French countryside. Church bells evoke the spiritual world and were, up until the end of the nineteenth century, rung vigorously before approaching storms, as it was believed that the peals would dispel the oncoming bad weather—a practice that often resulted in the bell-ringer’s demise. It is striking, given such a
In order to escape from the smoke, Coketown’s inhabitants have to travel beyond the city’s outskirts. Stephen Blackpool, a hard-working man who is trapped in a bad marriage, decides to leave Coketown after he refuses to join the city’s labour union in a strike and further refuses to spy on his former companions for Mr. Bounderby. Having lost his job, Stephen leaves town in search of employment. As he walks out of the city and into the surrounding fields, Stephen turns “from the chimneys to the birds,” where he is almost welcomed by the whispering sound of trees. The contrast between Coketown and its surroundings places industrial sounds in opposition to those heard in the forest. This relationship continues to inflect the way we listen, as it establishes a hierarchy of sounds that privileges the unthreatening chirps, rustles, and babblings perceived in a rural environment while associating the rhythmic chugging and metallic eruptions of the city with unwanted (but unstoppable) activity. And yet city sounds can transmit information to those who are attuned to its codes.

Mrs. Sparsit, Mr. Bounderby’s housekeeper, is always acclimatized to the sensory information her environment provides. On the surface, it appears that Mrs. Sparsit privileges sight over sound. She keeps a perpetual eye on her neighbourhood, attentive to any tidbit of juicy information. Sitting by her window, she doesn’t “think much” of the evening’s sounds, the “whooping of boys, the barking of dogs, the rumbling of wheels, the steps and voices of


Dickens, *Hard Times*, 126.
passengers, the shrill street cries, the clogs upon the pavement when it was their hour for going by, the shutting-up of shop-shutters.”219 She seems capable of controlling her senses, and shuts off—at least temporarily—her “greedy hearing,” which only seeks to acquire information that could be used to condemn other townsfolk. Mrs. Sparsit does not in return make any sounds, which is a notable feat indeed, since hearing calls upon us directly as listeners. It creates a feedback loop in our calls and responses to aural cues. Hers is a unidirectional relationship with the environment. In hiding behind half-closed shutters and staying quiet, Mrs. Sparsit only wants to decode information.

This desire pushes her beyond Coketown’s city limits to the Bounderby country house. Desperate to know what Mr. Bounderby’s wife (and Thomas Gradgrind’s daughter) Louisa is doing with the obsequious Mr. Harthouse, a young man from London who is eager to join the political world, Mrs. Sparsit rushes across town so quickly that one would think “she had been caught up in a cloud and whirled away.”220 The sky is overcast and night falls as Mrs. Sparsit creeps through the home’s surrounding gardens to the forest where she can listen closely to her targets’ conversation. Mrs. Sparsit’s “greedy hearing” is soon rewarded, but only briefly; the storm breaks out and heavy rain begins to fall, muffling the sound of the information she so hungrily wants. As Louisa leaves the house in a hurry (and as quietly as possible), Mrs. Sparsit follows her to the train station where they both “listened to the thunder, which was loud, and to the rain, as it washed off the roof, and pattered on the parapets of the arches.”221 The two women are united by the sounds that surround them. Like the smoke that binds Coketown’s inhabitants to one another, the storm’s loud presence draws

219 Ibid., 96.
220 Ibid., 158.
221 Ibid., 161.
together individuals in an overarching weathered sound system. Mrs. Sparsit can see Louisa, but Louisa does not know that she is being observed. Sight becomes secondary as the fading light, the hidden figures in the forest, and the oncoming tempest darkens the skies. In a chain that connects the reader to Mrs. Sparsit, and Mrs. Sparsit to Louisa, the reader eavesdrops on the entire exchange until they are interrupted by a “hiss, a crash, a bell, and a shriek”\(^\text{222}\)—the train arrives, carrying the women back to Coketown where they are eventually separated.

In a novel that describes the changing state of the atmosphere, Dickens’s writing transcribes the library of sounds that fill the air. Such a catalogue of sounds connects Louisa and Mrs. Sparsit to one another and it also serves as a reference point for readers who have heard the sound of a storm. Dickens’s writing brings back sounds that are easily forgotten by human ears, though they might be captured in the atmosphere’s atoms. In his descriptions of a fictional storm, he invokes the atmospheric archive familiar to many of his readers and allows for the sound to reverberate once more in their own minds.

Literary texts record cultural atmospheres. Acoustic materiality itself is further complicated by recording, which translates the audible and transforms it by rendering it into the aural. Tim Ingold notes that these processes make it possible for sound to be “played back within an environment (such as a darkened room) in which we are otherwise deprived of sensory stimulus.”\(^\text{223}\) For Ingold, that which is audible can be heard, but the aural is heard indirectly—it is sound carried over to a new context, to a new audience. The crux of the issue, then, is that before sound recording technologies were available, the written word was used to describe and to re-inscribe what was heard. The visual and the audible, as “virtually

\(^{222}\) Ibid.
\(^{223}\) Ingold, “Against Soundscape,” 11.
inseparable”224 modes of perception—“hearing proposes, sight disposes”225—are therefore contained within the existence of books as material objects.

2.2 Haze for Days: Hard Times’ Smoky Atmosphere

For Coketown’s working population smoke appears as a constant reminder of their industrial purpose. As Bounderby tells Mr. Harthouse, a new arrival to town: “First of all, you see our smoke. That’s meat and drink to us.”226 It is the by-product of the hands’ labour, the very thing that circulates alongside them and within them, being breathed in and out incessantly. For outsiders, however, the smoke is a signal: it points to Coketown’s purpose—and to its very existence. The place itself is “inseparable from the work by which it [is] sustained,”227 and yet there is a distinct separation, mapped out aurally and atmospherically along the city’s geographic markers.

Coketown is “shrouded in a haze of its own.”228 The haze is both exclusively present over the town’s borders and is of its own making—the city’s raw manufacturing power creates its own ecological barrier, one that is visible from a distance as a “sulky blotch upon the prospect.”229 The city isn’t immediately visible to those who look upon it from afar—it is hidden behind a “blur of soot and smoke, now confusedly tending this way, now that way, now aspiring to the vault of Heaven, now murkily creeping along the earth, as the wind [rises and falls], or change[s] its quarter: a dense formless jumble […]”228

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224 Ibid., 11.
226 Dickens, Hard Times, 97.
227 Ibid., 21.
228 Ibid., 85.
229 Ibid.
is suggestive of itself, though not a brick of it could be seen." The dense cloud of smoke that hovers over the city is created, in a sense, by the multitude of chimneys that form the town’s skyline. As Steven Connor remarks,

The great innovation of the modern city is […] the institution of the chimney, as the celestial cloaca, the sewer into the sky. No architectural form characterizes modernity’s relation to the natural world better than the chimney—the vertical drain or exhaust pipe, that aims to expel noxious wastes into the topless heights of the sky, as we do our less volatile effluents into the similarly unfigurable immensity of the oceans. The chimney connects, but in order precisely to keep at a distance, two regimes of space.

The vertical planes that the chimneys are supposed to keep separate collapse throughout *Hard Times*, since the smoke refuses to remain above the chimney-tops and instead is found creeping along the streets, staining the red brick walls and depositing ash everywhere. As with all things, the chimney “raises the possibility of a return” since we know that what goes up must come down… Here, the “vertical become[s] vortical,” and that which was expelled returns, covering Coketown and its inhabitants along with it. Smoke possesses the city, simultaneously revealing its presence and hiding its details.

The technological innovations that give Coketown its purpose also separate it from the rest of the world, metaphorically and materially, as the city alters its atmosphere by virtue of its constant labour. This may be because Coketown’s smokestacks are poorly designed: “the chimneys, for want of air to make a draught, were built in an immense variety of stunted and crooked shapes.” This implies that there is no air to begin with, and the town’s chimneys mushroom along its rooftops, not only feeding more smoke into the atmosphere but

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230 Ibid.
232 Ibid.
233 Dickens, *Hard Times*, 52.
seemingly feeding on this same smoke, as well. Coketown’s boundaries are as unclear and nebulous as the permanent haze that coats the city. (It is, in fact, difficult to say whether the smoke is rising or falling, coming or going.) When Stephen Blackpool leaves Coketown, he can finally breathe freely and see the sky—and also see what he’s left behind. After his disappearance, two women leave Coketown to find him: his beloved Rachael, a friend from his youth whom he should have married, and Sissy Jupe, a young woman who was raised by Thomas Gradgrind after her father, a circus performer, ran away. In order to leave the city, Rachael and Sissy must “help themselves out of the smoke,” which conjures up the image of two women pulling themselves out of an amorphous pit of grey-black cloud.

The smoke hides the sun and often blocks the stars, plunging the city’s inhabitants into a world that seems to move beyond the reach of the elements. Some of Coketown’s citizens, at least, know about the world behind this dark, shape-shifting mass. Stephen, in his passionate defense of workers’ rights, tells the wealthy mill owner Bounderby and his emotionally stunted wife Louisa (née Gradgrind) that although he doesn’t know about many things, he does know that “the heavens is over [him] ahint the smoke.” This near-permanent smokescreen would befuddle even the most adept reader of the skies as the “sun [is] eternally in eclipse, through a medium of smoked glass.” Coketown’s weather is skewed; mechanical processes have influenced atmospheric ones, effectively changing the

234 While they do not figure in these novels, factories that produced chemicals on a large scale were notorious for emitting acidic fumes that would eliminate plant life in surrounding areas. In such cases, smoke left a very visible and extremely alarming trace in the wake of its devastation. Dickens alludes to this when he writes “Coketown cast ashes not only on its own head but on the neighbourhood’s too—after the manner of those pious persons who do penance for their own sins by putting other people into sackcloth.” See in particular Book the Third, Chapter VI of Hard Times.
235 Dickens, Hard Times, 197.
236 Ibid., 114.
237 Ibid., 126.
city’s climate and, as a result, collapsing the cyclical predictability of seasonal time, much like the carbon cycle’s interruption has disrupted today’s climate.

Although there is no smoke to be found beyond Coketown’s murky limits, there remain traces of its origins. The countryside is a landscape “blotted here and there with heaps of coal” and scarred by old signs of the mining activities that provide the town with the fuel required to operate its vast factories. Such coal pits were common in the areas surrounding large urban centres. Some abandoned mines were often the most dangerous, as they were not always properly shut; others were not structurally sound and could become a risk for those who walked above them. Stephen falls into such an abandoned coal pit, locally known as the Old Hell Shaft, in the darkness of the night. In a cyclical pattern of grim circumstantial irony, his fall into a coalmine echoes the many falls of drunk men who would get lost in the dark fogs of industrial towns. Some of them were so badly disoriented that they fell into the Thames and drowned. As the cultural historian Rosalind Williams notes, Britain’s history of digging runs parallel to the rise of smokestacks. As coal mining became increasingly crucial to the development of British industry and its concomitant imperial expansion, tunnels of smoke that rose above growing urban centres mirrored the mineshafts that were hidden below. In this sense, coal smoke points to its own cyclical nature: it emerges from the ground, burns, rises into the air, and comes back down. Throughout its journey, its presence poses a threat to humans who build cities over the emptied craters of the land that surrounds them.

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238 Ibid., 197.
Since the cloud of matter that causes the city to appear as a “blur of soot and smoke” cloaks Coketown, workers are forced to turn from the sky and, instead, to rely on their ears for the sound of bells that signal time’s passage. Smoke, like dirt, is “matter out of place,” and it is also “time out of joint,” writes Connor. Smoke separates Coketown from the rest of the country by virtue of its presence and by its effects—Coketown’s smoke makes the city timeless in that it becomes an endless repetition of sameness, architecturally as well as temporally. It contains “several large streets all very like one another, [where people all go] in and out at the same hours, with the same sound upon the same pavements, to do the same work, and to whom every day was the same as yesterday and tomorrow, and every year the counterpart of the last and the next.” The smoke’s languid monotony envelops and transforms everything it touches, masking the passage of seasonal time and replacing it with material measures: “so much fuel consumed, so many powers worn out, so much money made.” Smoke is the most overpowering signal—it is a quantifiable substance that indicates the continuous operation of machinery and the accrual of profits in a system that imposes regulated factory time over the rural dependence on seasonal variations and their correlating demands on farmers. Leaving Coketown’s urbanized and regimented chronological system and moving towards the rural only underscores smoke’s power as a material force.

Mrs. Sparsit constantly seeks to pierce through the smoke, literally and figuratively. Watching the world carry on outside her window, she spies the street as it begins “to sink behind the smoke; […] when the smoke [is] burning red, when the colour fade[s] from it,

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243 Ibid., 71.
when darkness seem[s] to rise slowly out of the ground, and creep upward, upward, up to the
house-tops, up the church steeple, up to the summits of the factory chimneys, up to the
sky.” The sun remains eclipsed, even as it sets, and the smoke is the only medium through
which the sky can be understood. Darkness and smoke seem interchangeable, both rising and
creeping toward the firmament.

Smoke hides the sky that hangs over Coketown. It also hides devious schemes: Tom
Gradgrind, Thomas Gradgrind’s corrupt and hedonistic son, uses Stephen Blackpool to
disguise his theft, while Bounderby proverbially blows so much smoke that he dissimulates
his own history from inquiring minds. These overlapping concealments thicken the plot as
well as the atmosphere that pushes across Coketown and presses against its very being.
Machines as well as machinations are reflected in the architecture, which traps everything
within a self-regenerating haze, and Nature is “as strongly bricked out as killing airs and
gases [are] bricked in.” To Mrs. Sparsit, these different elements are screens that need to
be broken through in order to obtain valuable information. As her eye wanders over the
world outside her window and cuts it up into little tender pieces, her active mind provides the
savoury brown sauce of inference that she relishes as much as her evening meal. The smoked
glass evokes a smokescreen; the cloud of smoke that hangs over the town is the material
representation of the more pernicious elements of the atmosphere, which obfuscate evil
deeds. Here, the secondary aspect of atmosphere points to smoke’s aesthetic potential.

244 Ibid., 95.
245 Smoke and crime were commonly paired in the nineteenth-century cultural imagination. Thorsheim suggests
that “many middle-class commentators—obsessed with a supposed connection between darkness and crime—
saw air pollution not primarily as a public health problem but as a catalyst and cloak for social disorder.” See
_Inventing Pollution_, 53.
246 Dickens, _Hard Times_, 51.
While the word “atmosphere” appears infrequently in *Hard Times*, its use speaks to the term’s multiple meanings. It is first used to describe Stephen Blackpool’s room and all of its contents: “A few books and writings were on an old bureau in a corner, the furniture was decent and sufficient, and, though the atmosphere was tainted, the room was clean.”\(^{247}\) The term “atmosphere” appears a second time to describe the factories’ interior spaces. To the workers like Stephen who slog in the mills, the atmosphere there is “like the breath of the simoom: and their inhabitants, wasting with heat, toiled languidly in the desert.”\(^{248}\) In both instances, the atmosphere is suggestive of its many implications—a passing reference denotes Stephen’s ability to resist all-encompassing contamination, signaling his moral rectitude. This highlights the mid-Victorian understanding of pollution, which held the term to represent a moral failing—a sign of sin, rather than a sign of environmental contamination. Stephen’s wife, an alcoholic who has stolen all of his belongings in order to finance her addiction, is polluted; he is not, nor is the atmosphere that surrounds him.\(^{249}\)

Class is rendered through descriptions of the atmosphere in a given urban or rural place (Stephen’s room is clean in spite of the dirty air), as are the very material and physical conditions of labour (the hot air produced by Coketown’s machines). The simoom’s hot breath is a small part of an atmosphere that envelops the globe, linking culturally foreign atmospheres to the town’s industrial familiarity. In this way, the atmosphere makes key Coketown interiors feel like strange lands—the very industry that supports the city has the

\(^{247}\) Ibid., 55.
\(^{248}\) Ibid., 86.
\(^{249}\) See, in particular Peter Thorsheim, *Inventing Pollution*, 204. The evolution of “pollution” is also evident in other novels, notably in Jane Austen’s *Pride and Prejudice* when Lady Catherine asks Elizabeth whether “the shades of Pemberley are to be thus polluted” by her (shameful) marriage to Mr. Darcy. See Jane Austen, *Pride and Prejudice*, ed. Pat Rogers (Cambridge: Cambridge University Press, 2006), 396.
power to change the environment because it pumps smoke into the atmosphere, into Stephen’s home, and into its inhabitants’ bodies.

In *Hard Times*, moving beyond industrial areas represents an idyllic return to the sounds of the past: birdsong, babbling brooks, the rush of wind through the trees, the sustained rhythm of farm labour. In *Hard Times*, sounds endlessly reverberate through the atmosphere and unite Coketown’s inhabitants. As a result of the town’s near-constant industrial drive, sounds thicken the air (along with the smoke) and echo through city spaces. Living in Coketown fills the lungs with ash and the ears with sound—leaving becomes a cleansing experience that rinses various pollutants out of one’s system.250

### 2.3 Strike the Air: Sounding NORTH AND SOUTH

*North and South* opens with Margaret Hale gently calling her cousin Edith’s name. Margaret spent her childhood alongside her cousin. She was sent from her native village of Helstone to London, where she was to “share the home, the play, and the lessons of her cousin Edith.”251 Now that both young women are grown, and Edith is to be married, Margaret will return home to live with her parents. Shortly after a joyous homecoming to her beloved countryside cottage, Margaret’s father, Reverend Hale, announces that he has had an irrevocable crisis of conscience: he “must no longer be a minister in the Church of England.”252 The family must leave the parsonage. The Reverend’s dear friend Mr. Bell suggests that the Hales move to

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250 Gaskell was convinced that leaving Manchester in order to breathe ‘clean air’ in southern continental regions was imperative to good health. See Emily Morris, “‘For her very life’: Duty, Health and the Poisonous Atmosphere of Haworth in Elizabeth Gaskell’s *The Life of Charlotte Brontë*” *Brontë Studies* 38 (2013): 185-94.
252 Ibid., 35.
Milton-Northern, a large industrial town in the country’s uppermost regions, where Mr. Bell owns property. From her relatively humble but stable origins in the south, Margaret moves northwards. It is in the smoky atmosphere of Milton that she hears a new pattern of sounds that reverberate from the machinery and echo even in the sounds of the workers’ voices. The sound of her own voice opens (and closes) the novel and encompasses a multiplicity of compounded aural signifiers throughout the text.

In *North and South*, Milton accents are harmonious insofar as they are perceived as authentic representations of Northern speech, but they are also jarring; they inflect the audience’s quiet reading with an accent that is otherwise absent, vocalized as it is through the page. Ivan Kreilkamp notes that throughout “the 1840s, as a consequence of working-class literacy and political action, the English language became charged with new political meanings as a site of class conflict.” The industrial novel’s representation of such clashes and its adoption of an “authentic” narrative vocabulary—one that reproduces dialects and accents—“achieves at once the ethical purity of disinterestedness” while producing “the power of an irresistible charisma.” Transcribed speech patterns represent more than local colour. Kreilkamp argues that Gaskell struggles to negotiate the tensions between representation and authenticity; like other Victorian authors, she eliminates the political content of her working-class characters’ voices and uses them, instead, as powerful agents of her own. Gaskell “imports class struggle into language” and creates a vocal tapestry

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254 Ibid., 38.
255 Ibid., 56.
256 Ibid., 53.
that seeks to render conflict in terms of an all-encompassing, physical and psychological experience.

Once the Hale family is settled in Milton, Margaret begins to explore the city more freely. As she is unaccustomed to the factory shifts and the corresponding foot traffic in the streets, Margaret often gets caught up in a wave of workers leaving the mills. The “tones of their unrestrained voices” and “loud laughs and jests” cause a “disorderly tumult” that frightens her at first, but it is in this crowd that she first notices Nicholas Higgins.257 A pattern of “silent recognition” builds between them. One day, Margaret meets Nicholas as he is walking with his daughter in the fields that surround the city. The “careworn” factory worker and union representative introduces the first acoustic markers of difference when he thanks Margaret for giving his daughter, Bessy, a bouquet of wildflowers: “Bessy’ll think a deal o’ them flowers; that hoo will; and I shall think a deal o’ yor kindness. Yo’re not of this country, I reckon?”259 His accent, and those of the other working-class people, is transcribed throughout the text—translations of the passages are included in the glossaries and notes to modern editions, but these were not available in the first editions of North and South, or in its initial serialized form.260 This transcription recreates a legible sonic portrait of life in Northern England as readers are forced to reconstruct the accents while the narrative simultaneously stresses the difference between classes, geographies, and cultures.

The pitch of the Northern accent is adjusted to suit its environment, as when Higgins visits the Hale household after his daughter’s death. Higgins’s physical presence contrasts

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257 Gaskell, North and South, 72.
258 Ibid., 73.
259 Ibid.
260 The glossary indicates, for instance, that the word “hoo” is the local pronoun for “she.”
with their parlour, and his “strong Darkshire accent” especially stands out against the parson’s “quiet study,” tamed only by Nicholas’s “lowered voice, and [the] good, earnest composure on his face.” His accent is strange to Southern ears and to readers’ eyes, and a lowered volume must compensate for the foreign sound of his words—as well as for the political content of his speech. He addresses the Reverend politely, though his political discourse is not drained of meaning, and Margaret mediates the exchange. She stands between the workers and the mill owners, her voice communicating messages from opposing sides of a conflict that plays itself aloud in the atmosphere.

While the Higgins family’s accents are translated from the acoustic to the written form, John Thornton’s accent is only inferred. Gaskell’s is a sly orthography. It points to Thornton’s position on the socioeconomic scale. Although he uses a southern vocabulary inflected by Northern expressions, his accent is not evident and mirrors his efforts to rise to the status of gentleman. On the page, Mr. Thornton’s accent is modulated by its tone, but it does not stand in sharp contrast to Mr. Bell or Mr. Hale’s Oxford inflections the way Nicholas Higgins’s expressions do. As an indicator of one’s social position, an undesirable accent can also become a source of pride as it testifies to the didactic message and powerful rhetoric, spoken and written, of the self-made man. John Thornton’s pride in his humble origins demonstrates not only how “dialect came to denote class,” but also suggests that intonation could be used to influence and thwart expectations. When Thornton visits London to settle his business affairs, Edith wonders whether “he is able to sound his h’s, which is not

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261 Gaskell, *North and South*, 222.
a common Darkshire accomplishment—eh, Margaret? He impresses the elite London crowd in spite of his accent, and rather diffuses southern expectations. Thornton’s accent differs from Margaret’s, but this is never explicitly shown in Gaskell’s orthography; rather, his accent is elided. As his use of Northern slang is limited to the industrial context when describing manufacturing concerns and workers, or “hands,” it is Margaret’s speech that becomes increasingly noticeable for its shifts.

Initially, Margaret perceives the North in unpleasant acoustic terms—its “manufacturers, the people, the wild and bleak country” produce a “discordant” idea, as everything in Milton-Northern differs from her home in spatial and sonic terms. While she describes Milton as a “strange, desolate, noisy, busy place,” Margaret tells Bessy that in Helstone, “there is a continual rushing sound of movement all around—not close at hand,” despite the fact that “every leaf may seem still.” The noise levels in Milton are invasive and constant, pervasive in the sounds of the workers, the mill, and the city itself. Yet, as Margaret becomes more familiar with her new surroundings, the city’s aural influence is reflected in her vocabulary: she uses “a provincialism” when speaking to her mother, who abhors the use of “factory slang.” Margaret defends herself, responding that as she “live[s] in a factory town, [she] must speak factory slang when [she] want[s] it.” Margaret wields a powerful rhetoric of social struggle and imports cultural difference into her speech, hinting towards the rapprochement between formerly antagonistic groups and individuals.

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263 Gaskell, North and South, 417.
264 Ibid., 40.
265 Ibid., 101-10.
266 Ibid., 233.
267 Ibid., 233.
The novel’s final scene, which reconciles these differences through the contractual, financial, and romantic pitch of marriage, shows Margaret’s full progression in linguistic terms as she threatens to imitate Mrs. Thornton’s anticipated “indignant tones.”

Margaret’s voice opens and closes the narrative, and her linguistic progression traces the novel’s main reconciliatory message. Margaret becomes fluent in both “standard” English and its Northern dialect—she does not lose her accent, so to speak, but rather borrows key terms in order to denote her familiarity with Milton. Sounds have the power to create multiple atmospheres, and the atmosphere has the potential to create and carry sounds. Margaret’s speech represents conciliation, but also testifies to the aural forces at work in the novel and to the greater unifying power of the spoken word.

Beyond any individual character’s speech, surrounding noises are of central concern to the industrial novel, and to *North and South* in particular. While Kreilkamp finds that “the major industrial novels share a common concern with the potential of workers’ speech to degenerate into violence,” the sounds of the crowd—or of the masses—echo throughout the text and deserve further attention. Accents and cadences are supported by secondary audible apparatuses, such as the noises of the city, the voices of large groups, and sounds that occur in nature. These three elements—the urban, the popular and the natural—are united in Gaskell’s use of the term murmur, especially as it relates to the sounds associated with industry. As Margaret’s perceptions of the North and the South of England alter throughout the novel’s progression, so do the sounds associated with different types of labour.

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268 Ibid., 425.
Sound, like smoke, has the power to separate and to link those who produce it (the workers who operate the mill’s machinery) from those who benefit from its constant presence (the owners). While the “hands” are used to the sound of their machinery, these do not hold the same connotations to them as it does to their employers. The “heads,” so to speak, can associate the sound of manufacturing processes with profit, wealth and opportunity. For Mrs. Thornton in particular, the mill’s loud noises represent economic success and audibly reinforce her son’s position as a self-made man.

The sound of industry reminds her of her son’s arduous labour and his financial success after years of toil. Mrs. Thornton’s husband speculated their entire savings, lost, and took his own life in the wake of such dishonour. As a teenager, the young John Thornton took up an apprenticeship in a draper’s shop and sent his earnings home to his mother, who managed to save a small amount of money out of the meagre salary. When Mr. Hale asks Mrs. Thornton if she is disturbed by the house’s proximity to the mill and its constant “smoke and noise,” she repositions the sounds of industry:

I have heard noise that was called music far more deafening. The engine-room is at the street-end of the factory; we hardly hear it, except in summer weather, when all the windows are open; and as for the continual murmur of the work-people, it disturbs me no more than the humming of a hive of bees. If I think of it at all, I connect it with my son, and feel how all belongs to him, and that his is the head that directs it. Just now, there are no sounds to come from the mill; the hands have been ungrateful enough to turn out, as perhaps you have heard.  

The striking workers’ and the mill’s silence are unwelcome. Mrs. Thornton seeks the noise of the factory as a sign of prosperity. In *Popular Culture and Performance in the Victorian City*, Peter Bailey suggests that noise is “a ‘sound out of place.’ In any hierarchy of sounds it [is at

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270 Gaskell, *North and South*, 160.
the] bottom, the vertical opposite of the most articulate and intelligible of sounds, those of speech and language and their aesthetic translation into music.” Mrs. Thornton re-arranges the hierarchical structure of sound along a different axis, one that positions productivity above the convenience or the perceived value of quiet spaces. This inversion forbids the presence of silence, or of sounds that are disconnected from the mill’s modes of production.

This is supported by Karin Bijsterveld’s nuanced reading of the shifting noises produced by the Industrial Revolution, which suggests “positively evaluated loud and rhythmic sounds have connotations of strength, significance, and being in control, whereas noise as unwanted sound has often been associated with social disruption.” In *North and South*, the loud rhythmic sounds of machinery are interrupted by a strike. The workers manipulate sound and silence as a means to break through social barriers. While silence is difficult to bear for the Thorntons, the sounds of the workers are even worse when they are signs of dissent.

Rumours of a labour dispute first appear as a low storm cloud on the horizon until conflict thunderously bursts forth. Margaret Hale is caught between two sides. She has befriended the mill worker Nicholas Higgins and his daughters, and she champions the workers’ cause, often engaging in heated conversations with John Thornton. Thornton invites

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272 Karin Bijsterveld, *Mechanical Sound: Technology, Culture, and Public Problems of Noise in the Twentieth Century* (Cambridge, MA: MIT Press, 2008), 40. This is corroborated by David Garrioch’s study of the sounds of early modern European towns, which suggests “sounds created bonds between those for whom they had meaning.” And so while we may no longer hear the incessant whirr of cotton mills, it is worth noting that for those who did not derive a direct profit from these industries or who did not operate the very machines in question, industrial sounds were perceived as annoying, loud, unwanted noise. Recorded in text, the sounds of industry are signals that operate along affective as well as aesthetic lines, but that echo the relation borne out through acoustic markers. See David Garrioch, “Sounds of the City: The Soundscape of Early Modern European Towns” in *Urban History* 30 (2003): 20.
Margaret and her father to a lavish dinner party where other guests are predominantly mill owners. The Hales return home to find the ailing Mrs. Hale recovering from a fit of painful spasms. The next morning, Margaret steels herself and decides to ask Mrs. Thornton, John’s intimidating and stern mother, is she could borrow a waterbed as the doctor believes it may alleviate Mrs. Hale’s painful symptoms. It is a hot August afternoon. On her way from the small Hale residence in Crampton Crescent to the impressive house on Marlborough Street, Margaret begins to notice a change in the atmosphere. The workers have been on strike longer than the union anticipated, and yet Margaret eventually realizes that the crowds in the Milton streets do “not appear to be moving on, so much as talking, and listening, and buzzing with excitement.”273 She is the only one who moves through the street, quietly, whereas others are simultaneously listening and making a low constant hum. Absorbed by her thoughts and preoccupied by her mother’s poor health, Margaret only realizes something is amiss because of the city’s relatively lower volume. Jarring sounds do not pull her from her introspection, but the constant buzz signals a shift that eventually becomes unmistakable. By the time Margaret nears her destination, she perceives that there is a “thunderous atmosphere, morally as well as physically, around her”—she can hear the “low distant roar” grow from every direction.274 Once she reaches the mill, the young woman can hear the “first long far-off roll of the tempest,” but everything else is quiet: “There was no near sound, —no steam-engine at work with beat and pant, —no click of machinery, or mingling and clashing of many sharp voices; but far away, the ominous gathering roar, deep-clamouring.”275 Without their human operators, the machines are left to stand, dumb and still, unable to churn out the

273 Gaskell, North and South, 170.  
274 Ibid.  
275 Ibid., 170-171.
cotton, sound, and smoke that would normally spring from their ceaseless chugging. The mill’s silence is ominous and undesirable for all the involved parties, as the absence of noise leads to a repugnant and eerie silence. The atmosphere is thickened by the silence of interrupted labour, of workers’ rights brought to the forefront through a willful retraction of human energy. Even in its absence, sound inflects the atmosphere with meaning.

In the Thorntons’ parlour, Margaret waits, listening closely. The atmosphere is stifling and deeply quiet. The half-open windows seem to allow the wind to carry “the distant multitudinous sound nearer; and yet there was no wind!”276 The occasional uproar is punctuated only by a “profound stillness.” And like the shifting pressure that precedes a storm, the air at Marlborough Mills is thick with sound and with the potential of all that those sounds represent. The crowd’s booming approach has the strength of a tempest, and performs the wind’s function as an omen of violent weather.

In the sultry summer atmosphere, the distant roar of the crowd grows and pushes through the city, advancing ahead of the multitude. When the striking workers reach the mill’s gates, they press their bodies upon the barrier and push forth, straining against the locked entrance. A sound from within the mill’s main courtyard provokes the crowd, however. Mr. Thornton’s “well-known and commanding voice,” as soon as it is heard, shifts the tone of the scene: “Hitherto [the workers] had been voiceless, wordless, needing all their breath for their hard-labouring efforts to break down the gates. But now, hearing him speak inside, they set up such a fierce unearthly groan”277 that the women, who are watching the confrontation from the parlour windows, are struck with fear. Though the workers cannot yet

276 Ibid., 172.
277 Ibid., 173.
break through the strong wooden gates, their voices are finally heard from within their
master’s private space—the machines no longer drown out the sounds of their protests.

The sounds of the crowd enter the mill’s interior space, foreshadowing the workers’
entry through the locked doors. After a sustained effort, the gates burst open. As the workers
storm the mill, they produce a terrifying wave of sound that breaches the Thorntons’ parlour
through closed windows. Inside, the servants, Margaret, and the Thornton family can “hear
the one great straining breath; the creak of wood slowly yielding; the wrench of iron; the
mighty fall of the ponderous gates.” 278 The threat that these sounds represent cause Fanny to
faint, and the crowd produces a “demonic” yell that even shocks the unflappable Mr.
Thornton. The sounds reach their climax as the “tramp of innumerable steps right under the
very wall of the house, and the fierce growl of low deep angry voices that had a ferocious
murmur of satisfaction in them, more dreadful than their baffled cries,” approach. 279
Margaret can hear nothing but the “savage satisfaction of the rolling angry murmur.” 280 And
yet the sounds of the murmuring crowd are at once disruptive and muted; although the
crowd’s protests are heard in the drawing room, the workers (for a time) respect the physical
boundaries and do not immediately make their way into the factory, or into the house. Their
sounds anticipate their movements, but human bodies require more time to cross the
boundaries, be they made of brick or of unspoken expectations, that separate the workers
from the mill owner.

278 Ibid., 173.
279 Ibid., 174.
280 Ibid., 175.
John Thornton and his striking employees are separated by more than physical distance. He also refuses to speak to them for long, drawn-out moments that unerringly demonstrate his power to withhold far more than wage increases and fair conditions. Mr. Thornton’s refusal to address his workers embodies his ideologically reinforced opposition to his workers’ demands. After all, the refusal to communicate is still a form of communication. Margaret quickly notices that Thornton’s silence only sparks further vehemence: “If Mr. Thornton would but say something to them—let them hear his voice only—it seemed as if it would be better than this wild beating and raging against the stony silence that vouchsafed them no word, even of anger or reproach.”

Silence takes on the qualities of hardened, unchanging stone. He does make an attempt to speak, but only a “momentary hush of […] noise” follows and quickly disappears. The crowd no longer listens to the mill owner. From the window, Margaret watches and senses that the boundaries between Thornton and the workers are quickly collapsing. Only a single touch “would cause an explosion,” causing “stormy passions” to “pass their bounds.” Margaret rushes down to the mill yard and stands between the crowd and Thornton, but her “hoarse” pleas do little to calm the “angry sea of men.” The confrontation comes to a head when Thornton declares that he will never send back the workers he has summoned from Ireland to replace those on strike. Suddenly, “hootings rose and filled the air” but their volume does not reach Margaret, who is transfixed by a group of boys who are gathering stones to throw at Thornton. He still has said very little, whereas the crowd’s sounds are all that can be heard—they satiate the air, leaving little space.

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281 Ibid., 176.
282 Ibid.
283 Ibid.
for Margaret’s desperate calls for peace. After she is struck in the head by a rock, the crowd disperses—but Thornton continues to challenge them by announcing that they will not persuade him to change and remains as stony as ever.

As the crowd thins out and the “clank” of approaching soldiers is heard, Thornton has only broken his quiet, authoritarian position twice, while the crowd’s loud cries have barely abated. The scene’s volume echoes the power structure that divides noise from sound, and “hands” from “heads.” Silence is the “sound of authority—generational, patriarchal and formidably inscribed in the regimes of church and state,” though it is not “necessarily an absence of sounds, but rather an act. As such it can also register disengagement, evasion and resistance.” While the mill’s silence represents the workers’ call for higher wages, Thornton’s silence demonstrates his ability to withdraw employment altogether. The workers’ sounds are out of place, and their bodies are out of place—both are no longer related to the manufacturing process. Although the crowd has the ability to generate a low, constant grumble that permeates boundaries, such power is fleeting. The sound of state power, heard in the ringing of the soldier’s metallic weaponry, soon arises and reinstates divisions of regimented space and social behaviour.

As a subdued noise, a murmur juxtaposes the negative connotations of rumour, reproach and disagreement with the nearly quiet, hushed and pleasant tones of a bourgeois domestic interior. To murmur is to stand between silence and fury, and to aurally reproduce the sounds of industry as well as the sounds of discontent, themselves a result of the industrial forces at play. A murmur rises from and produces an agglomeration; likewise,

284 Bailey, Popular Culture and Performance in the Victorian City, 199.
industry causes and creates murmurs. In *North and South*, it is the sound of a murmur that echoes the efforts made to reconcile the disparate geographies and cultures in their vocabularies, accents and tones—a murmuration negotiates the ways in which social classes and the spaces they occupy interact.\(^{285}\)

Just as one must move “from the public sphere to the private to examine the ways in which sound interpenetrated the two,”\(^{286}\) we must now move between the country and the city, as well as from the North to the South, in order to explore the ways in which the novel’s sounds evolve alongside Margaret Hale. Murmurs are often paired with other aural descriptions, and occasionally linked to the sounds of insects—and of bees, in particular. This association implies industrial success within an alternative context, and hints at Gaskell’s attempt to reconsider the deep divide between the geographic poles of England along acoustic lines.

This first instance occurs before the Hales relocate to Milton-Northern, when Margaret receives an unexpected guest from London. It is Mr. Lennox, her cousin Edith’s brother-in-law, who has come to Helstone to ask Margaret to marry him. He and Margaret stroll “along the little terrace-walk under the south wall, where the bees still hummed and

\(^{285}\) On a poetic note, a murmuration is also the term used to describe a flock of starlings. The word itself can serve as a noun or as a verb; as the former, it indicates the “expression of discontent or anger in subdued tones; muttered or indistinct complaint or grumbling, especially on the part of a crowd, populace, etc.” This primary meaning is becoming archaic, as by modern standards a murmur is primarily understood to be “a word or sentence spoken softly or indistinctly; faint or barely audible speech, especially among a crowd or assembly; the subdued expression of a particular feeling by a group of people.” Yet a murmur also connotes natural imagery, as it describes “a low continuous sound, especially as produced by water, wind, etc.” As a verb, to murmur means “To complain in low muttered tones; to give voice to an inarticulate discontent; to grumble” (Oxford English Dictionary). A murmur is particular in its double meaning: it is both soft and faint, like a whisper, as well as threatening utterance of general discontent and disapproval. While Margaret’s father is often overheard murmuring to himself, the crowds of workers are the most significant vehicles of subdued and yet audible ire. The scene of the confrontation between the striking workforce and Mr. Thornton is, arguably, one of the loudest in the novel.

\(^{286}\) Picker, *Victorian Soundscapes*, ii.
worked busily in their hives.” Here, the bees are productive forces in the “exquisite serene life” of the countryside.287 Aside from the farmers who labour the land, bees are the only other explicitly mentioned workers who populate the southern village. They are heard only as they work, and resurface directly only when Mrs. Thornton compares the sound of the mill to that of a successful hive: recall that in her ears, the workers’ sounds are no more disturbing than “the humming of a hive of bees.”288 Productivity has a sound, one best exemplified by the drone of a thousand insects constantly fulfilling their appointed tasks.

This productivity is also compared to an excessive affluence. Bees are alluded to in Mr. Thornton’s criticism of the South, when he declares that he would rather live a poor life in Milton than “lead a dull prosperous life in the old worn grooves of […] the South, with their slow days of careless ease. One may be clogged with honey and unable to rise and fly.”289 This recalls the earlier introduction of the bees near the Hale cottage, where insects and people do not have an immediate purpose for—or cannot productively exchange—their labour. The honey accumulates, and prevents the South from rising to alternative modes of entrepreneurial success. In response to this metaphor, Margaret passionately defends her home and disengages: she is “resolutely silent,” even after Mr. Thornton tries to appease her. The sound and silence of the bees, as well as the products of their labour, can represent both the industrial North and the traditionally oriented South; while the North hums from the buzz of its manufacturers, the South is a subdued hive, drowned by its own riches.

It is only after she has lived in Milton for many months that Margaret comes to understand Mr. Thornton’s perspective. Her father has died suddenly, shortly after her

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287 Gaskell, *North and South*, 29.
288 Ibid., 160.
289 Ibid., 82.
mother’s lengthy illness and passing. Her brother, who was accused of mutiny and lives in exile in Spain, cannot return to England without risking his life. Accompanied by her father’s dear friend Mr. Bell, Margaret returns to Helstone. As they walk through the forest on their way to the public schoolhouse, the pair suddenly hears the humming of a hive of bees, the very sound that Mrs. Thornton would associate with the cotton mill’s successful operation: “The buzz of voices, like the murmur of a hive of busy human bees, made itself heard as soon as they emerged from the forest on the more open village-green on which the school was situated.”

Industry is alive in the South, although it is of a different sort than its northern counterpart. Here the sounds are more than likened to the insects that produce them—the children are directly associated with the bees. The sound of the workers in Milton is akin to the sound of a busy hive, yet the children in Helstone are “human bees,” whose very existence produces the sounds of industry. Their labour differs, as do its results, but its sound remains one that echoes the prosperity associated with industry and gainful employment, be it gainful in terms of capital or useful knowledge.

The progression of sound throughout North and South culminates in this final hive that recalls the previous intervention of bees in Margaret’s life. Before she moved to Milton, the insects were the only source of production-related sound overheard in Helstone. Sound, then, has the power “to appropriate, reconfigure or transgress boundaries” and as it can

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290 Ibid., 81.
291 During her return trip to Helstone, Margaret visits one of her father’s old parishioners who tells her that a neighbour in the village, in an effort to retrieve a set of missing clothes, enacted a superstitious custom—that of burning a live cat. Margaret, “sick at heart,” is unable to bring her old acquaintance to see the rational explanation and is forced to recognize that her once idealized home and some of its inhabitants maintain a prevailing belief in “savage country superstitions” that are just as cruel as some of the practices she finds in the North. Gaskell’s use of folkloric knowledge, unlike Brontë’s, highlights the darker side of such beliefs.
convert “space into territory,” it also denotes spaces invested with aural meaning.\textsuperscript{292} The North (noisy, mechanical) meets the South (full of the sounds of the forest, fields and commons) and both converge through the murmuring of a hive of bees.\textsuperscript{293}

2.4 \textit{North and South} and Thickened Air

In \textit{North and South}, smoke is a constant reminder of the factories and the labour required to operate them. Even from a distance, Milton manifests itself as a cloudy spot upon the horizon:

For several miles before they reached Milton, they saw a deep lead-coloured cloud hanging over the horizon in the direction in which it lay. It was all the darker from contrast with the pale gray-blue of the wintry sky; for in Helstone there had been the earliest signs of frost. Nearer to the town, the air had a faint taste and smell of smoke; perhaps, after all, more a loss of the fragrance of grass and herbage than any positive taste or smell. Quick they were whirled over long, straight, hopeless streets of regularly-built houses, all small and of brick. Here and there a great oblong many-windowed factory stood up, like a hen among her chickens, puffing out black ‘unparliamentary’ smoke, and sufficiently accounting for the cloud which Margaret had taken to foretell rain.\textsuperscript{294}

As is the case in Coketown, the signs generally taken to foretell the weather no longer apply in Milton, where bearings are skewed by an industry that goes so far as to flout the rules of governmental regulation by ignoring the \textit{Town Improvement Act} of 1847, which was meant to reduce the outpouring of smoke in manufacturing towns. (Over a century later, similar carbon emission statutes are often ignored by corporations—the main difference being that carbon is often invisible, and smokestacks in the West rarely emit black smoke anymore.)

\textsuperscript{292} Bailey, \textit{Popular Culture and Performance in the Victorian City}, 207.
\textsuperscript{293} One of Manchester’s heraldic symbols is the worker bee, a symbol of industry that is included across various fixed structures in the city. It was there that I noticed bees embedded in the metal sidewalk posts near the John Rylands Library, where Gaskell’s archives are housed.
\textsuperscript{294} Gaskell, \textit{North and South}, 60.
The very smell of the place is described in terms of a lack, an absence of the very things that would have corroborated Margaret’s multisensory reading of the weather. As she travels farther away from Helstone, her body seems to lose its former ability to interpret its surroundings and becomes overwhelmed by the force of this new smoky atmosphere. It pressures the newcomers and influences their movements as they become directionless things whirled about through town, robbed of the ability to decide where to go. Margaret and her father are caught up in the currents of an atmosphere they cannot interpret, predict, or control—and do not participate in the economy of its creation, but must face the consequences of its circulation.

In Gaskell’s Milton, smoke is the visible manifestation of the flow of profits that unites the workers to the mill owners and to the town’s citizens. Everyone is united within the smoky air. When Margaret first meets Nicholas Higgins, a labourer, and his daughter, Bessy, Higgins remarks that the “North and South has both met and made kind o’ friends in this big smoky place.” Smoke and its promises of economic gain attract crowds who come to Milton in order to spin cotton into a better quality of life. Yet working in Milton’s mills has come at the price of Bessy’s life—it is not the smoke that kills her, although she admits to her father that his “Tobacco-smoke chokes [her]!” Rather, Bessy’s time in the carding-room has caused her to breathe in lethal amounts of cotton filaments. This fluff, as it is called, fills the air with particulate matter. In Milton, fluff clutters the atmosphere and infiltrates bodies, killing them from the inside. It is a glaring reminder that breathing admits the atmosphere into the body and invites a substance that circulates within as well as without.

295 Ibid., 73.
296 Ibid., 135.
And while Coketown’s smoke is “meat and drink”\(^{297}\) to its workers, so is fluff to those in Milton. As Bessy explains to Margaret, there were those who didn’t take to working in carding-rooms with better ventilation because “they said as how it made ‘em hungry, after they’d been long used to swallowing fluff, to go without it.”\(^{298}\) Fluff, like smoke, is a toxic result of manufacturing processes. It leaves physical traces on machinery and inside workers’ bodies.

Much as Stephen Blackpool’s clean room suggests moral purity, interiors in *North and South* speak to the force with which smoke—and the labour that gives rise to it—yokes inhabitants who would perhaps rather be kept separate, and who expend a great deal of energy in order to establish boundaries between one another amidst the thick atmosphere’s unifying force. When Margaret and her father return the courtesy of a visit to Mr. Thornton, they discover that he and his family’s living quarters are but a stone’s throw away from the very factory they own. Marlborough Mills are separate from Milton’s streets, kept apart by a brick wall with a single entrance that is guarded by a porter. Within a huge yard are offices and “an immense many-windowed mill, whence proceeded the continual clank of machinery and the long groaning roar of the steam-engine, enough to deafen those who lived within the enclosure.”\(^{299}\) In short, the mill makes itself known immediately. Across from its imposing structure, Margaret notices “a handsome stone-coped house,—blackened, to be sure, by the smoke, but with paint, windows, and steps kept scrupulously clean.”\(^{300}\) Thus the mill’s

\(^{297}\) Dickens, *Hard Times*, 97.  
\(^{298}\) Gaskell, *North and South*, 102.  
\(^{299}\) Ibid., 111.  
\(^{300}\) Ibid., 111.
windows give onto the house, and the house’s windows look upon the mill: the two are
inextricably linked and further united by the smoke that leaves its telltale signs on the brick.

Once inside, the Hales are led to the Thorntons’ drawing room, which looks directly
upon the factory walls. The drawing room is even further removed from its industrial context
by its contents. They are bagged up, “with as much care as if the house was to be
overwhelmed with lava, and discovered a thousand years hence.” The room is elaborately
decorated in shades of white, pink, and gold and the overwhelming effect blinds Margaret. It
sparkles so brightly that she is “hardly conscious of the peculiar cleanliness required to keep
everything so white and pure in such an atmosphere.” The Thorntons’ home is so
scrupulously clean that it seems to shirk any sign of its proximity to a loud, smoky mill.
While both Blackpool’s room and the Thorntons’ drawing room are untainted by the dirty air
that creeps past so many brick walls, Mrs. Thornton’s efforts seem to draw a line in the
smoke, so to speak, in order to better demarcate herself from those she scorns as greedy,
over-reaching workers. By bagging up her furniture, laying out protective rugs over fancy
carpets, and keeping decorative objects under glass domes, Mrs. Thornton resists the
perceived contamination of industrial smoke while simultaneously drawing pride from what
it represents: profit and production. Everyone in Milton breathes the same contaminated

301 Ibid., 112.
302 Ibid., 112. Intriguingly, Gaskell herself seems to have been susceptible to similar types of displays. The first
time Gaskell met Charlotte Brontë, she writes that she barely even noticed her: Brontë being a “little lady in [a]
black silk gown, whom I could not see at first for the dazzle in the room.” See The Life of Charlotte Brontë, xxi.
303 Margaret is at once dazzled and oppressed by the decorations in the room, which seem to trap the air within
and freeze the objects in a state of impenetrable, unmov ing time. Interestingly, smoke abatement campaigns
were only successful wealthy citizens pressured law-makers into legislating more vigorous measures by arguing
that smoke caused property damage to their houses and their interiors. In this sense, the inside of a house
became more important that the inside of a worker’s body. See Lord Ashby and Mary Anderson, “Studies in the
Politics of Environmental Protection: The Historical Roots of the British Clean Air Act, 1956: I. The
air. Whereas citizens’ lungs would likely look the same from the inside out, few have the resources required to keep the outside from coming in.

We should also bear in mind that smoke acts quietly; unlike the deafening factory outside the Thorntons’ home, smoke doesn’t make a sound—and while it is the result of much noisy labour and combustion, the transfer of energy and the volatile trace of another element—it moves without making a peep, leaving behind a visual trace of itself on buildings and inside those who inhale it. It is hyper-visible and odorous, but silent. And yet smoke can force others to make sounds; for example, when it comes into the lungs and brings on a fit of coughing. Unlike the wind, which is personified in Charlotte Brontë’s novels because of the sounds it makes—howling, moaning, sobbing, keening—smoke is quiet, but it is borne about by a noisy beginning and a noisy end.

3 Capturing the Atmosphere

The smoke in Coketown and in Milton results from steam engines, which require coal to power machines that transform the cotton industry, the landscape, and the atmosphere itself. This smoke is the tangible result of an unprecedented industrial boom that burned through countless metric tons of coal, producing thick black effluvia and ushering in heightened carbon dioxide levels in the earth’s atmosphere. As Jesse Oak Taylor points out, the hard

evidence for the atmosphere’s variation through time can be found in ice samples taken from the Arctic, which show a sudden spike in carbon dioxide levels during the mid-nineteenth century. Literary fiction that was written during this period brings “a fictional world into being that renders legible otherwise invisible dynamics at work.” Atmospheres in nineteenth-century texts, while measurable and described in very vivid terms, cannot be relived. The blackened buildings in Keighley, Manchester, and London have been sandblasted, the markers of industrial activity peeled back. Still, the atmosphere remains on the pages that hold the very texts that describe its changes. Atmospheric shifts have always been physically observable, mediated in increasingly complex systems and represented in and on literary fiction’s pages.

Hard Times and North and South were published in a serial publication that wanted to educate and entertain its audience. Their depiction of the atmosphere stands in contrast to Charlotte Brontë’s representational framework, which relied on the language found in a different kind of popular print document—the almanac. In Coketown and in Milton, knowing some signs of the sky is pointless; a dense cloud of smoke obfuscates the sky, hides the stars, and blocks the wind. Publications such as the Household Words Almanac shun the very signs that were once taken as portents, while similar superstitious beliefs are shamed in fictional narratives. Sound and smoke become signs of change, of industry, and in their trajectory across the atmosphere they bump up against emerging boundaries between people and their surroundings. The atmosphere was defined on the pages of almanacs as an invisible, fluid

305 Ibid., 2.
substance that intimately ties human fates to planetary courses. In *Household Words*, the atmosphere remains an invisible fluid—only it is a contested site. Its presence allows sound to travel, but its currents are tainted by coal smoke. The atmosphere’s amalgamating powers erode as the atmosphere’s definition expands and becomes more scientific in the wake of standardized measures, increasingly rigid classification systems and industrial processes.

Interactions with the atmosphere are mediated by print culture. In England as well as in France, the educational boom of the mid nineteenth century is played out in popular literary forms such as magazines, serial magazines, newspapers, and novels. As the definition of the atmosphere expands, its capacity to unite humans across a global scale shrinks; it is transformed from a common substance to a commodity.
“We wanted to take a [...] novel and create a pop-up book,” said Rick Miller when describing his 2015 stage adaptation of Jules Verne’s *Twenty Thousand Leagues under the Seas.* It premiered during the opening weeks of the Pan American Games in Toronto, but Miller’s goal was to bring the play—which features a dizzying array of multimedia effects—around the world. His updated version includes a strong message about ocean conservation and environmental protection and aims to blend education with entertainment. Miller’s adaptation transforms Verne’s novel into a show that can be brought to life on stage or broadcast online; the production company behind the play promises to deliver “family entertainment and storytelling, integrating online education with live [events].” In this way, it carries forth a mission first stated by Verne’s editor, Pierre-Jules Hetzel, over a century ago: to educate families and their children while entertaining them. Hetzel’s goal was outlined in the title of his *Magasin d’éducation et de récréation,* which translates most literally to the *Magazine of Education and Recreation,* a serial publication launched in 1864 that would become the primary vehicle for Verne’s works. The magazine’s preface explains its scope: “Il s’agit pour nous de constituer un enseignement de famille dans le vrai sens du

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307 I use the English title here because Miller’s adaptation has yet to be translated and does not feature French text. To maintain the integrity of Verne’s title, however, I refer to *Vingt Mille Lieues sous les mers* throughout the rest of the chapter.

mot, un enseignement sérieux et attrayant à la fois, qui plaise aux parents et profite aux enphants. […] L’amusant doit cacher une réalité morale, c’est-à-dire utile: sans cela il passe au futile, et vide les têtes au lieu de les remplir.”309 [“Our goal is to provide an education for the whole family, in the true meaning of the word—an education that is both serious and appealing, that pleases parents and benefits children. […] The entertaining must hide a moral reality; in other words useful: otherwise it becomes futile, and empties heads instead of filling them.”]310 In Verne’s novels, Hetzel—and Rick Miller, one hundred and fifty years later—found the perfect blend of scientific education and unadulterated entertainment value that would dazzle audiences without sacrificing didactic content.311

Vingt Mille Lieues sous les mers (written from 1865-69, serialized throughout 1869, and published in novel form in 1871) accumulates and redistributes knowledge. By collecting and processing information between the pages of a novel, Verne crystallizes disparate sources that depict an evolving understanding of the atmosphere. In Vingt Mille Lieues sous les mers, the atmosphere suddenly becomes a portable object for personal use. It is removed from its global context and syphoned into the Nautilus’s walls. The Nautilus transforms the atmosphere from a thing that exclusively surrounds the earth into a commodity that can be carried around and consumed privately. Verne wrote Vingt Mille Lieues sous les mers by

310 Unless otherwise indicated, translations from French to English are my own.
311 At the time of writing, it was announced that Bryan Singer, who directed the blockbuster X-Men franchise (X-Men, X2, X-Men: Days of Future Past and the upcoming X-Men: Apocalypse) will direct an adaptation of Twenty Thousand Leagues under the Sea [sic]. Singer wrote the script and stated, via social media, that this is a story he has wanted to “retell since childhood” and that it will be “an epic and emotional adventure for all ages!” See Dave McNary, “Bryan Singer’s ’20,000 Leagues Under the Sea’ [sic] Lands at Fox,” Variety, February 3 2016. Accessed April 2016. http://variety.com/2016/film/news/bryan-singer-20000-leagues-under-the-sea-fox-1201696533/.
using an ample store of note cards that synthesized popular science. His method anticipates the accumulative principal that is currently at the heart of pressing questions about our presence on the planet: there is too much carbon dioxide in the air, too many pressures on natural resources, too much debris clogging up the oceans and the earth.

In this chapter, I trace the links between one of Verne’s sources—Pierre Larousse’s *Grand dictionnaire universel du dix-neuvième siècle*—and its definition of the atmosphere as it is deployed throughout *Vingt Mille Lieues sous les mers*. By including it as one of the many other things that Captain Nemo gathers aboard his submarine, *Vingt Mille Lieues sous les mers* represents the atmosphere as an endless renewable resource that serves to further human exploration and discovery—a thing that can be stored, rather than a finite presence that binds all living creatures. The mushrooming categories of knowledge at play in Verne’s fiction reveal how atmospheric forces that were once understood in planetary terms were beginning to be perceived as discrete entities. In a world where everything can be harvested and used for private consumption, the atmosphere becomes a commodity among many others and ceases to operate as a unifying force. Its impact is measured according to its importance to the individual rather than to the species, or to the planet overall.

1 A Brief History “of the Universe”: Knowledge Transmission in *Les voyages extraordinaires*

1.1 Jules Verne’s Catalogues

Jules Verne was born in Nantes, France in 1828. After a brief career as a clerk, he devoted himself to writing poems, essays, and short fiction; the editor Pierre-Jules Hetzel quickly
noticed his writing skills and powerful desire to become a professional writer. The two formed a symbiotic relationship that would come to bear the fruit of the *Voyages Extraordinaires* [*Extraordinary Journeys*] collection, the sixty-five novels Verne wrote from 1863 until his death in 1905. These texts were written under the aegis of a strict contract with Hetzel: as of 1862, Verne was obligated to write three novels per year. He maintained this pace until 1871, when their agreement was modified to require a more reasonable two novels per year.

In the summer of 1865, Jules Verne had already published two novels: *Voyage au centre de la Terre* [*Journey to the Centre of the Earth*] and *De la Terre à la Lune* [*From the Earth to the Moon*]. His friend, the author George Sand, had written to him with an enticing suggestion—to create a story about the ocean and its mysteries. Verne began researching his topic in his customary manner—by reading everything he could find about the sea in different magazines, dictionaries, journals, novels, exploration accounts, and scientific books. Scholars of Verne’s body of work have traced the disparate sources of his inspiration, from encyclopaedias to children’s stories. Among the popularizing works that were meant to explain the natural world, “*Les Mystères de l’océan* [*The Mysteries of the Ocean*] by Arthur Mangin, *Le Fond de la mer* [*The Bottom of the Ocean*] by Léon Renard, and *Le Monde sous-marin* [*The Underwater World*] by Frédéric Zurcher and Élie are the most commonly cited sources, as they had become respectable classics in the field by the time Verne was planning his book. Popular dictionaries were also consulted, most notably the *Dictionnaire universel*

312 Daniel Compère has meticulously gathered a compendium of sources that Verne used when composing his novels, either as they are explicitly or indirectly referred to. Daniel Compère, *Jules Verne écrivain* (Genève: Librairie Droz, 1991), 17.
d’histoire naturelle [The Universal Dictionary of Natural History] by Charles d’Orbigny, and Pierre Larousse’s famous Grand Dictionnaire universel du XIXe siècle [The Great Universal Dictionary of the Nineteenth Century]. As for weekly and monthly publications, Verne read the magazine Le Tour du Monde [Around the World] as well as the Journal des Voyages [Travel Journal], the Nouvelles Annales des Voyages [New Annals of Voyages] and the Bulletin de la Société de Géographie de Paris [Paris Geography Society Bulletin], among many others. Verne gathered material from a wide range of popular texts written by scientists and popularisers alike, though popular texts appear more frequently in those sources that are directly related to his fiction. In order to ensure that he never repeated himself, Verne kept scrupulous note cards that were then classified according to their topic. Each card was cast-off after its use, in order to avoid any inadvertent redundancies. These cards were kept in boxes that were neatly stacked in the author’s study, ready for use. Accruing so many pieces of paper and translating their contents to literary fiction highlights Verne’s own position within an environment occupied by so many sheets of information. His literary production is mirrored in this constant note taking, which generated the ideas and plot points for his novels, plays, and short stories. Seen from the perspective of aggregate and layered information, Verne’s body of work becomes encyclopedic in its scope as well as its form: an endless accumulation and expansion of columns piled atop one

314 Compère, Jules Verne écrivain, 44.
315 See Marie A. Bello, “Jules Verne at Home,” The Strand Magazine, vol. IX, February 1895 for a more detailed description of Verne’s writing methods. The interview was republished online in 1999 by L’Express, a popular French magazine that publishes articles on French and international current events, cultural interests, political happenings, and many more diverse topics. Interestingly, the author Marie Bello is named but the interview’s context is erased—there is no mention that the original exchange took place nearly a century earlier. http://www.lexpress.fr/culture/livre/entretiens-de-marie-a-bello-avec-jules-verne_802990.html.
another, related to each other in cross-sections, swerving between definitions, illustrations, and maps. The resulting textual atmosphere is one of erudite certainty—a collection of bookmarks rearranged into an adventure narrative—that arranges an ocean of information into a streamlined story within a contained form.

1.2 Popular Reception and Criticism

Verne’s work was plagued by lukewarm reviews, and many of the criticisms that appeared when his novels were first published re-appear in recent versions of his fiction. In a review of Miller’s 2015 adaptation of *Twenty Thousand Leagues Under the Seas*, the *Toronto Star*’s theatre critic was impressed with the show’s special effects, but found that the text fell “rather flat.” Other reviews also found the most redeeming aspect of the play to be its technological flair. To be sure, it seems that manipulating Verne’s work in order to move from the page to the stage has been difficult. Even during the author’s lifetime, dramatic renderings of Verne’s novels were—like their source material—rarely deemed to be artistic successes. In his review of the theatrical adaptation of *Le Tour du Monde en quatre-vingts jours*, a critic wondered whether popular tastes were growing tired of Verne’s redundant process: “le maniement de cette lanterne magique savante, où Monsieur le Vent et Madame la Pluie sont remplacés par le méridien et par l’oxygène. […] Cette science enjolivée n’est

316 Verne himself drew the maps that accompany the text in *Vingt Mille Lieues sous les mers*. They show a smoothed conception of the land and surrounding seas to the reader who remains on the waves’ (and pages’) surface. The maps are printed next to the text, and both perform the trick of simultaneous revelation and dissimulation: the reader can trace the Nautilus’s journey with her index finger, but the maps don’t show everything—they do not get to the bottom of things, let alone to the bottom of the ocean. Travel on the Nautilus requires a wholly novel mode of spatial orientation. The text communicates along a doubled axis: scientific knowledge is transmitted alongside fictional events, and the intermingling allows for a world of thickened possibilities.

bonne qu’à dégoûter de la vraie.”318 [“Manipulating this scholarly magic lantern, where Mister Wind and Madam Rain are replaced by the meridian and oxygen […] This gussied-up science is only good at putting one off from the real thing.”] Another one of his contemporaries described Verne’s work as a mechanical exercise that transforms popular scientific knowledge into a cheap form of entertainment. In an essay that appeared in France’s Le Figaro littéraire in 1878, Émile Zola declared that Verne’s novels were not quite novels, and that his audience was not especially discerning:

Celui-là n’écrivait pas précisément des romans ; il met la science en drame, il se lance dans les imaginations fantaisistes en s’appuyant sur les données scientifiques nouvelles. En somme, ce sont bien des romans, et des romans plus aventueux et plus imaginaires encore que les nôtres [ceux des naturalistes]. Le goût public est à ces vulgarisations amusantes de la science. Je ne discute pas le genre, qui me paraît devoir fausser toutes les connaissances des enfants.319

[That one doesn’t quite write novels; he dramatizes science, he throws himself into fantastical imaginings by relying on new scientific data. His are indeed novels, overall, and they are far more adventurous and imaginative than ours [the naturalists’]. Popular tastes call for such amusing vulgarizations of science. I won’t talk about the genre, which strikes me as something that distorts children’s learning.]

The distance implied and enforced in “celui-là” (“that one”) is further augmented in Zola’s comparison of Verne’s novels to cheap ephemera: “[ses romans n’ont] aucune importance dans le mouvement littéraire actuel. Les alphabets et les paroissiens se vendent bien aussi à des chiffres considérables.”320 [“If the Extraordinary Journeys sell well, then so too do ABC books and prayer books, in considerable numbers. They have absolutely no significance for

320 Ibid., 357.
the contemporary literary movement.”]321 That one, “celui-là,” stands apart; his prodigious output, audience, and profit margins separating him evermore from the struggles and aesthetic privileges of the naturalist coterie. Perceiving him as one who would willingly sacrifice artistic integrity on the altar of scientific education, Zola cemented Verne’s status as a popular entertainer—appreciated by the middle-class and worth little more than the cover price of his latest novel—and excluded him from the closed ranks of literary circles, even though both of them used much of the same source material for inspiration.322 And so despite countless literary, cinematic, and theatrical adaptations of works from the *Voyages Extraordinaires*, there were few in-depth discussions of Verne’s rich textual universe until the middle of the twentieth century.

The literary establishment’s recognition was precisely what Verne sought throughout his career. In a letter to his editor, Verne notes that his very name is often forgotten or left out of the catalogues of contemporary authors. Worse still, it was often elided from the very publication that depended on his continuous output; a literary critic, Paul St-Victor, didn’t mention him among a list of the authors who regularly contributed to the *Magasin d’éducation*. Indeed, Verne suspected the serial and its audience were the cause of his exclusion from the Academy. In an article predicting which successful authors would soon

322 Noiray, “L’inscription de la science dans le texte littéraire,” 30. Noiray points out that both Verne and Zola undertook lengthy research before writing their novels, often consulting similar sources: “Les sources auxquelles il [Émile Zola] recourt sont souvent les mêmes que celles de Jules Verne : ce sont les gros ouvrages de vulgarisation illustré, souvent fort bien faits, dont les maisons Hachette, Hetzel, Mame, etc., se sont fait une spécialité […] Dans le cas de *Vingt Mille Lieues sous les mers*, les ouvrages dans lesquels Jules Verne a puisé sa documentation […] appartiennent à cette catégorie respectable des ouvrages de vulgarisation de bonne tenue.” [“The sources he [Zola] consulted are often the same as those used by Jules Verne: they those are voluminous illustrated popularizing works, often very well made, that publishing houses like Hachette, Hetzel, Mame, etc. specialized in. In the case of *Twenty Thousand Leagues under the Seas*, the texts from which Jules Verne drew his documentation […] belong to that respectable category of popularizing works of good repute.”]
join the Académie française, Verne protests that “on parlait de Daudet, Goncourt, Fabre, Féval, etc., tous excepté moi. J’imagine donc que si ma candidature s’était produite, elle aurait fait lever bien des épaules.”[^323] [“They spoke of Daudet, Goncourt, Fabre, Féval, etc., all except me. I fancied that had my candidacy been put forward, it would have raised many eyebrows.”] After reading this self-deprecating note, Pierre-Jules Hetzel wrote to his son that Verne was obsessed with the idea of joining prestigious ranks: “voilà un bonhomme férû de l’idée de l’Académie. […] On n’arrive pas à l’Académie avec des livres pour les enfants dit-il ? Mais les livres qu’il fait sont les seuls qu’il puisse faire et ce n’est que par eux qu’il pourra arriver. […] Qu’il soit patient.”[^324] [“Here is a man keen on the idea of the Academy […] One doesn’t become a member of the Academy with children’s books, he says? But the books he’s written are the only ones he is capable of producing and it is only through them that he will get there. […] Let him be patient.”] Patience would do little for Verne, as he was never inducted into the Académie; rather, his body of work would be relegated to the purportedly dubious ranks of children’s literature and science fiction.

Academic audiences mostly ignored Verne’s works until an essay by Michel Butor, published in 1960, sparked a new wave of interest. Different studies further removed from the time of Verne’s life open with much the same pronouncement that Butor makes: “Tout le monde a lu Jules Verne.”[^325] [“Everyone has read Jules Verne.”] While many readers around the world still enjoy his novels, academic discussions are still far from widespread; Verne’s work remains at a midpoint between mass appeal and scholarly legitimacy, treasured by


[^324]: Ibid., 168.

middle-school students but rarely taken up in University-level courses. Some critics have linked the dearth of critical analysis of Verne’s body of work to its history of poor translation and of haphazard foreign-language editing. Today, Jules Verne is one of the most translated authors in literary history, yet English versions of his works are still pigeonholed as stories written for children and young adults.326

In failing to write books that were taken up by an exclusively elite audience, and in endeavouring to make scientific topics accessible to a wide variety of readers, Verne became famous but not prestigious, popular but not sought-after by the upper echelons of French literary circles, and is now established as an author whose work is accessible and loved by a school-aged public. The educational bent evident throughout the Voyages Extraordinaires may help to explain their mass appeal as well as their limited critical reception. Their different storylines were often woven from information collected throughout different popular print sources.

Verne’s writing method produced fiction that strongly retains the educational flavour of its source material. Critics have identified the documents that spurred Verne’s inventiveness and found that the author deployed an arsenal of strategies to avoid plagiarizing his source texts, while keeping certain stylistic and didactic elements from scientific articles. Many of the scholars engaged in such work argue that Verne’s genius lies in his ability to manipulate

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complicated scientific materials and to blend them in a compelling narrative structure. In other words, the very thing that Zola criticized—Verne’s ability to dramatize science—is a compelling element for many of his readers.\textsuperscript{327} These notecards that Verne used also add to his novels as texts that are accumulative not only in their genesis, but also in their ontological orientation. So many notes are collated, copied, and aggregated in order to form predictable set pieces that interlace together to form the text. Information is stacked, like so many columns in an encyclopedia’s pages.

For the French philosopher Michel Serres, who identifies strongly with the author as a fellow mariner, this tendency to gather so many references in a single work is a way to plumb the depths of understanding as well as the depths of the sea.\textsuperscript{328} The encyclopedia’s columns of text, which contain the printed account of human knowledge, are stacked on top of each other: “le sous-marin plonge moins sous les eaux que le Nautilus n’indexe, par son mouvement vertical, toute l’épaisseur des classifications. L’immersion n’est qu’une lecture, verticale et de haut en bas, des rubriques du dictionnaire.”\textsuperscript{329} [“The submarine dives less than the Nautilus indexes, by its vertical movement, the thickness of classifications. The immersion is only a reading, vertical and from top to bottom, of the dictionary’s rubrics.”] In this sense, Jules Verne’s novels attempt to encapsulate all of the knowledge available at the time for any given theme: geology features prominently in \textit{Voyage au centre de la Terre},

\textsuperscript{327} Daniel Compère argues this by drawing direct comparisons between Verne’s prose and his source materials. Although Verne often rearranges information, uses synonyms, and adds grammatical flourishes to distinguish his work from that of his sources, Compère notes that Verne’s fear of being accused of plagiarism remained constant throughout his career and was especially pronounced during the composition of \textit{Vingt Mille Lieues sous les mers}. See Daniel Compère, \textit{La Science romanesque de Jules Verne} (Amiens: Centre Rocambole, 2013).


\textsuperscript{329} Ibid, 152.
whereas ballooning and geography are more evident throughout *Le Tour du monde en quatre-vingts jours*.

Verne’s ambitious desire to gather the sum of human knowledge in his novels was declared by his editor Hetzel in a foreword to the *Voyages Extraordinaires* collection: “Son but est, en effet, de résumer toutes les connaissances géographiques, géologiques, physiques, astronomiques, amassées par la science moderne, et de refaire, sous la forme attrayante et pittoresque qui lui est propre, l’histoire de l’univers.” [“His goal is, in fact, to summarize all of the geographical, geological, physical, and astronomical knowledge gathered by modern science and to remake, in its own attractive and picturesque form, the history of the universe.”] This totalizing scope gestures towards the accumulative principal at the heart of Verne’s method: to gather information and recycle it into a new narrative. In this way, Verne’s novel transforms knowledge into something that can be distilled, integrated into an amusing narrative, printed, distributed across a vast network of readers, and consumed privately.

## 2 Understanding the Atmosphere

### 2.1 Pierre Larousse’s *Grand Dictionnaire universel du XIXᵉ siècle*

*Vingt Mille Lieues sous les mers* recycles and transmits popular scientific knowledge that appeared in encyclopedias, lectures, and serial publications. Verne’s novel distributes the atmosphere’s attributes as they were defined in Pierre Larousse’s *Grand dictionnaire universel du XIXᵉ siècle*, an ambitious endeavour that proposes—much like Verne’s broadly unifying scope—to gather the sum of human knowledge and to explain the universe to its
readers. Verne would have read the atmosphere’s definition, as it appears in the *Grand dictionnaire universel du XIXᵉ siècle*, as he began researching and writing *Vingt Mille Lieues sous les mers.*

It is worth quoting in full:

Layer of fluid gas, of vapours, that envelops the earth’s sphere […] The atmosphere could be, more rightly than the wave, taken as a type of mobility itself (Blerzy.) – Gaseous envelope that surrounds a celestial body: we doubt that the moon has an

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330 The first volume of the *Grand dictionnaire universel du XIXᵉ siècle* was published in 1866 and comprised definitions for all manner of words that began with the letter “A”, from “A” to “Azzubeydi,” with the “atmosphere” in between. The main author, Pierre Larousse, died in 1875, one year before the last of fifteen volumes was published. Supplemental volumes were also issued in 1877 and 1890 for a total of seventeen tomes. It is available online at http://gallica.bnf.fr/ark:/12148/bpt6k50723k/f2.image.r=.

ATMOSPHERE. (Acad.) […] A rare, transparent, compressible and elastic fluid that surrounds a body by leaning upon it, is what we call its ATMOSPHERE. (Laplace.) […] – By analogy. Imponderable gas or fluid that a body is surrounded by: an electrified body is surrounded by an ATMOSPHERE of electricity […] – By extension. The air of a country, of a place, air in which we habitually live: the icy ATMOSPHERE of the North. The brilliant ATMOSPHERE of the south of France. London’s foggy ATMOSPHERE. […] Any gas that we breathe.–Fig. Place in which we live, considered as exerting an influence: an ATMOSPHERE of intrigue, of vice, of corruption. – Mechanical. Power source particularly adopted by steam engines, and equal to the weight of a column of atmospheric air in its normal state, its base being surface measurements, or 1.0336 kg per square centimeter, or 10.336 kg per square meter. […] With the word air, we considered the so-named fluid gas in relation to its own nature and all the chemical, physiological, hygienic, etc. phenomena of which it is the object or the cause. Here, we only need concern ourselves with the mass of air as a fluid envelope, forming a layer, with varying thickness, over the solid or liquid parts of the Earth. […] As such, the mass of air that attaches itself to the flanks of the Earth and that follows it in all of its astronomical movements is like a hollow sphere that serves as a case, and this is what the word atmosphere means: sphere of vapours, fluid sphere. […] But the atmosphere’s influence is not limited to vegetable life; it also bears upon mankind and animals. We find as much difference between the robust inhabitants of a mountainous region and the weakened population in our cities, as there is between the fresh and pure air of the mountains and the atmosphere, heavy with noxious miasmas, that envelops our cities.

The first sentence is, perhaps, the most striking in its suggestion that the atmosphere should not be taken entirely as a wave, but as mobility itself. In a novel where the main character’s motto is Mobilis in mobile, or movement in the moving element, this perception of the atmosphere places it as the ultimate fluid medium—changeable and flexible, ever shifting. The atmosphere is explained as an envelope of fluid gases that move and allow for movement to exist globally. As a framework that deeply affected the view of the world, the mass of invisible fluid that sat atop the planet and manifested itself in the weather was also felt physically. The belief in a liquid atmosphere spurred theories about electricity (as a fluid force that surrounded objects), and disease (the thick atmosphere, known as miasma, that was believed to carry contagion—especially in hot, humid climates), and as a regional marker (a place’s particular atmosphere). In the Grand dictionnaire universel du XIXe siècle, the
atmosphere’s fluidity remains, but its definition expands—like so many gases—and its multiple contexts are layered in four full columns that spread over two pages. The atmosphere’s mysteries are explained, its weight measured, its heights hypothesized, and its effects declared to be evident in humans, animals, and plants alike. The atmosphere has passed through Coketown’s fact-obsessed pages and emerges, in Verne, as an entirely known substance that human agents can control and use.

The atmosphere is still conceived of in terms of its fluidity—this much hasn’t changed since Brontë—but in the *Grand dictionnaire universel’s* explanation, it is further elucidated by standardized weights, previously hidden properties are revealed, and the way it functions can be traced across vast distances. Whereas only twenty years earlier, almanacs referred to the atmosphere as a liquid and mysterious force that linked distant planetary influences to human lives, Larousse’s definition of the atmosphere, taken up by Verne and disseminated in literary texts targeted to children and their families, suddenly makes it something that can be understood by anyone. Reading the signs of the sky is no longer a vital act that can determine an individual’s survival; rather, reading the right instruments or reading the right scientific texts becomes important. The atmosphere’s signs are secondary to its immediately measurable properties.

### 2.2 Layers and Indexes

With their stocks of air replenished, Nemo and his crew are free to explore, explain, and exploit the mysteries of the ocean. In *Vingt Mille Lieues sous les mers*, Doctor Aronnax shares a wealth of underwater experiences with his host, Captain Nemo: aboard the Nautilus, they discuss different scientific discoveries and exchange information; they go on a hunting
expedition in a vast forest hundreds of meters below the ocean’s surface; and they witness an underwater volcanic eruption that illuminates Atlantis’ vestiges, among other adventures. Throughout these events, Aronnax keeps meticulous scientific notes. The novel is, in fact, based on the collection of notes Aronnax writes over the course of his travels with Nemo, and which he manages to save during his escape from the Nautilus. The Doctor’s assistant Conseil is blessed with the ability to classify an endless variety of species without truly knowing how to describe them in aesthetic terms: “Classer, c’était sa vie, et il n’en savait pas davantage. Très versé dans la théorie de la classification, peu dans la pratique, il n’eût pas distingué, je crois, un cachalot d’une baleine!”[“But his scientific knowledge ended there. Well versed in the theory of classification but little in its practice, he wouldn’t, I think, have distinguished a sperm whale from an ordinary whale!”] His skill is based entirely on taxonomy and an objective detachment from the affective responses and intellectual curiosity that mark Aronnax’s time aboard the submarine. Conseil further stands in sharp contrast to Ned Land, the passionate Canadian harpooner who gleans his nautical knowledge from generations of fishing, folkloric wisdom, and his infallible eyesight. Conseil and Land enter into a friendship that underscores their differences—the two are opposites who often disagree, while also proclaiming unending loyalty for each other. Between them, Aronnax provides an equalizing discourse that most often sets up the delivery of informational lists.

332 All references to the novel are from Jules Verne, Vingt mille lieues sous les mers, ed. Jean Delabroy (Paris: Éditions Pocket Classiques, 1991), 39 [17]. Translations are taken from Twenty Thousand Leagues under the Seas, translated by William Butcher (Oxford: Oxford University Press, 1998). William Butcher’s translation is unabridged and maintains a strong equivalence with the original. References to the translated text are in square brackets following the page number for the French text.
Aronnax borrows and learns from the plants, animals, machines, and people around him; the breadth of his knowledge encompasses the gap that divides Land from Conseil. The good Doctor is the tempering presence within a range bracketed at its extremes by an excessive reliance on Linnaean classification and a belief in the mysterious, impenetrable powers of nature. Aronnax is encyclopedic in his ability to synthesize different streams of expertise into a single, concise entry that explains everything, but focuses on nothing in particular. William Butcher describes him as a character that “mainly serves to organize knowledge, to ask naïve questions, to act generally as a foil, and to transcribe Conseil’s classifications. […] If nothing else, Aronnax is systematic.”

His voyages are motivated by his curiosity—Aronnax admits that Conseil follows him “partout où m’entraînait la science” [“everywhere science had taken me.”] His agency is sublimated by a loftier ideal, one indirectly expressed by the scientific impetus: Aronnax wants to get to the bottom of everything, to understand and unspool all the tightly coiled information about the world. His actions are entirely motivated by his willingness to try anything and to discover everything in the name of science, the ultimate higher purpose.

Yet by following every scientifically motivated opportunity, Aronnax secures himself between those with specialized knowledge of a particular field of expertise and the public at large. He can chat about the intricacies of marine biology with Captain Nemo as well as he can explain evolutionary principles to Ned Land. Like Verne’s notecards, Aronnax dips into

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334 William Butcher, introduction to Twenty Thousand Leagues, xxiii.
335 Verne, Vingt mille lieues sous les mers, 39 [17].
different topics and discards them once they have been sufficiently explained. Aronnax is, like Verne, an author: his notes constitute the basis for the narrative, and in this way he occupies the role of popularizer. In explaining natural phenomena to his audience—mostly to Ned Land and to Conseil—Aronnax becomes the point of origin for multiple lists that, like Larousse’s definition of the atmosphere, build on previous layers of information and spin into various directions.

2.3 Listing the Atmosphere

*Vingt Millie Lieues sous les mers* is famous for its lists. The compendium of facts and figures contained in the novel presents itself as a key to unlocking the mysteries of the abyss, which points to the larger system of life on earth, open to the eager scientist and awaiting discovery and explanation: “Just as Aronnax’s lists attempt to cram everything in, so his classifications go down to the smallest detail. Everything inside is neatly labeled, as in Nemo’s museum; but the unintelligible or uncontrollable are banished.” A list represents all that is known, but in so doing it also reveals the limits of our knowledge. Lists present themselves as potentially eternal. Words on the page neatly arranged in rows and columns,

336 Nemo even writes marginal comments in his copy of Aronnax’s book, pushing the Doctor’s text between blank space and diligent commentary: “Dans la bibliothèque je trouvais souvent des livres qu’il laissait entrouverts, et surtout des livres d’histoire naturelle. Mon ouvrage sur les fonds sous-marins, feuilleté par lui, était couvert de notes en marge, qui contredisaient parfois mes théories et mes systèmes.” [“In the library I often found books he had left open, mainly books on natural history. My work on the submarine depths had been read by him, and the margin was covered with notes, sometimes contradicting my theories and my systems.”] See Verne, *Vingt Mille Lieues*, 438 [275].

337 According to Butcher, the French poet Guillaume Apollinaire admired Verne’s style: “Quel style a Jules Verne ! Rien que des substantifs !” [“What a style! Nothing but substantives!”] Butcher adds that there is “a bewildering number of common and proper nouns in the novel.” Butcher, introduction to *Twenty Thousand Leagues*, xxi.

338 Ibid.
may appear to be stable, fixed, and tethered. Yet their presence masks how profoundly disturbing it is to be in between the known and the unknown.

The Nautilus, a comfortable marine cocoon, enfolds Aronnax, Land, and Conseil and muffles the abyss that surrounds them. Lavish furnishings, luxurious meals, and the ship’s safe interior always welcome the Doctor and the Captain after their expeditions. The Nautilus is an opulent ship, replete with rare artworks, vast collections that no land-based museum could ever hope to gather: a library of twelve thousand volumes, bound in uniform leather; paintings by da Vinci, Holbein, Titian, and Géricault; bronze statues and other precious artworks; and countless seashells, conches, and pearls that all adorn the submarine’s library and salon.339 Of Verne’s tendency to transform his interiors into cocoons, Roland Barthes writes: “il était maniaque de la plénitude: il ne cessait de finir le monde et de le meubler, de le faire plein à la façon d’un œuf; son mouvement est exactement celui d’un encyclopédiste du XVIIIe siècle ou d’un peintre hollandais: le monde est fini, le monde est plein de matériaux numérables et contigus.”340 [“Verne had an obsession for plenitude: he never stopped putting a last touch to the world and furnishing it, making it full with an egg-like fullness. His tendency is exactly that of an eighteenth-century encyclopaedist or of a Dutch painter: the world is finite, the world is full of numerable and contiguous objects.”] Nemo’s art and book collection are the most fixed parts of the Nautilus, as the captain ceased adding to them the day he dove beneath the waves—they are immovable, kept intact beneath their

339 See chapter XI, “Le Nautilus.”
glass cases. Butcher refers to the Nautilus’s interior as a “hothouse atmosphere.” The image is striking, but it implies an auto-regenerative quality that the Nautilus does not possess, as it must replenish its own air supply. The ship’s seemingly hermetic spaces, such as the Captain’s inherently closed collections, are contained within an open-ended text that refuses to conform to the implied certainty of imposed boundaries, be they spatial, geographical, technological, or literary; after all, *Vingt Mille Lieues sous les mers* ends ambiguously, with the disappearance of the Nautilus after Aronnax’s escape from its shell. Nemo’s collections create the illusion of certainty in an environment that is entirely foreign.

Nemo’s library has been the subject of multiple analyses that point to its unusual nature. Libraries are constantly evolving entities. Knowledge shifts, expands, and books that were once on the cutting-edge of their fields are removed and replaced. Nemo’s library refuses these conventions. Its stasis endlessly fascinates the author Alberto Manguel, who narrates “The Library at Night,” a new exhibit at the *Bibliothèque et Archives Nationales du Québec* in Montreal. In the exhibition, audiences “move to an immersive forest landscape that provides a sharp contrast to the rigorous order usually associated with temples of knowledge. If, as Manguel writes, ‘the library in the morning suggests an echo of the severe and reasonably wishful order of the world, the library at night seems to rejoice in the world’s essential, joyful muddle,’” Participants are invited to wear a headset with thick goggles and built-in earphones. A screen in the goggles projects audiovisual recordings that simulate the experience of being inside one of ten libraries. Nine of them are or were once real and

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341 Butcher, introduction to *Twenty Thousand Leagues*, xix.
342 Robert Lepage, one of Québec’s pre-eminent playwrights and multimedia directors, designed the exhibit. [http://www.banq.qc.ca/activites/expositions/bibliotheque_la_nuit.html?language_id=1](http://www.banq.qc.ca/activites/expositions/bibliotheque_la_nuit.html?language_id=1).
thriving: the great library at Alexandria, Mexico City’s Biblioteca Vasconcelos, and the Library of Congress are but a few examples. Only one is fictional—it is Captain Nemo’s library aboard the Nautilus—and it does not rejoice in the joyful muddle that the library at night communicates to Manguel.

The library inside the Nautilus perpetuates the illusion of the Nautilus as a perfectly full closed system. In his tour of a three-dimensional rendering of the library, Manguel narrates a short descriptive text that explains how the Captain’s collection of identically bound volumes is a fascinating combination of a real library and of a fantastical one, as its collection never changes. In the essay that inspired the virtual exhibit, Manguel writes that libraries such as the one aboard the Nautilus “are doubly disturbing” because they “cannot be collected” and also because “they cannot be read.”343 He notes that Nemo’s library, however, mostly contains real books. Aside from copies of Aronnax’s books on natural history, the captain has works by recognizable authors such as Victor Hugo, Michelet, Rabelais and George Sand. It remains that the library represents, in Nemo’s mind, the “seul lien qui me rattache à la terre”344 [“the only ties connecting me to land.”] On the day his ship dove beneath the waves, Nemo bought “mes derniers volumes, mes dernières brochures, mes derniers journeaux, et depuis lors, je veux croire que l’humanité n’a plus ni pensé, ni écrit.”345 [“I bought my last books, my last magazines, my last newspapers, and I would like to believe that humanity has thought or written nothing since then.”] The familiar atmosphere of a bourgeois interior, like the predictable narrative set-pieces of Verne’s adventure novels,

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344 Verne, *Vingt mille lieues sous les mers*, 120-21 [70].
345 Ibid.
bring comfort in the secure knowledge of what we do know. Nemo’s manifold collections are complete; the Nautilus generates its own energy; we know from the very beginning that the story’s heroes will survive; there is no need for the controlled atmosphere to accept outside forces or to bring them within its casing. Captain Nemo and his crew glide over the unknown and depend on the carefully curated and, as a result, truncated human knowledge at their disposal.

These familiar and comfortable settings facilitate the reader’s and Aronnax’s exploration of the unknown. The mysteries at the bottom of the ocean are no longer inaccessible and frightening; rather, they become a parade of colours and discoveries broadcast through a vast window to a comfortably seated audience. As Barthes notes, “la jouissance de l’enfermement atteint son paroxysme lorsque, du sein de cette intériorité sans fissure, il est possible de voir par une grande vitre le vague extérieur des eaux, et de définir ainsi dans un même geste l’intérieur par son contraire.”³⁴⁶ […The enjoyment of being enclosed reaches its paroxysm when, from the bosom of this unbroken inwardness, it is possible to watch, through a large window-pane, the outside vagueness of the waters, and thus define, in a single act, the inside by means of its opposite.”] While the Nautilus encloses its travellers, its function as a container that carries the upper regions of the atmosphere into the ocean’s depths further perpetuates the myth of separation from the environment that is repeated in the experience of living in houses or traveling in enclosed vehicles. From the confines of the Nautilus’s parlour, Aronnax and his friends can describe the wonders beyond their windows without risking their lives.

³⁴⁶ Barthes, “Nautilus et bateau ivre”, 92 [67].
The idea of the master system—the one that contains all other systems—is one of the topics in Barthes’s *Leçon*. Barthes maintains that literature aggregates all forms of knowledge. It does more than collect them, however; it also legitimizes and frees these different ways of knowing by recognizing the fact that they are, themselves, incomplete and ever changing. He writes: “La littérature fait tourner les savoirs, elle n’en fixe, elle n’en féchise aucun; elle leur donne une place indirecte, et cet indirect est précieux. D’une part, il permet de désigner des savoirs possibles—insoupçonnés, incomplis : la littérature travaille dans les interstices de la science : elle est toujours en retard ou en avance sur elle.”[^347] [“Yet literature, in this truly encyclopaedic respect, displaces the various kinds of knowledge, does not fix or fetishize any of them; it gives them an indirect place, and this indirection is precious. On the one hand, it allows for the designation of possible areas of knowledge—unsuspected, unfulfilled. Literature works in the interstices of science. It is always behind or ahead of science.”] The very separation between literature and science contains the space that allows literature to access the narrow gaps that divide the known from the unknown, the perceived world and that which is hidden from us. The endless lists, extensive descriptions, and scientific details all mask a series of gaps that situate the Nautilus and its crew outside the known world. The Captain and his men occupy a space between defined places (such as land and sea) and straddle delineated boundaries.

A catalogue of our knowledge is comforting, especially when it takes shape as a solid, illustrated, bound and distributed encyclopedia. Blank pages, however, bear the burden of discovery and evoke the constant and endless enterprise that is the search for knowledge.

Filling in the gaps is terrifying, especially when it comes to measuring, quantifying, and explaining things that are invisible to the naked eye and do not readily reveal themselves to us: “La crise du savoir est là, qu’on ne sait qui le sait, qu’on se doute que personne vraiment ne le sait. Cette faiblesses, ou ce trou appelé Nemo, est telle qu’il n’y a plus dans ce champ qu’une violence aveugle.”348 [“The crisis of knowledge is there, in that we don’t know who knows, and we doubt that anyone really knows at all. That weakness, or that hole called Nemo, is such that there is nothing but a blind violence.”] Nemo represents the complete unknown, and the total impossibility of ever perfectly knowing anything, including the primary medium of our environment, the atmosphere.

3  From Global Fluid to Molecule

3.1  The Atmosphere Inside Out

For *Vingt Mille Lieues sous les mers*, Verne built fictional narratives around popularized scientific texts such as the definitions published in the *Grand dictionnaire universel du XIXᵉ siècle*. Indeed, the mechanical definition of the atmosphere is invoked throughout *Vingt Mille Lieues sous les mers*, and the amount of pressure that applies to all things above and underneath the waves is consistently mentioned. At the beginning of the novel, various ocean liners are attacked by a mysterious creature. Their hulls, strong as they are, are pierced by this mysterious sea-monster. Doctor Aronnax firmly believes that the culprit is a gigantic cetacean and publishes an article to this effect. His theory seems to be well received, and he

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is summoned on a hunting expedition to track and capture the unknown creature. It is aboard the Abraham Lincoln that Aronnax meets Ned Land, a Québécois harpooner who refuses to believe that a giant narwhal could exist—let alone that it would attack multiple ships.

Aronnax persists in his explanation and suggests that the animal he envisages must be enormous and likely lives a few miles below the waves, which requires a very strong body. Ned does not see the connection between strength and ocean depth. To illustrate his point, Doctor Aronnax explains to Ned Land how his survival at the bottom of the sea would be threatened by the weight of the atmosphere, which would crush him in no time at all:

Eh bien, quand vous plongez, Ned, autant de fois trente-deux pieds d’eau au-dessus de vous, autant de fois votre corps supporte une pression égale à celle de l’atmosphère, c’est-à-dire de kilogrammes par chaque centimètre carré de sa surface. Il suit de là qu’à trois cent vingt pieds cette pression est de dix atmosphères, de cent atmosphères à trois mille deux cents pieds, et de mille atmosphères à trente-deux mille pieds, soit deux lieues et demi environ. Ce qui équivaut à dire que si vous pouviez atteindre cette profondeur dans l’Océan, chaque centimètre carré de la surface de votre corps subirait une pression de mille kilogrammes. Or, mon brave Ned, savez-vous ce que vous avez de centimètres carrés en surface ?
— Je ne m’en doute pas, monsieur Aronnax.
— Environ dix-sept mille.
— Tant que cela ?
— Et comme en réalité la pression atmosphérique est un peu supérieure au poids d'un kilogramme par centimètre carré, vos dix-sept mille centimètres carrés supportent en ce moment une pression de dix-sept mille cinq cent soixante-huit kilogrammes.
— Sans que je m’en aperçoive ?
— Sans que vous vous en aperceviez. Et si vous n’êtes pas écrasé par une telle pression, c’est que l’air pénètre à l’intérieur de votre corps avec une pression égale. De là un équilibre parfait entre la poussée intérieure et la poussée extérieure, qui se neutralisent, ce qui vous permet de les supporter sans peine. Mais dans l’eau, c’est autre chose.
— Oui, je comprends, répondit Ned, devenu plus attentif, parce que l’eau m’entoure et ne me pénètre pas.349

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349 Verne, Vingt Mille Lieues sous les mers, 52-3 [25-6].
[“Well, Ned, when you dive, your body undergoes a pressure equal to 1 atmosphere for every 32 feet of water you go down, that is 1 kilogram for each square centimetre of its surface. It follows that this pressure would be 10 atmospheres at 320 feet, 100 atmospheres at 3,200 feet, and 1,000 atmospheres at 32,000 feet, or about 2½ leagues. In other words, if you could reach this depth, each square centimeter on your body would be undergoing a pressure of 1,000 kilograms. Now, my good Ned, do you know how many square centimeters you have on your body?
“No idea, Dr Aronnax.”
“About 17,000.”
“As many as that?”
“And since atmospheric pressure is in fact slightly more than 1 kilogram per square centimeter, your 17,000 square centimeters are at this very moment undergoing a pressure of 17,568 kilograms.”
“Without me realizing?”
“Without your realizing. And the only reason you are not crushed is the air entering your body with an equal force. The inward and outward pressures are in perfect equilibrium, they cancel each other out, and so you can bear them without discomfort. But it is not the same underwater.”
“Now I understand,” replied Ned, suddenly more attentive. “Because the water is all around me, and isn’t coming into my body.”]

The primary mechanical and scientific definition of the atmosphere is retained, and repeated, throughout. The atmosphere bridges literary fiction to scientific explanation. The atmosphere’s secrets—its calculated weight, its circulation—are understood, opening up a space for explorers (and readers) to discover on their own terms, buttressed by the comfort brought by the perceived mastery of a familiar element. Thus, the imperialism of scientific knowledge paves the way for the fiction of perfect understanding. It also reduces the atmosphere to something that can be taken and stored for personal consumption alongside the Nautilus’s supply of food items, such as wild fruit, game, plants, and fish. Another important “provision,” the atmosphere, must be refreshed. This reminds us that breathing is biologically necessary, and it also aligns the atmosphere with the banality of mundane things.

When it is referred to as a provision, the atmosphere is reduced to its smallest, particulate size. This occurs from the very first time Aronnax and his friends, Ned Land and Conseil, encounter the Nautilus up close. After the submarine runs through their ship,
Aronnax and Conseil are adrift at sea—until they find Ned Land floating atop the Nautilus. Once the shock of encountering such a spectacular machine subsides, Aronnax quickly deduces that the metallic structure must either make its own air or come up to the surface, like a whale, to fill up its lungs: “Et, en effet, s’ils ne faisaient pas eux-mêmes leur air, il fallait nécessairement qu’ils revinssent de temps en temps à la surface de l’Océan pour renouveler leur provision de molécules respirables. Donc, nécessité d’une ouverture qui mettait l’intérieur du bateau en communication avec l’atmosphère.”

[“And indeed, if they didn’t manufacture their air themselves, they had to come up to the surface sometimes to replenish their supply of breathable molecules. Hence the need for an aperture so that the interior of the boat could communicate with the outside air.”] The breathable molecules, invisible to the naked eye, are stockpiled like any other supplies required for long-term underwater expeditions. When the atmosphere’s components are broken down into its smallest constituent parts, its overwhelming largeness erodes. The atmosphere is, like any other item that can be studied and dissected, understood on a microscopic scale that suddenly reduces its unfathomable presence. When, in the next sentence, the atmosphere stretches back to its vast size, it is no longer an immense force—it is the source of a necessary item, a mother lode from which to gather, bit by bit, the thing required for survival. The atmosphere thus becomes a renewable resource that can be replenished by the Captain and his crew. Still, Nemo’s ability to replenish his atmospheric provisions depends on his ship’s power to reach

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350 Ibid., 84 [46]. Emphasis added. Butcher’s word choice here is interesting, as he has replaced “atmosphere” with “outside air.” This highlights how the atmosphere is often interchangeably used with air, but also shows how they are not perfectly equivalent terms. The original French version conjures the sense of scale that separates the immense atmosphere from the Nautilus’s interior, especially in relation to the ship’s aperture.
the surface of the ocean—a surface that can shift from a liquid to a solid at dangerously rapid speeds when it freezes.

Despite his attempt to remain exclusively apart from the earth by living underwater—ensconced in a medium of his choosing—Nemo has to return to the border between the air and the sea in order to live. Like any provision in limited supply, the Nautilus’s stocks of fresh atmosphere eventually run dry. Nemo knows this and boasts that he could have used the phenomenal electric powers at his disposal to produce his own air, but that he chooses to return to the surface whenever his heart desires: “Oh ! je pourrais fabriquer l’air nécessaire à ma consommation, mais c’est inutile puisque je remonte à la surface de la mer, quand il me plaît. […] Des pompes puissantes [emmagasinent l’air] dans des réservoirs spéciaux, ce qui me permet de prolonger, au besoin, et aussi longtemps que je le veux, mon séjour dans les couches profondes.”351 [“Oh, I could manufacture all the air I need for my consumption, but that would be pointless since I go back up to the surface whenever I want. Powerful pumps […] store air in special tanks, thus allowing me to remain at the deepest levels as long as I wish.”] Nemo’s choice to return to the surface to breathe, whale-like, paradoxically underscores the atmosphere’s own finitude, its own limited capacities to contain carbon dioxide. In the Nautilus’s almost hermetic existence under the sea lies a synecdoche for the atmosphere as a resource that, though it appears to be endlessly renewable, is limited. The ship cannot clean its own air and must return to the surface to exchange its load of carbon dioxide for oxygen or its occupants will die.

351 Ibid., 133 [78-9].
This threat presents itself when Nemo takes the Nautilus to the South Pole and, in leaving the frozen landscape towards warmer seas, becomes trapped in a tunnel of ice. In this extreme landscape, the ocean becomes a sheet of solid ice—a floating continent that traps the submarine. Ice floes and sudden freezing temperatures transform liquids into solids and the water turns into ice—the boundaries between physical states are confused: “Tout était gelé alors, même le bruit.”352 [“Everything was frozen, even sound.”] Established boundaries between solid, liquid, and aural states suddenly shatter, putting the submarine and its crew at risk; the Nautilus is not meant to be stationary, as it must renew its atmosphere. The ship is caught by water’s cycle. The submarine and its crew must dig their way out of the ice, taking turns wearing suits fitted with oxygen tanks. The work is hard and Aronnax, who labours alongside his faithful Conseil, notices how difficult it is to breathe inside the submarine: “… Je trouvai une notable différence entre le fluide pur que me fournissait l’appareil Rouquayrol et l’atmosphère du Nautilus, déjà chargée d’acide carbonique. L’air n’avait pas été renouvelé depuis quarante-huit heures, et ses qualités vivifiantes étaient considérablement affaiblies.”353 [“I found a notable difference between the pure fluid that the Rouquayrol apparatus had been giving me and the atmosphere of the Nautilus, already full of carbon dioxide. The air had not been renewed for 48 hours, and its vivifying qualities were considerably reduced.”] The atmosphere’s fluid properties remain, but they are paired with a matter-of-fact presentation of the carbon cycle. Without fresh air, Aronnax knows his life is in danger—and he digs all the more quickly in order to reach the surface before the ship’s tanks are emptied of all their reserves of “fresh molecules.”

352 Ibid., 468 [295].
353 Ibid., 509 [322].
Thankfully, the Nautilus manages to escape from its icy prison in the nick of time. After many days and nights of constant digging and drilling through the thick wall of ice that separates the ship from the sea’s surface, the submarine bursts forth on an ice field and the machine’s door opens and Conseil, Aronnax, and Ned Land push themselves outside to get a breath of fresh air: “Je respirais, je humais l’air vivifiant de la mer. Mes deux compagnons s’enivraient près de moi de ces fraîches molécules. [...] Nous n’avions pas à nous modérer, nous pouvions aspirer à pleins poumons les atomes de cette atmosphère, et c’était la brise, la brise elle-même qui nous versait cette voluptueuse ivresse!”354 [“I was breathing, I was gulping down the invigorating sea air. My two companions beside me were drunk on fresh air. […] But there was no need to ration ourselves. We could breathe in great lungfuls of atmosphere, and the wind itself suffused us with this voluptuous intoxication!”] Conseil happily declares that they shouldn’t be afraid to breathe deeply, as “il y en a pour tout le monde” [“there is enough for everyone.”] In the same sentence, the atmosphere’s multiple and overlapping definitions are foregrounded: it is a fluid, it is life-giving, it clings to the earth’s surface—but does not pierce the boundaries of the sea or of the continents—and its atoms are plentiful.

Conceived in terms of a fluid medium, the earth’s atmosphere becomes an immense continuum rather than a series of substantially different layers. The hydrological cycle, condensation, evaporation, and precipitation, blurs the boundaries between different states for the same matter and highlights the atmosphere’s endless recuperative cycle. It regenerates

354 Ibid., 520 [329].
itself, from the bottom of the ocean to the upper edges of the atmosphere.\footnote{Scientists are finding greater relationships between the planet’s hydrological cycle and the devastating effects of greenhouse gases. Carbon dioxide levels in the atmosphere are filtered in part through the world’s oceans, which are becoming more acidic as CO₂ overwhelms the Earth’s ability to filter the atmosphere. The UK Acidification Research Programme, for example, has stated that “if we continue emitting CO₂ at the same rate, by 2100 ocean acidity will increase by about 150 per cent, a rate that has not been experienced for at least 400,000 years.” Quoted in Tim Flannery, \textit{Atmosphere of Hope: Searching for Solutions to the Climate Crisis} (New York: Atlantic Monthly Press, 2015), 35.} The Nautilus’s entrapment simultaneously reveals and conceals the atmosphere’s limits. The dangers of excessive carbon dioxide, quickly forgotten in the trio’s drunken inhalations, do not translate to the planetary scale. Whereas the men have only just narrowly escaped death by asphyxiation, they do not yet associate these limits with those of the earth as a whole. The reality of the biological and chemical danger of carbon dioxide poisoning is difficult to process when it is presented globally. In the instant it takes the atmosphere to suffuse the ship’s crevices anew, it appears as an endless resource ready to be sucked back into tanks and carried away beneath the waves.

When the Nautilus rises to the surface of the sea it bobs between the water and the open sky and fills its tanks with the breeze. Just as the chimneys in Dickens’s skies unite two opposing realms of existence, the Nautilus “connects, but in order precisely to keep at a distance, two regimes of space.”\footnote{Stephen Connor, “Unholy Smoke,” n.p.} Captain Nemo’s submarine spatially inverts the mining imagery at play in Dickens’s \textit{Hard Times}, where coal is mined around Coketown, burned in the city’s factories, and expelled in the sky before it returns to blanket all available surfaces. Rather, Nemo extracts the atmosphere and nuances the nineteenth-century trope of mining the underground for its riches and carrying them back to the surface. Instead of pulling elements from below up to the surface, the atmosphere is sucked into the Nautilus’s tanks.
and carried below the waves to be enjoyed at a later time. Like the books and journals that line the library walls, or the fine cutlery that adorns the Captain’s lavish dinner table, resources are taken into the submerged world so that it mirrors the interiors found in bourgeois homes. This enforces the perception that the elements that make up our curated surroundings, as well as the resources required for survival, can be cordoned off, carried, and encapsulated within a series of impermeable categories.

3.2 The Atmosphere as Fluid Mobility

Understanding the atmosphere and making it portable give Nemo the power to move between categories of knowledge. In the same way that Nemo can travel between catalogues of facts and things, his underwater existence allows him to break across the two-dimensional surface of the earth’s planes. Underwater travel is similar to air travel in that both shun the tyranny of surfaces and shift to a vocabulary of immersion and multi-directional physical motion. In the Nautilus, the potential for travel emanates from all sides, along all angles of the ship’s hull. The submarine can move along a vertical axis as well as the horizontal planes etched into the compass: above, below, and diagonal trajectories are suddenly available. Directions are opened up and become more than descriptive categories—they are spatial openings that allow the Nautilus to move and, like the ocean, fluidly navigate currents below continents and icebergs.

The Nautilus’s innovative design allows atmosphere and water to trade places, hinting at their life-giving connectivity and similarities. Such a reversal is especially evident after Nemo brings Aronnax out of the submarine and onto the ocean floor for the first time:
The terrestrial atmosphere and the aqueous one are practically interchangeable. Water does not hinder Aronnax physically, and he is free to wonder at the marvels before him. Above, the “calm surface of the sea” mirrors the vault of the sky, clear and blue. Aronnax is like a Russian doll, nestled within a larger system. First, he is safely ensconced within his suit, which pumps air to his lungs and allows him to move within a secondary casing, that of the ocean. Finally, the ocean itself is contained within the larger terrestrial atmosphere. (In Larousse’s words, it is a case, un étui.) Even Aronnax’s breath within the diving suit is returned to the Nautilus; it is not expelled as an air bubble into the water. His respiration’s invisibility reinforces the illusion that the ocean is nothing more than a denser kind of air, an extreme thickening of the atmosphere. This illusion pulls down the sky and transposes it upon the ocean. These different layers, seen from the bottom of the ocean floor, flatten the differences between the ocean and the sky; it all becomes an overarching blue vault. The ocean briefly replaces the atmosphere as the life-giving medium. The scale of things

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collapses underwater, as these layers are transposed and smoothed out into a sweeping erasure of spatial limitations and a simultaneous extension of conquerable territory.358

The Nautilus’s and, by extension, Captain Nemo’s movement underscores the state of being immersed in the very substance that can be defined as the archetype of movement: *Mobilis in mobile*, “movement in the moving element.”359 The saying is even embossed on the submarine’s cutlery, a permanent marker that reminds Aronnax and his friends that this ship’s entire existence is based on constant movement, the condition of continuous change. As Serres says, Verne “dispose de la mobilité du déplacement physique dans son sous-marin, mais aussi d’une sorte de mobilité idéologique. *Mobilis in mobile* traduit en science, technique et dans le concret l’idéal de la liberté.”360 [“He possesses the mobility of physical movement in his submarine, but also has a kind of ideological mobility. *Mobilis in mobile* translates liberty’s ideal into science, technique, and into reality.”] Such mobility generates freedom, both political and intellectual, that refuses imposed boundaries and instead diffuses them through a fluid, flexible medium. Read in conjunction with Larousse’s definition of the atmosphere—which is explained, first and foremost, as mobility itself—Nemo’s motto suffuses *Vingt Mille Lieues sous les mers* with an atmosphere that is entirely its own, separate

358 This scene is especially evocative when read alongside Leandro Erlich’s “Swimming Pool” (1999), a brilliantly simple art installation: an underground swimming pool, its walls painted the shade of a robin’s egg, is covered by a sheet of glass. A thin stream of water runs over the glass. Visitors who explore the pool’s interior can gaze at those who stand around its edges, or vice-versa; in both cases, the other side of the transparent, aqueous division appears as a hazy blur. The piece’s humour lies in standing at the bottom of the pool without having to get wet. As an interactive exhibit, “Swimming Pool” allows us to live at the bottom of a watery world for a moment and without having to sacrifice the comforts associated with being on dry land. It is a physical manifestation of an experience that Jules Verne described over a century earlier.

359 Butcher’s notes on the Nautilus’s famous motto specify that in Latin, ‘Mobilis’ means “nimble, mobile, lively; shifting, varying, changeable; inconstant, or fickle’ and thus ‘Mobilis in mobile’ can be translated as ‘Mobile in the mobile element’ or ‘Changing within change.” In Jules Verne, *Twenty Thousand Leagues under the Seas*, 392-93.

from the solidity of the earth’s surface and yet attached to its flanks, indivisible from the very substance it shuns.

Aronnax and his companions are firmly ensconced within a staggered set of containers: whether it is the diving suit, the Nautilus, or the impenetrable secrets that Nemo keeps, *Vingt Mille Lieues sous les mers* features a series of imbricated atmospheres. Whereas the earth’s atmosphere—perceived as a fluid that occupies fluctuating states in multiple environments—acts as a continuum along multiple axes, these tonal atmospheres create the illusion of a separation between people and their surroundings, complicating relationships between individuals and the environment by aborting the potential for interchange within a greater system.

In this sense, the Nautilus occupies the space that marks the fantasy of division, but that can never truly divide. The space where the atmosphere becomes denser is where the Nautilus comes to rest on top of the waves of the ocean, as if straddling the shaded area that separates waves from clouds:

> Pendant plusieurs heures, le Nautilus trancha de son éperon ces flots blanchâtres, et je remarquai qu’il glissait sans bruit sur cette eau savonneuse, comme s’il eût flotté dans ces remous d’écume que les courants et les contre-courants des baies laissaient quelquefois entre eux.
>
> Vers minuit, la mer reprit subitement sa teinte ordinaire, mais derrière nous, jusqu’aux limites de l’horizon, le ciel, réfléchissant la blancheur des flots, sembla longtemps imprégné des vagues lueurs d’une aurore boréale.

[For several hours, the Nautilus’s prow cut the whitish waves, and I noticed that it floated soundlessly over the silky water, as if sliding over those foamy areas sometimes produced in bays by the collision of currents and counter-currents. At about midnight the sea suddenly resumed its normal colour, but behind us, as far as the eye could see, the sky reflected the whiteness of the waves for a long time as if filled with the dim gleams of an aurora borealis.]

361 Verne, *Vingt Mille Lieues*, 301-2 [187].
Here, the Nautilus is doubly in between. As the sky takes on the characteristics of the milky waves, it becomes difficult to determine where the atmosphere ends and where the water begins. The sea reflects and refracts the sky’s dying light, which mirrors the white gleams and produces a new kind of aurora borealis. Unlike the northern lights that shone over Lucy Snowe in Brontë’s *Villette*, and which signaled a message that knowing readers could interpret, this display has no veiled meaning. The atmosphere turns in upon itself, thickened and extended beyond the horizon’s limits. The Nautilus floats over the water, cutting across the foamy middle that transcends the fine line between liquid and gaseous. The submarine slices through this interstitial space until midnight—the point in time that is the most in-between—and ceases to make sound, quietly tearing a line through the interminable whiteness of its nautical and aerial atmosphere, both fluid and encompassing. The Nautilus occupies a frothy space that comes into existence as two substances—air and water—imperfectly blend with one another, and marks the continuum between the atmosphere’s varying densities.

Constant movement is nearly impossible—even the moving element sometimes solidifies, as when the South Pole’s ice makes both the atmosphere and the ocean freeze. A hardened state is precisely what Nemo seeks to avoid in his refusal to set foot on solid ground; its rigid crust is still a fertile environment for tyrants and despots, whereas below the sea “[leur pouvoir cesse, leur influence s’èteint, leur puissance disparaît!”[^362] [“their power ceases, their influence fades, their authority disappears.”] Scholars have noted that Nemo’s desire to immerse himself in the sea stems from a desire to be within an element that he

[^362]: Ibid., 118 [68].
perceives to be the most free of all. However, water’s movement can be stopped, and even the mobile element can change into a fixed one when it is frozen; similarly, Nemo’s pursuit of freedom transforms him into a tyrannical ruler who keeps prisoners and commands his ship with absolute authority.

Nemo wants to separate himself completely from solid land, which opposes his *Mobilis in mobile*. The sea is the moving element that surrounds immovable landmasses, yet the atmosphere encompasses both. The air Nemo breathes becomes an invisible but omnipresent umbilical chord that both surrounds and fills the Nautilus, despite many efforts to totally break from the Earth’s surface. The atmosphere aborts the radical caesura that Nemo seeks to enact—it is inescapable, because it is necessary to human existence. Nemo’s tanks must still syphon the atmosphere below the material sea. In its periodical trips to the surface, the Nautilus punctures the false bottom that creates the illusion of impermeable boundaries that the ship’s contents, in their endlessly categorized and unchanging order, seek to perpetuate.

4 Experiencing Immersion

4.1 Sounding the Depths of the Ocean

In *Vingt Mille Lieues sous les mers*, as in the novels of Charlotte Brontë, Charles Dickens, and Elizabeth Gaskell, sound brings the fact of immersion to the forefront. Though the atmosphere is invisible, its presence enables hearing. Water is a better conductor of sound than air. Beneath the waves, the auditory becomes a reminder of the atmospheric. When

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Aronnax explains atmospheric pressure to Ned Land, it becomes clear to the harpooner that the invisible substance that surrounds him also penetrates him, as well as all living things. In this sense, the atmosphere’s presence enables hearing; the auditory is inherently connected to the atmospheric. Ingold suggests that the “ear builds a bridge which allows a two-way flow of sensory traffic. […] The space of hearing, then, is not set over against you, the listener, but streams towards you and into you.”

Moving from the visual to the aural is akin to a “transition from a static to a fluid medium.” In a context wherein the very cause of hearing was attributed to the atmosphere’s elastic fluidity, as previously discussed, Ingold’s choice of words is especially revealing. The atmosphere’s invisibility is secondary when its aural qualities are foregrounded.

This highlights the physical properties of sound and sea. Both signal immersion, a total physical participation that, like the ethereal qualities of the atmosphere, forces the temporary negation of divisions between the self and the environment and binds bodies to their surroundings. Underwater, even walking on the seabed produces sounds of an “intensité étonnante” [“astonishing intensity.”] As Aronnax explains, “Les moindres bruits se transmettaient avec une vitesse à laquelle l’oreille n’est pas habituée sur terre. En effet, l’eau est pour le son un meilleur véhicule que l’air, et il s’y propage avec une rapidité quadruple.”

“The slightest sounds were transmitted at a speed to which the ear is not accustomed on dry land. The reason is that water is a better conductor of sound than air, and transmits it four

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365 Ibid, 266.
366 Verne, *Vingt mille lieues*, 185 [110-1].
367 Ibid., 185 [110-1].
times as quickly.”] The underwater world is a space of unprecedented sensory immediacy, which blurs boundaries and confuses the progression of time.

Sound’s movement across dense space further transcends the blurred lines between the self and the environment. Aronnax’s immersion affords him heightened aural perception. He does not see the rain, but hears it; mobile in the moving element, sound travels through water and surprises Aronnax:

Tout en avançant, j’entendais une sorte de grésillement au-dessus de ma tête. Ce bruit redoublait parfois et produisait comme un pétillement continu. J’en compris bientôt la cause. C’était la pluie qui tombait violemment en crépitant à la surface des flots. Instinctivement, la pensée me vint que j’allais être trempé ! Par l’eau, au milieu de l’eau ! Je ne pus m’empêcher de rire à cette idée baroque. Mais pour tout dire, sous l’épais habit du scaphandré, on ne sent plus le liquide élément, et l’on se croit au milieu d’une atmosphère un peu plus dense que l’atmosphère terrestre, voilà tout.  

[While walking, I heard a sort of sizzling sound above my head. The noise sometimes got much louder and became a continuous crackling. I soon understood the reason. It was rain, pattering violently down on the surface of the water. Instinctively the thought came to me that I was going to get wet! Being rained on underwater: I couldn’t help laughing at the strange idea! But to tell the truth, in the thick clothing of the diving suit I no longer had any sensation of being underwater, and only felt as if I was in an atmosphere slightly denser than on land.]

The atmosphere’s continuity removes the spatial otherness that being underwater can afford.

Walking along the ocean floor is no different than walking along the street—only if you get caught in the rain, now you won’t get wet. As the raindrops pierce through the ocean’s surface and return to the starting point of their hydrological cycle, they make one last sonic impression on those who would listen. Sound penetrates the suit’s protective barrier—it further erases the gaps that the Doctor’s vision, for instance, maintains in perceiving objects that remain removed, physically, from his body. Sounds and bodies commingle, both
becoming hypermobile in their fluid surroundings. The rain’s “sizzling” and “crackling”
travels through the water and the thick diving suit to alert Aronnax to the weather; yet the sky
is no longer above—it is around, and the ocean is the primary medium.

Sonically as well as physically, Nemo pushes himself away from land. In the final
pages of the novel, as Aronnax hides from the Captain before attempting an escape, he
overhears Nemo’s musical lament: “En ce moment, j’entendis les vagues accords de l’orgue,
une harmonie triste sous un chant indéfinissable, véritables plaintes d’une âme qui veut briser
ses liens terrestres. J’écoutai par tous mes sens à la fois, respirant à peine, plongé comme le
capitaine Nemo dans ces extases musicales qui l’entraînaient hors des limites de ce
monde.”369 [“Suddenly I heard distant chords from the organ, the sad harmony of an
indefinable tune, the veritable complaint of a soul wishing to break all ties with earth. I
listened with all my senses, hardly breathing, plunged like Captain Nemo into musical
ecstasies that carried him beyond the limits of this world.”] Aronnax listens with his entire
body and his entire being. Nemo’s song plunges its listeners into an affective atmosphere that
communicates all that is ineffable. His music telegraphs one of the atmosphere’s secondary
definitions, that of the “Air d’un pays, d’un lieu, air dans lequel on vit habituellement” [“The
air of a country, of a place, air in which we habitually live”]. In a turn of phrase that puns on
the French definition of air, which in this case can mean both the air that we breathe and a
musical tune, Nemo’s melody creates an affective atmosphere and reinforces the looping that
defined the nineteenth-century understanding of aural phenomena as being the result of the
atmosphere’s elasticity. Sound, as a wave that travels faster in fluid, readily lends itself to the

369 Ibid., 593 [377].
thickened atmosphere of the ocean. Here, sounds are as much a part of the fluid as they are a
product of its elasticity.\textsuperscript{370} The organ’s music, Nemo’s parting song from beneath the waves,
is akin to whale song: it carries a message that is incomprehensible to our ears, but still
evokes an emotional response.\textsuperscript{371}

4.2 Weather Events as Liminal Spaces

Nemo exists in a permanent state of immersion that binds him to the weather as much as it
keeps him in the ocean. He finds the compatible traces of his being in the intermingled
atmosphere, charged with different forces, wreaking havoc on land and in the sea:

\begin{quote}
A dix heures du soir, le ciel était en feu. L’atmosphère fut zébrée d’éclairs violents. Je
ne pouvais en supporter l’éclat, tandis que le capitaine Nemo, les regardant en face,
semblait aspirer en lui l’âme de la tempête. Un bruit terrible emplissait les airs, bruit
complexes, fait des hurlements des vagues écrasées, des mugissements du vent, des
éclats du tonnerre. Le vent sautait à tous les points de l’horizon, et le cyclone, partant
de l’est, y revenait en passant par le nord, l’ouest et le sud, en sens inverse des
tempêtes tournantes de l’hémisphère austral.

Ah ! Ce Gulf-Stream ! Il justifiait bien son nom de roi des tempêtes ! C’est lui
qui crée ces formidables cyclones par la différence de température des couches d’air
superposées à ses courants.\textsuperscript{372}
\end{quote}

[At ten o’clock the sky appeared to be on fire. The air was sundered by powerful flashes of lightning. I could not stand the light, but Captain Nemo contemplated them]

\textsuperscript{370}As I note in Chapter I, sound was understood as being the result of the atmosphere’s elastic fluid, which
snaps against eardrums.
\textsuperscript{371}Michel Serres has made the connection between Nemo’s desire for perpetual movement and music more
broadly. He considers Mobilis in mobile to include the musical significance of the refusal to end a movement:
“Ce mobilis in mobile, Chopin le fait entendre dans son Étude opus 25 numéro 2. Au lieu de composer un
mouvement, lent, rapide ou accéléré, à l’intérieur d’un cadre fixe, il écrit une partition en turbulence, tournant
sur elle-même, comme une sorte de mobile sans référence. Chopin fait ouïr cette double fluence. Aligné sur la
devise de Nemo, tout le XIXe siècle entend cette étude de Chopin.” \[“This is the same mobilis in mobile that
Chopin makes us listen to in his Étude, Opus Two, Number Twenty-Five. Instead of composing a movement,
slow, fast or accelerated within a fixed framework, he writes turbulent music that spins on itself, like a kind of
mobile without reference. Chopin makes us hear this double fluency. Aligned with Nemo’s motto, the whole
nineteenth century hears Chopin’s Étude.”\]
\textsuperscript{372}Verne, \textit{Vingt mille lieues}, 562 [357].
face on, as if drawing the soul of the storm into him. A terrifying sound filled the air, a complex sound composed of the roar of crushed waves, moans from the wind, and peals of thunder. The wind turned to all points of the compass, as the cyclone, which had started from the east, went back there after turning through north, west, and south, having rotated the opposite way from the storms of the southern hemisphere.

Ah, the Gulf Stream! It fully justified its name of Ruler of the Storms!

Nemo and the elements undergo a reversal. The waves and the wind take on human characteristics, moaning and roaring around Nemo, who seems to inhale the storm in order to become it. This is not the kind of wind that carries messages (as it does in Brontë’s novels). Rather, the elements are personified and shrink to a human scale while Nemo expands to absorb the very qualities of the storm. In this moment, the boundaries between humans and weather systems are porous. The wind jumps from one direction to the next, confusing the air and turning the atmosphere into an experience that engages the entire sensorium where elemental media meet. Solid earth and landscapes separate categories of existence by giving the illusion of stasis; Nemo’s presence fractures this illusion, as he seems to capture the storm inside him with every breath he takes. In seeking to separate himself from the world and from solid earth, Nemo binds himself to the atmosphere.

Being physically submerged in one’s environment—which can occur in water or in the air, as long as the body is constantly immersed—is to become part of a phenomenon. The separation between the physical self and the weather is erased when bodies are in the atmosphere, when they share the same arena as the weather: “hearing thunder, or feeling the wind, it is as though one’s very being mingles with the surrounding medium and resonates with its vibrations.”

Throughout the storm, the boundaries that separate Nemo from the weather are blurred as sounds rush through the atmosphere and the distinctions between

clouds and waves become ever more mixed. He is one with the atmosphere, whether it is in a watery state or a turbulent manifestation:


[But the sky was becoming more and more threatening. Signs of a hurricane were approaching. The air was turning pale white, even milky. The fine sheafs of cirrus on the horizon were being replaced by strata of nimbo-cumulus. Other low-lying clouds were quickly fleeing. The sea was roughening as it rolled in in long swells. The birds were disappearing, with the exception of the petrels, which revel in storms. The barometer was lowering markedly, showing an exceptional amount of moisture in the air. The contents of the storm-glass were decomposing with the electricity filling the air. A battle of the elements was nigh.]

Nemo, this “nobody,” does not represent nothingness; rather, his constant movement, alongside his desire to live “au sein des mers”[^375] [“in the heart of the sea”], enables him to become the ultimate extension of the atmosphere in all of its fluid and menacing possibilities. Nemo takes part in the very storm that could destroy him, a key player in the theater of the elements. As the weather intensifies and Nemo straps himself to the Nautilus’s platform to participate in the storm, Aronnax seeks the comfort and safety of the submarine’s living room. Yet being in the Nautilus muffles everything; it is an envelope that covers and protects, but also imposes itself to prevent its occupants from becoming part of their surroundings. Nemo refutes the division that would seek to contain and separate the atmosphere from itself; instead, he chooses to break through boundaries by becoming part of

[^374]: Verne, *Vingt mille lieues*, 569 [355].  
[^375]: Ibid., 118 [69].
the weather systems while his men remain tucked away in the safety of their compartments. As Nemo transcends the parameters imposed by habitats, maps, and national territories, his relationship with the Nautilus illustrates, more broadly, how the atmosphere resists categorization. The fluid atmosphere pushes through, overflows, infiltrates, and seeps out. The limits that humans craft to keep this fluid separate from themselves are, ultimately, pierced by the cyclical forces that dictate atmospheric phenomena.

Thus, humans are enclosed within a system that remains separate yet necessary. Occupying the shell is what gives it meaning; empty, it is full of possibilities—this is like science itself, or the metaphor of all that we know. The end of the novel is itself open-ended, mirroring the imperfect circuit that cannot close if it is to thrive. The fragile equilibrium is broken in the novel’s final scenes, where the Nautilus encounters a vortex and finds that the centre cannot hold.

The maelstrom, where “De tous les points de l’horizon accourent des lames monstrueuses” [“Monstrous waves rush in from all points of the horizon,”] claims the Nautilus. The “funnel” it forms—known as “le Nombril de l’Océan”³⁷⁶ [“the navel of the ocean”]—combines the powers of the ocean into an unstoppable force that opens the bottom of the sea to the sky, the walls of water opening up to divide the previously united realms. This vortex shows how the closed circuit shrinks upon itself, multiplies its own forces and buckles under the pressure of its own weight. The ocean’s constant circulation and re-circulation is crystallized in the movement of the waves that rush in from all directions, exacting enormous pressure and causing irreparable damage. This hurricane of the ocean is a

³⁷⁶ Ibid., 595 [355].
large-scale event that highlights the ocean’s relationship to the atmosphere and forces us to confront their common fluidity. It points to the danger of living in a closed system that endlessly recuperates itself, swirling continuously until an opening is created. In the maelstrom, Verne invokes the constant mobility and the deep ignorance that pervades our understanding of the ocean, and of the world. The Nautilus as umbilical cord is severed in the ultimate storm, which bears down upon the submarine’s walls and forces its captured passengers out.

In the maelstrom, the Nautilus shrinks to nothing more than a closed atmosphere, a bubble floating through the seas, no longer impervious to outside pressures and a casualty of the movement in the moving element that defines its very existence. The ship’s fate, however, is unclear; while Aronnax and his friends use the maelstrom to escape from Nemo, they leave the Nautilus as it shakes and groans in the midst of a turbulent vortex. Its destiny is unknown, as it is tied to Nemo’s mortality and may very well be dashed to pieces at the bottom of the ocean, now opened to the blue sky by the maelstrom’s spiralling eddies.377 In this closing scene, the Nautilus can reach its full potential. In Barthes’s words, “Il n’y a qu’un moyen d’exorciser la nature possessive de l’homme sur le navire, c’est de supprimer l’homme et de laisser le navire seul; alors le bateau cesse d’être boîte, habitat, objet possédé: il devient œil voyageur, frôleur d’infinis; il produit sans cesse des départs.”378 [“There is only one means to exorcize the possessive nature of the man on a ship; it is to eliminate the man and to leave the ship on its own. The ship then is no longer a box, a habitat, an object

377 Until it reappears in L’île mystérieuse, which was serialized from 1874 to 1875 and was published as a novel in 1875.
378 Barthes, “Nautilus et bateau ivre”, 92 [67].
that is owned; it becomes a travelling eye, which comes close to the infinite; it constantly begets departures.”] The maelstrom is the only force that stands to sever the Nautilus from its surrounding atmospheres; its nickname, the “navel of the Ocean,” aptly points to the physical mark that results from cutting the umbilical chord. It also speaks to the exchange at play in the broader system of beings and environments. In trying to separate parts of the atmosphere from their whole, Nemo discovers that such an enterprise is impossible; the atmosphere is always already everywhere, the ultimate closed system that forecloses the possibility of another.

Scholars have suggested that the constant change offered up by an unchained existence under the sea threatens the political order imposed by the arbitrary political lines drawn across the two-dimensional globe.379 And this is certainly relevant, especially considering the politically loaded drafts that Verne and his editor debated at length. The unlimited freedom the Nautilus represents holds the power to topple, from beneath the ocean, the established boundaries that are held aboveground. Captain Nemo can move beyond the moving element, and his ability to do so ripples across the fluid space of the ocean. The seemingly separate, self-sufficient Nautilus is connected to the very systems it has forsaken. Simultaneously, the Nautilus’s enclosed nature (its “egg-like” hermetically sealed fullness, as Barthes writes) perpetuates the myth of perfect severance by furthering the belief in a membrane, or in the spatial containment offered by bodies, clothing, and vehicles.

379 In the introduction to his English translation of the novel, Butcher discusses Verne’s original plans, as outlined in his early manuscripts, to showcase Nemo as a man who must fight against the rest of the world. See also his article, “Hidden Treasures: The Manuscripts of ‘Twenty Thousand Leagues’” Science Fiction Studies 32 (2005).
5 Camille Flammarion’s Unifying Atmosphere

The atmosphere is, in fact, a closed system. It is not connected to an external source that could renew its carbon dioxide levels. This finitude was understood during Verne’s lifetime, though its representation in *Vingt Mille Lieues sous les mers* speaks to the atmosphere’s transformation from a totalizing, unifying force to a demystified substance that can be converted into a commodity.380 Among the popular scientific texts that circulated in England and in France and that Verne catalogued in his collection of notecards, Camille Flammarion’s works on meteorological phenomena, astronomy, and popular physics were some of the most well-received and widely translated studies. Flammarion’s *L’Atmosphère* (1871, the same year that Jules Verne’s *Vingt Mille Lieues sous les mers* was first released as a richly illustrated octavo) opens with a preface that reveals the period’s perception of the singular experience of living within an element that cannot be seen but is most certainly felt:

> L’Atmosphère fait vivre la Terre. Océans, mers, fleuves, ruisseaux, paysages, forêts, plantes, animaux, hommes, tout vit dans l’atmosphère et par elle. *Mer aérienne répandue sur le monde, ses vagues baignent les montagnes et les vallées, et nous vivons au fond de cette mer, pénétrés par elle. C’est elle qui glisse en vivifiant fluide à travers nos poumons qui respirent, ouvre la frêle existence de l’enfant qui vient de naître, et reçoit le dernier soupir du moribond étendu sur son lit de douleur.*381

[The Atmosphere gives life to earth, ocean, lakes, rivers, streams, forests, plants, animals, and men; in and by the Atmosphere every thing has its being. *It is an ethereal sea reaching over the whole world; its waves wash the mountains and the valleys, and we live beneath it and are penetrated by it.* It is the Atmosphere which


makes its way as a life-giving fluid into our lungs, which gives an impulse to the frail existence of the new-born babe, and receives the last gasp of the dying man upon his bed of pain.]382

James Glaisher, a meteorologist working at the Greenwich Observatory, edited the English edition383 of Flammarion’s book, which was published in London in 1873. In both languages, the preface does more than introduce scientific observations; it also underscores how the atmosphere, understood as a life-giving ubiquitous element, has the power to transcend boundaries. The opening line says it all: without the atmosphere, there would be no life. The fluid that surrounds humans is effusive and absorptive—it is a closed system that envelops, glides, embraces, and includes everyone and everything. The atmosphere, as an ethereal sea, maintains an aura of invisible omnipotence and established structure. Like the sea, it is a fluid force; and yet like the air, it is invisible to the naked eye.

The 1888 edition of Flammarion’s *L’Atmosphère* features a famous engraving of a man leaning forward through the vault of the sky to peer at the wonders beyond. The caption explains that the image is based on the story of a missionary from the Middle Ages who claimed to have found the point where the earth and sky touched.384 His head, his right hand, and the tip of his walking stick pierce through a dark line that looks like the atmosphere’s

382 In the Preface to the first edition, modified over the years, James Glaisher declares: “The science of the Atmosphere is the question of the day. We are just now, in regard to this study, in an analogous situation to that of modern Astronomy in the days of Kepler. Astronomy was founded in the seventeenth century. Meteorology will be the work of the nineteenth,” 6.
383 W. F. Barrett’s review praises Glaisher’s work as an editor: “the value of the original work is considerably increased by the careful revision […], and the additions by [Glaisher] of many useful foot-notes.” Barrett adds that the “tendency of M. Flammarion, like other popular French writers, to run into grandiloquent language, has been in general suppressed; though still a few cases remain that might well have been pruned.” Passing references to the “appropriate condensation and excision” of the original work’s “unwieldy size” aptly mirror the severe cuttings that Jules Verne’s novels underwent in their translations from French to English. As Barrett notes, Glaisher also converted all the French data—offered in centigrade and based on measures taken in Paris—into English measures and locations. W. F. Barrett, “Flammarion’s Atmosphere” Nature (May 8, 1873): 22.
384 See Appendix VI.
skin—a shell that contains the stars, the earth, and a sun that looks on the traveller with mild curiosity. The head is separated from a body that remains in its native element, but it seems as though the man stumbled upon the end of this boundary accidentally: beyond this first membrane lies an endless series of other varying strata, distant clouds, strange orbs, and spinning wheels. This traveller is like Nemo in his desire to seek the point of separation, the specific site where the world’s ecosystem ends. The man in the woodcut precipitates the first puncture, which cascades into the potential for an endless series of perforations. We are left to wonder if the wanderer stayed on either side of the boundary, too scared by the prospect of releasing one substance into the other, of causing an unprecedented atmospheric hemorrhage. Nemo’s attempt to separate himself from his surroundings enacts a similar wound—that of a caesura—that the atmosphere must bear. *Vingt Mille Lieues sous les mers* transforms the atmosphere from an actor that influences a collective whole into a portable element that serves individuals.

At the conclusion of his treatise on the atmosphere, Flammarion describes the earth’s position relative to the entire universe by comparing our planet’s course around the sun to the course of a lead weight dropped into a bottomless abyss. After thousands of years, the weight would have travelled a great distance—and yet this distance would be nothing at all, as it is relative to an infinite space and becomes, as a result, equivalent to stasis. Still, we are reassured that our own smallness is not insignificant. After all, the atmosphere is in everything, becomes everyone, and recuperates all that it contains: everything is involved in the cycle “entre les produits de la nature et les flots mobiles de l’Atmosphère”385 [there is “a

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continuous exchange between the products of nature and the moving flood of the atmosphere.”] We are within it as much as it is in our own bodies; faith in membranes only ever produces temporary relief at the cost of splitting ourselves from the beings that are equally immersed. We are all, then, *mobilis in mobile*. Entering into a communion with the atmosphere allows for an affective opening that binds human bodies to our external environment and incorporates us within natural cycles.

A liquid atmosphere transforms the air into a sea of currents; that which is invisible no longer connotes emptiness, but rather becomes a force that absorbs all output and redistributes it across an all-encompassing system. Greater awareness of our place within this fluid world transforms our very surroundings from spaces that can be filled with the by-products of human activity to a delicate, reverberating network. This presence is what distinguishes the nineteenth century’s explanation of the atmosphere from our current understanding of the air as a gas, which transforms the atmosphere into a substance that surrounds bodies but also remains separate from them. Steven Connor describes our current condition as being surrounded by air “as you would be surrounded by a room or a house. But you are not yet, nor ever will be, on the inside of air. In the air, you are only ever out.”

If the atmosphere is a fluid, however—and one that fills in all of the tiny gaps between its own atoms, rendering interstices obsolete—it is within our bodies as much as it is without them. The flow of currents envelops everyone and everything, but everyone and everything also contributes to the atmosphere’s sweeping expansion by adding their own effluvia (be it breathy or otherwise) to the bottomless aerial ocean.

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As Williams explains in her study of the metaphorical and material potential of the subterranean, the world that lies beneath the surface is a space loaded with seemingly unlimited potential for scientific and self-discovery.\(^\text{387}\) This is especially remarkable in the nineteenth century, when unprecedented and expansive digging laid hundreds of kilometers of underground pipes, railroad tracks, subway systems, and sewers. For Williams, “the triumphs of modern industrial and urban life arise from connections buried below the surface of the earth.”\(^\text{388}\) To dig is to become evermore in between, surrounded by the walls of a tunnel that bears down upon the body with unrelenting pressure. And yet the perception of the earth’s hard surface as the uppermost level of our environment is illusory. As Williams evocatively reminds us, the “real surface of our planet is the upper edge of the atmosphere, beyond which lies the frigid and uninhabitable realm of outer space. We have always lived below the surface, beneath the atmospheric ocean, in a closed, sealed, finite environment, where everything is recycled and everything is limited.”\(^\text{389}\) The language Williams uses to describe the weathered world—the atmospheric ocean—echoes that of the scientists of the nineteenth century, who explained the invisible yet omnipresent atmosphere in terms of its fluidity. The interplay between atmospheric and oceanic fluidities highlights the tenuous imposition of boundary lines. As one critic has said, it is worth remembering that we are “breathing in the atmosphere into which [other, long-dead] breath has passed and in which it, along with a few molecules from Caesar’s final exhalation (to say nothing of Descartes’s

\(^{387}\) Williams, *Notes on the Underground*, 52.

\(^{388}\) Ibid., 52.

\(^{389}\) Ibid, 212.
farts), remain suspended. Because we breathe, being is shared.” Our emanations are endlessly recuperated and connected within a broader ecological framework that connects all living things.

Conclusion
Rediscovering the Atmosphere

“The thing to remember about the atmosphere is its size. A little air is so thin, so fluid; in small amounts it can slip about so rapidly, that the conditions which give rise to a hurricane cannot be reproduced on a small scale. In trying to explain a hurricane, therefore, one must describe the large thing itself, not a model of it. For it is only when one thinks of the hugeness of a parcel of air on the world, the big distance it may have to shift to equalise some atmospheric difference, that one can realise how slow and immobile, regarded on a large scale, the air is.”

-In Hazard, Richard Hughes (1938)

Whereas Brontë’s novels feature the atmosphere as a complex system of signs that bear a direct relationship on heroines’ individual lives, Dickens’s atmosphere shrinks as it is overrun by the byproducts of the industrial revolution. The atmosphere shrinks even further in Verne’s novel, where it becomes a portable commodity. Over the course of twenty-five years, the atmosphere’s global bearing—its vast presence, an envelope for the world, a mysterious series of forces that influence, somehow, human lives—shrinks until it matters only on an individual scale. The atmosphere stops being an indecipherable fluid that covers the world and unites its inhabitants; instead, it is sucked into the orbit of the individual consumer who requires it to live.

On the first of March in 2016, a snowstorm descended upon the Greater Toronto Area. Weather reports had anticipated its arrival and many media outlets were reporting a major alert. Commuters were told to expect delays in the evening, as the snowfall was expected to reach up to forty centimeters. Drivers were encouraged to exercise caution. Overnight temperatures were expected to drop considerably below zero, forcing homeless people across the city to seek shelter in special centres that would remain open longer than
usual. At approximately 5:30PM, big fluffy snowflakes began to land in the downtown core and quickly blanketed the city. Traffic diminished as the storm advanced, and pedestrians became scarcer as the night progressed and the snow accumulated on normally busy sidewalks.

Online, images and descriptions of the weather quickly aggregated. People living in Toronto’s suburbs sent photographs of their yards to 24-hour news channels, which broadcast notable images across their media networks. In the morning, as the storm abated and left a layer of snow upon the ground, environmental reporters looked to the internet in search of a fresh crop of tweets, Facebook statuses, Instagram posts, and Snapchat videos that featured footage of the snow and its aftermath: children playing and animals running in the snow became fast favourites among viewers. In a cycle that began in a meteorological cloud and ended in a data cloud, a feedback loop had been formed.

As John Durham Peters points out, the term “media” was long understood to refer to the natural elements: water, earth, fire, air. Its meaning shifted as the industrial revolution progressed and grew to include new forms of technology, eventually reaching the meaning we attribute today to different forms of media, these pluralized definitions and forms of representation that carry with them a history of fluidity, flexibility, change, and motion. Sustained focus on elemental media, as Peters calls them, reveals the conceptual bridges that were built in the mid nineteenth century to relate to a changing environment. The meaning of media is crucial now more than ever, since, as Peters notes, “our most pervasive surrounding environment is technological and nature […] from the ocean floor to the atmosphere—is

391 Peters attributes this observation to Jochen Hörisch’s *Ende der Vorstellung: Die Poesie der Medien* (Frankfurt: Suhrkamp, 1999), 134.
drenched with human manipulation.” For Peters, the atmosphere is an elemental medium. It mediates our existence in a series of exchanges that occur on the microscopic and macroscopic level: the atmosphere allows us to live, and its presence has determined our existence—from the way our cells function under constant pressure to the large-scale weather systems that influence migration, habitation, and survival.

Media are often passed over as the background and props that allow the real action of human existence to take place. Peters evocatively reminds us that “Media, as things in the middle, are often regarded as being of secondary importance to the meanings we consciously construct, but media usually harbor the deepest and greatest of meanings.” The meanings we construct to interpret and explain the atmosphere, an elemental medium, reveal a complex history that enmesh human emotion, technology, industry, and a perpetual quest to discover humankind’s role in a weathered world. It also highlights how deeply uncomfortable it is to remember the fact that the atmosphere is a finite substance, one that is endlessly circulated, contaminated, cleaned, and shared among all creatures and things on the planet.

I am reminded of the work of Teresa Margolles, a Mexico-based artist. In one of her installations, called “Vaporización” [“Vaporization”] (2002), the water used to clean unclaimed corpses from Mexico City’s morgue was purified and diffused in a small space bounded by thick curtains. The room felt like a sauna, but the steam’s source wasn’t immediately apparent to the person walking into the room. Hot mist filled the air, the space, and then their own bodies. It is only once the participant reached the explanatory plaque that

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393 Ibid., 6-7.
they would realize that breathing meant inhaling water that washed over dead bodies. In SOMA Magazine, Franklin Melendez notes, “Vaporización […] seems like a conceptual meditation” until it is “suddenly transformed into a visceral encounter with the other side, with the physical residue of those who have been claimed, often anonymously, by the urban bustle.”³⁹⁴ Margolles’s piece is also a reminder of our atmosphere’s finitude. After all, molecules that once passed through our ancestors’ bodies are now circulating around the globe, being brought in and out of so many lungs, circulating in the hydrological circle that connects the atmosphere to the ocean. The rain that flowed downhill from the Brontë Parsonage, touched corpses and snaked its way into Haworth’s drinking supply is still present in the water we consume today, only it has taken on many different shapes and passed over countless other bodies and surfaces. (It could be a cloud in Spain or a light shower in Thailand.) Margolles’s installation renders the co-mingled and inter-mingled fact of life to the forefront. The atmosphere, thickened by tiny drops of shared water, is an amplification of a reality that we are quick to forget.

Remembering that the atmosphere is limited, recycled, and necessary to animals, plants, and objects other than ourselves requires an openness to global intimacy. As Charles Babbage wrote in 1837, “if the air we breathe is the never-failing historian of the sentiments we have uttered, earth, air, and ocean, are in like manner the eternal witnesses of the acts we have done.”³⁹⁵ Climate change confirms that the earth, air, and ocean record the way we influence the atmosphere and show our actions back to us in increasingly unpredictable and

violent patterns. Though it may be invisible, the atmosphere still retains traces of our actions and of our breath in its very composition.

The things we use to mediate the atmosphere speak to its enduring resistance to being pushed aside, reduced to a cliché or to a convenient form of shorthand for expressing emotion. Instead of raising copies of Henderson’s *Meteorography*, we increasingly hold up our smartphones to the sky and ask them: “What will the weather be like today?” My phone can track my location and a human-like voice replies, in a matter of seconds, with a description of the forecast. I take pictures of sunsets and landscapes and store them “in the cloud,” an ethereal location that is created by a series of satellites and networks but that is conceived of in meteorological terms. The data cloud floats above my head and I mediate its information with my devices. And in the same way that *Household Words* was printed thanks to the power of coal-fuelled steam engines, my smartphone requires extremely rare minerals that are mined in regions that are often devastated by overexploitation. Extracting these minerals is difficult, dangerous, and harmful to the environment. I raise my phone to the sky and ask what kind of day it will be, unaware—if only for a moment—that this act of mediation interprets the atmosphere while it also changes its composition.
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Title page from John Henderson’s *Meteorography, or the Perpetual Weather Almanac* (Edinburgh: R.S. Mitchie and J. Sutherland, 1841). This image is taken from the copy held at the Thomas Fisher Rare Book Library at the University of Toronto.
Appendix II

“Rain Next Day” in *Meteorography, or the Perpetual Weather Almanac*. From the Thomas Fisher Rare Book Library at the University of Toronto.
Appendix III

“Showers Next Day” in *Meteorography, or the Perpetual Weather Almanac*. From the Thomas Fisher Rare Book Library at the University of Toronto.
Appendix IV

Colour wheel based on weather events in Charlotte Brontë’s *Jane Eyre*, by Rebecca Chesney. Permission to reproduce the image has been granted by its author.
Appendix V

“Observations on the Weather” stitched to an 1829 edition of Moore’s Almanac. From the Thomas Fisher Rare Book Library at the University of Toronto.
“A missionary from the Middle Ages says that he found the point where the sky and the Earth touch...” from Camille Flammarion, *L’Atmosphère: météorologie populaire* (Paris: Hachette, 1888).
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