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Take a deep breath and hold it. Do you know you absorb billions upon billions of air molecules? 

Breathe in. Along with air, each lungful you inhale contains millions of particles, including dust, pollen, viruses, bacteria, and fungi. Breathe out.

Breathe in. Do you realize that chemical fumes escape into the air, are drawn into your lungs, into your bronchial tubes and into your blood? Breathe out.

Breathe in. The air you just inhaled has already been contaminated with a grimy, gray, microbe-infested fuzz of debris, dust, and gas released by decaying building materials. Breathing in the contaminated air, the Environmental Protection Agency designates the workplace.

Imagine an office building at the center of the information economy at the end of the day. Everyone has thought twice about their irritation from the smelly copier, a second passes a lozenge to a fourth floor worker, a co-worker’s perfume wafts by. A sixth complaint begins to form.

Dispersed in far-flung corners of a building, in cubicles, in a corner, in a desk nook, a second passes a lozenge to a fourth floor worker, a co-worker’s perfume wafts by. A sixth complaint begins to form.
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Claudette Murphy, as well as
my two kids for turning out so
and rewrote this book bouncing
matt Price has read every
dozens of times. He is my most
friend. I dedicate this book to

Introduction

Take a deep breath and hold it. Do you know that when you breathe in your lungs
absorb billions upon billions of air molecules? Now breathe out.

Breathe in. Along with air, each lungful you inhale contains the detritus from
our indoor environments: fibers, vapors, tiny airborne insects and their excre-
ment, viruses, bacteria, and fungi. Breathe out.

Breathe in. Do you realize that chemical fumes from the objects around you es-
cape into the air, are drawn into your lungs, dissolve across your alveoli mem-
branes and into your blood? Breathe out.

Breathe in. The air you just inhaled has already passed through ducts encrusted
with a grimy, gray, microbe-infested fuzz of debris, hair, dust, and fiber particles
released by decaying building materials. Breathe out.—Classroom exercise from
the Environmental Protection Agency designed to teach children about indoor air;
paraphrase of Tchudi, “Lesson Plan on Indoor Air Quality” (1993)

Imagine an office building at the end of the twentieth century.
One worker typing at a desk rubs an eye. Working in a nearby
cubicle, a second blows a congested nose. Standing at the photocopier, a third passes a lozenge to a fourth. A fifth begins to feel dizzy as a coworker’s perfume wafts by. A sixth, a seventh—a crowd of com-
plaints begins to form.

Dispersed in far-flung corners of a building, these workers in the
information economy at the end of the twentieth century may never
have thought twice about their irritations. But sometimes they began
talking to each other. Latent connections may already have been in place:
maybe they were neighbors, or parishioners in the same church, or ate
at the same table during lunch. Perhaps a first worker complained about
an aspect of their work environment, and others chimed in—Me too, me
three! Complaint comparison became a conversational buzz at breaks—
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Me four, me five! Repetitions accumulated, and someone began asking questions, gathering in others: Do you feel unwell, too? Perhaps repetitions were recorded in a notebook, turned into signs that together gained new weight. Irritations absorbed into the crowd became symptoms, a collective pattern. Compelled by the din of complaints, other workers might also ask themselves questions about their own bodies. One can easily imagine prying open a ventilation grate and peering inside.

Suddenly a threshold was passed, and now many noticed that they felt unwell. A threshold was passed, and what yesterday had gone by without remark was today intolerable. The multitude continued to grow, giving work in the office building a new rhythm. Workers, mostly women, staged meetings, collected signatures, filed grievances, conducted informal surveys. What had been unconnected, diverse bodily occurrences cohered into an event. Individual symptoms joined the crowd of similarities and became linked in a chain of repetition: in the building . . . in the building . . . in the building . . . in the building. At other buildings, in other cities, strangely similar chains of events occurred. Though many miles apart, they heard news of each other through short newspaper articles or on TV. Workers in one building pointed to workers in other buildings. The crowd, linked by symptoms, declared an occupational health problem. A name circulated, under which all these differences coalesced: sick building syndrome.

Becoming Sick Building Syndrome

Before 1980, sick building syndrome did not exist. In order to become "sick," a certain kind of office building had to come into existence. In the 1970s, office buildings became architecturally "airtight" for the sake of energy efficiency, while internally they were arranged in "open" floor plans. Work inside was governed according to novel, cybernetics-inspired techniques of design and administration. New kinds of materials—plastics, solvents, adhesives, synthetic carpet, particle board, dry wall, acoustic tiles, and so on—made up the surfaces that in turn housed computers, printers, and fax machines that were mechanically kept cool and dry. Air-conditioned and carpeted, office buildings stood in striking contrast to the treacherous factories, pitiless sweatshops, and deadly mines of industrial work. Office buildings extended the scope of the workplace, middle-class ambience to delimit them. The gyres of industrial work "out there" and the middle-class workplace "in here" were connected by a rubber gasket of air conditioning.

Sick building syndrome was a problem that was relative privilege and luxury that characterized the middle classes. In the 1970s, minor health complaints disappeared and people relaxed. The sick building syndrome was a sign that the work environment had become more dangerous. It was symptomatic of the increased awareness of the dangers of the workplace and the need to control them.

Bodies signaled the possible presence of hidden chemical dangers. The media and government investigations of the 1970s exposed the dangers of asbestos, lead, and other hazardous materials in the workplace. The evidence of sick building syndrome was overwhelming. The Office of Information and Occupational Safety and Health (OSHA) was created in 1970 to enforce workplace safety standards. The Occupational Safety and Health Act (OSHA) was passed in 1970 to establish standards for workplace safety and health. The Environmental Protection Agency (EPA) was created in 1970 to regulate environmental pollution. The Clean Air Act was passed in 1970 to regulate emissions of pollutants into the air. The Clean Water Act was passed in 1970 to regulate discharges into water bodies. The Resource Conservation and Recovery Act was passed in 1976 to regulate hazardous waste.
Introduction

ymet, and someone began asking if others also felt...together and turned into signs that together were symptomatic of complaints by the din of complaints, other questions about their own bodies. A ventilation grate and peering

and now many noticed that they felt what yesterday had gone by without...timate continued to grow, giving birth to a new phenomenon: Workers, mostly women, filed grievances, conducted informal, diverse bodily occurrences symptoms joined the crowd of similar reports. Repetition: in the building...in other buildings, in other cities, in other countries. Though many miles apart, a short newspaper articles or on workers in other buildings. The phenomenon coalesced: sick build-

were not clear. In order to become...had to come into existence. In the...or, or not, they were arranged in "open" floor plans according to novel, cybernetics-in...in the act. New kinds of materials were used: carpet, particle board, dry wall, or the so-called "health" materials that were mechanically kept cool and tidy. Office buildings stood in striking contrast to the sweatshops, and deadly

mines of industrial work. Office buildings, constructed to house the vast extension of information work in booming postwar America, relied on a middle-class ambiance to delimit them as different from industrial workplaces, even if wages for many were comparable.

Sick building syndrome was a problem only possible in conditions of relative privilege and luxury that characterized Reagan-era America. It captured the attention of a new generation of health professionals...and class. At the same time, sick building syndrome expressed the sense that privilege was imperfect, even threatened. Chemical dangers could not be ignored; they lurked nearby in the most unexpected places. The very materials and technologies of postwar comfort and success might themselves be sources of subtle and stealthy chemical exposure. Even the most innocuous products could contribute to the constant background of chemical stimuli.

At mid century, glass-box architecture was accompanied by rhapsodic optimism. Yet during the 1970s, a resurgent feminism and a newly articulated environmentalism spawned an office-workers movement that made occupational health, and particularly chemical exposures, one of its concerns. Office workers gathered complaints about their workplace with simple questionnaires. Surveys collected the many ways relatively privileged people understood their health as a reaction to possibly hidden chemical dangers in their daily environment. Bodies signaled the possible presence of hazards through common, minor ailments such as headaches and rarer, serious diseases such as cancer. The new physical space of office buildings, combined with anxiety over the buildup of toxic hazards, led to protests that in turn triggered government investigations of office buildings.

Occupational health investigators who traditionally investigated factories or acute chemical spills—engineers, toxicologists, and industrial hygienists—were now called on to inspect nonindustrial, seemingly comfortable office buildings. Once in office buildings, their equipment almost never registered a chemical exposure. No overpopulous molecule, no errant fume, no physical cause could be found. To make matters more complicated, complaining office workers did not even share a common disease, which could then be tracked to an offending germ.
Instead, investigators were confronted with a messy litany of runny noses, scratchy rashes, endless fatigue, burning inhalations, and queasy stomachs. In the early 1980s, these occupational health events acquired the name sick building syndrome.

What exactly the name referred to, or if it even referred to anything, was highly contested. In the absence of a definitive cause, some experts claimed that women, who made up the vast majority of office workers, were experiencing “mass hysteria” triggered by stress and facilitated by a feminine coping style or even by menstrual irregularities. Workers’ compensation administrators and health insurance companies, in turn, balked at covering a health problem that could not be made to fit traditional explanations. Despite such hesitation, worker protests kept repeating and proliferating during the 1990s, making sick buildings one of the most common types of occupational health investigations in the United States during that decade. A new kind of chemical exposure—indoor pollution—had been identified, not from a discovery in a medical laboratory or clinic but from changes in the ways ordinary people created knowledge about and experienced their everyday environment. Yet not everyone believed that indoor pollution was a real menace. Some scientists, environmentalists, and doctors, bolstered by representatives from chemical manufacturers, held that slight exposures emanating from the commodities of daily life were not a significant worry. In contrast, other scientists, doctors, and activists, joined by experts sponsored by the tobacco industry, held that indoor pollution was in fact a significant worry, perhaps even more so than industrial pollution. They argued that tiny exposures accumulated in otherwise unremarkable interiors and that these exposures, in their sheer multitude, were impossible to untangle from their specific sources. Thus no single product or company could be blamed. Vapors seeped from the abundant and ubiquitous accoutrements of comfortable postwar culture. Was it the new carpet at work? Or the particle board cabinets at home?

As a history of the inside of ordinary office buildings in the twentieth century written at the opening of the twenty-first, this book seeks to capture the ways relatively privileged twentieth-century Americans resided in a world filled with possible chemical exposure. Indoor exposures were possible because the material landscape of privilege had changed in the twentieth century. Yet, unlike the nineteenth century, indoor spaces were no longer filled with smoke and soot from heating, lighting, and cooking flames; they were filled with volatile organic waste. Of course, even before the exposure to toxic molecules. In fact, in many ways the postwar era improved. So why in the late twentieth century did indoor exposures become a serious environmental health issue? How did this new pollution become not just materially present but also a knowable, knowable object that both experts and nonexperts could come to regard as an everyday American life.

Historians of medicine have paid inadequate attention to how microbes have become objects of attention since the advent of germ theory. But in a time of industrialization and modernization, we might stand far less about how chemical exposures entered the twentieth-century world as cultural and social sites. Sick building syndrome exemplifies this.

The historical scholarship concerning the politics of production and consumption of commodities has tended to concentrate on the production of industrial goods and their uneven distribution of environmental and health outcomes. The history of nonindustrial pollution, however, is not an exception. The history of indoor air pollution and environmental hazards was in the twentieth century more deeply gendered and more gendered than the history of industrial pollution. Sites for the articulation of a gendered politics of privilege in which most menial office workers were, at best, “women’s work.” Unlike the experts over the decades, the bulk of low-status office workers were not benefiting from the privilege and safety concerns of their colleagues in the 1900s and throughout the century. The rise of the office building syndrome erupted—office workers and feminisms to challenge this gendered system and take over the environmental conditions in office buildings. The book opened contemporaneously with accurate and academic references over women’s appropriate places in the workplace.

In debates between experts over the rising importance of the fact that women made up the majority...
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lighting, and cooking flames; they were no longer coated with lead-based paints, no longer lacking in basic plumbing that could flush away organic waste. Of course, even before the twentieth century the objects and materials that formed and populated interiors could emit potentially toxic molecules. In fact, in many ways the indoors had dramatically improved. So why in the late twentieth century did indoor chemical exposures become a serious environmental health concern? Indoor pollution became not just materially present but also a perceptible, definable, knowable object that both experts and laypeople sought to detect and alter.

Historians of medicine have paid important and considerable attention to how microbes have become objects of fear, management, and regulation since the advent of germ theory, shaping the habits of popular culture as well as the practice of medicine for over a century. We understand far less about how chemical exposures similarly came to populate the twentieth-century world as cultural objects of attention and practice. Sick building syndrome exemplifies the ways exposures became part of everyday American life.

The historical scholarship concerning chemical exposures has tended to concentrate on the production of industrial pollution, tracking the uneven distribution of environmental hazards across class and race lines. The history of nonindustrial pollution in comparison, for which there is almost no scholarship, brings into focus how chemical exposures and environmental hazards were also gendered. Office buildings in the twentieth century were deeply gendered spaces: they had become sites for the articulation of a gendered division of labor and a landscape of privilege in which most menial office work was designated a kind of “women’s work.” Unlike the experts called to investigate their unrest, the bulk of low-status office workers were women with aspirations of benefiting from the privilege and safety of nonindustrial work. Beginning in the 1970s and throughout the 1980s—the decades when sick building syndrome erupted—office workers could draw on resurgent feminisms to challenge this gendered division of labor. Thus, protests over the environmental conditions in nonindustrial workplaces happened contemporaneously with accusations of gender oppression and clashes over women’s appropriate place.

In debates between experts over the reality of sick building syndrome, the fact that women made up the majority of complainants opened up the
possibility of using the diagnosis of hysteria to explain worker unrest. For complainants themselves, practices of feminist organizing, as well as gendered performances of health care and detailed empathetic attention, could be drawn on to produce counter-narratives that argued for the reality of oppressive and unsafe conditions. Whether in ventilation engineering, office management, or worker activism, gender was a generative ingredient in the physical arrangements of the built environment, in the kinds of authority marshaled in debates, and in the explanations used to argue for the existence or non-existence of chemical injury. This book highlights the versatile and volatile work of gender in twentieth-century practices of rendering environmental health hazards perceptible and knowable. In the 1980s, gender and chemical exposures both generated controversy and uncertainty.

Sick building syndrome was a postmodern health problem, in form as well as time. Not only did it emerge in the information workplaces of the late twentieth century, its definitions encapsulated a conundrum that was postmodern in form: What are we to make of an object with no essence? As a syndrome, it was recognized only as a constellation of symptoms, not by an underlying mechanism. A typical definition of sick building syndrome depicted it as a diversity of ill health effects, mostly minor and associated with a building, for which no specific cause was found. Difference expressed itself in workers’ health complaints and in each building’s complex conditions. Though many investigators and labor activists hoped that a cause would someday be found, sick building syndrome came to be defined formally through its very lack of causal explanation. In fact, once a specific exposure was detected, an episode was no longer diagnosed as a sick building.

Sick building syndrome was thus a doubly troublesome phenomenon to affirm: it was found in spaces expected to be safe, even comfortable, and it was nonspecific and multiple both in its cause and expression. The words “sick building” signaled a confusion of boundaries between buildings and the bodies in them—how can a building be sick?—and an attempt to make sense of complexity by making buildings the unit of analysis. It was the mantra “in the building... in the building.” repeated in cities across the country, that lent sick building syndrome its coherence.

Most discussions in the late twentieth century of sick buildings, and transient or low-level exposures more generally, were caught in a debate about the very existence of these equity and toxic exposure occur or not? The contrast sick buildings provided, me, as a historian, how laypeople and experts have struggled with environmental health problem. In this book, I judge in favor of one side or the other. I have interpreted as arguing that indoor conditions are not “real.” They can be too easily used as a cause of physical injury, too easily plugged into antilabor building syndrome was simply a phantom of medicalization of labor problems by displacement. Writing about the historicity of chemical exposure, I have framed it as affirming the reality of exposure.

In this book, then, I take a step back from the sick building syndrome as an entry point for which chemical exposures were granted. That is, I am concerned with how exposure, an empirical study of the past, this is not an account of the rise of sick building syndrome, the evaluation of histories, each delineating how chemical exposures perceptible or imperceptible. Instead of resolving the factuality of exposure, I am concerned with history, which “exposure,” as an effect between phenomenon people could say, feel, and I want to understand the history of how only materialized but materialized as nonexposures imbued with uncertainty? This questions that necessitate thinking about exposures.

*Historical ontology* is a term developed by science to describe historical accounts of immune systems, subatomic particles, and being as recognizable objects via historical methods. Studies of historical ontology typically highlight the result of historically specific practices...
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The emergence of the sick building syndrome in the late 20th century was a phenomenon that generated considerable research and debate. For many, the syndrome was an outcome of broader social and political changes, including the rise of environmentalism and the growing concern with indoor air quality. The syndrome was often associated with issues of gender and the built environment, reflecting broader debates about the role of women in the workplace.

The book under review explores the historical and social contexts of the sick building syndrome, examining how it emerged and how it was understood. The author argues that the syndrome was not just a product of technological advancements, but also a reflection of broader cultural and political shifts. The book also considers the ways in which the sick building syndrome was used to challenge existing power structures and to advocate for change.

The book is part of a larger trend in historical scholarship that seeks to provide a more nuanced understanding of scientific knowledge and its role in society. By examining the sick building syndrome in historical context, the author provides a valuable contribution to our understanding of how scientific knowledge is produced and used.

In conclusion, the book is a valuable resource for scholars interested in the history of science, medicine, and culture. It provides a rich and detailed account of the sick building syndrome, and offers important insights into the ways in which scientific knowledge is produced and used in society.
techniques, instruments, methods of observing, modes of calculating, regimes of classification, and so on—and, importantly, that the objects that are apprehended through that truth-telling are also historical.6

Examining the history of how objects came into being does not imply a claim that the world only affects us in ways that humans can perceive. Chemical exposures do not only happen when we know about them. Instead, attention to historical ontology underlines that it was only in the eighteenth century, when humans found ways to detect and manipulate entities called molecules, that we could assert that molecules had always existed even before we knew about them. Now that we have molecules we need them and do things with them; they are things we cannot live without. Molecules now have atoms, bonds, polymers, and other properties that we study, manipulate, and even manufacture. At the same time, attending to historical ontology allows the possibility that in the future other objects and properties that do not exist for us now may come into being for us, and in doing so perhaps even make the object “molecule” a less useful description for truth-telling. Thus, attending to the historical quality of existence is a way to hold onto the concreteness of things in the world in a given moment, while at the same time allowing for the possibility that other, yet undeveloped, ways of registering, slicing up, and bringing into being the complexity of the world are, were, and will be made possible by new instruments, techniques, social movements, and so on.

This book makes two main arguments about the historical ontology of chemical exposures. First, I argue that exposures were brought into existence in multiple, often conflicting circumstances—the result of not just specific environments but also new arrangements of technologies and practices through which laypeople, scientists, and corporate experts apprehended the health effects of buildings on bodies.7 Second, I argue that any given way of materializing chemical exposures as perceptible and real also sets the terms of what was imperceptible and unreal. Indoor chemical exposures, I argue, came into being through multiple histories that did not all agree on the terms by which an exposure could be shown to have happened or not.8

Invisible to our eyes, chemicals wafting from carpet, ink, and adhesive are starring protagonists in the story of sick building syndrome. Environmental historians and historians of science have often debated how best to include nonhuman actors—such as buildings or molecules—in historical accounts.9 Environmental historians, prairie grass, weather, geologic time, and other nonhuman actors that have had important, often determinative effects on history. To grant such actors specific agency, environmental historians have tended to turn to the practices of objects in order to characterize their actions and effects. When it comes to chemical exposures, scientific findings, often originating in scientific studies exist for a vast number of reasons. Thus there is a dual uncertainty when it comes to chemical exposure. First, any incidence of chemical exposure, and its effects, is the result of scientific best efforts, because of the system and society itself; second, contemporary experts and the unknowable, low-level nature of chemical injury. The science on chemical exposures is thus less problematic and imperceptible. The history of imperceptibility was in the same gesture intrinsic to the history of perceptibility and imperceptibility, and imperception were not just generated in the history of knowledge practices.

Perceptibility and imperceptibility are not binary categories. Not only was the ability to register chemical exposures a result of specific historical practices, but also the ability to register them. The history of imperceptibility was in the same gesture intrinsic to the history of perceptibility. The history of imperceptibility was in the same gesture intrinsic to the history of perceptibility. The history of imperceptibility was in the same gesture intrinsic to the history of perceptibility. The history of imperceptibility was in the same gesture intrinsic to the history of perceptibility. The history of imperceptibility was in the same gesture intrinsic to the history of perceptibility. The history of imperceptibility was in the same gesture intrinsic to the history of perceptibility. The history of imperceptibility was in the same gesture intrinsic to the history of perceptibility. The history of imperceptibility was in the same gesture intrinsic to the history of perceptibility. The history of imperceptibility was in the same gesture intrinsic to the history of perceptibility. The history of imperceptibility was in the same gesture intrinsic to the history of perceptibility.
Introduction

...observing, modes of calculating, and, importantly, that the objects of truth-telling are also historical. Environmental historians have included mosquitoes, prairie grass, weather, geological processes, and microbes as actors that have had important, often deadly, consequences for human history. To grant such actors specific agency in their narratives, environmental historians have tended to turn to contemporary scientific findings in order to characterize their actors' qualities, habits, and consequences. When it comes to chemical exposures, however, contemporary scientific findings, often originating in corporate laboratories, are contested by other communities of experts or by laypeople claiming to suffer chemical injury. The science on chemical exposures is simply unreliable by our contemporary standards of scientific truth. Moreover, no scientific studies exist for a vast number of chemicals used in industry. Thus there is a dual uncertainty when it comes to chemical exposures: first, any incidence of chemical exposure is difficult to pinpoint, even with scientific best efforts, because of the complexity of the phenomenon itself; second, contemporary experts disagree about the import and even the existence of widespread, low-level exposures. This dual uncertainty is thus an important problematic for environmental historians, prompting increased attention to questions of how “unknowing,” ignorance, and imperception were not just accidentally but purposefully generated in the history of knowledge practices.

Perceptibility and imperceptibility are this book’s central concerns. Not only was the ability to register chemical exposures as existent the result of specific historical practices and technologies, but so too was the inability to register them. The history of how objects were rendered perceptible was in the same gesture intrinsically linked to a delineation of what was imperceptible. The history of how things come to exist is intrinsically linked to the history of how things come to not exist, or come to exist only with uncertainty or partially. In other words, seeing necessitates the designation of the unseeable, knowing the unknowable, and so on. Domains of imperceptibility were the inevitable results of the tangible ways scientists and laypeople came to render chemical exposures measurable, quantifiable, assessable, and knowable in some ways and not others.

Domains of imperceptibility were produced by limits in the capacities of knowledge practices, limits that were inevitable—every discipline of knowledge studies some things and not others; every scientific instrument can detect some things and not others; every experiment includes...
some variables and not others. These material limits in knowledge production were and still are at stake in debates over the existence of chemical exposures. By juxtaposing different, sometimes conflicting traditions of knowledge production—xicology with popular epidemiology, for example—one can throw limits into relief. I have layered and contrasted a select, and by no means exhaustive, set of histories in which scientific disciplines and lay communities rendered chemical exposures as events that one could or could not do something about. I will call the way a discipline or epistemological tradition perceives and does not perceive the word its regime of perceptibility.13

Chemical exposures are contentious events. They involve litigation, blame, neglect, and suffering. Chemical corporations, tobacco companies, manufacturers, and employers, as well as government administrations with antiregulation ideologies, have been deeply invested in producing science that minimizes or denies exposures. Such actors have developed techniques that maintain chemical exposure and their health effects as uncertain, that is, as events that one cannot do something about. Over the course of the twentieth century imperceptibility itself became a quality that could be produced through the design of experiments or monitoring equipment in order to render claims of chemical exposures uncertain. Other groups of laypeople and experts have nonetheless developed their own practices and technologies to produce evidence for the reality of harmful chemical exposures. Through their efforts, domains of imperceptibility have become populated with all sorts of qualities, such as multiplicity, nonspecificity, complexity, and so on.

It is possible to track the production of imperceptibility because what was generated as imperceptible in one place could be generated as perceptible elsewhere. It is precisely by tracing the confluence of different histories for apprehending office buildings that I have tried to throw domains of imperceptibility into relief. I show that imperceptibility was not only accidentally and inevitably produced, it was also at times purposefully generated and maintained, particularly but not exclusively, by industry-sponsored science. In either case, this book suggests regimes of perceptibility actively participated in making chemical exposures the phenomena they are today. In order to throw imperceptibility into relief through juxtaposition, this book makes a second argument about the historical ontology of exposures: objects are many things at once.

Multiplicities and Assemblages

A useful way to begin thinking about exposures in ordinary buildings, like the ones, now, is to see them as one of the ways bodies are exposed to bodies. We can then ask about the building, the office building? It is a real estate developer’s profit. And at the same time, the physicality; it is a structure of steel and concrete that mechanically delivers an indoor climate for efficiently organizing the work of people, a form to economy, and dividing people into bodies is plants, logos, and design are symbols of how buildings are repetitious, using the same over, so that one becomes disoriented. And be the same no matter what the particular office building is launched into the world of a hive of activity, bringing people together, hierarchies, friendships, and sexual encounters, worn out in one area and neglected in another building I work in, and the one I used to work in . . . and . . . In short, office building multiplicities composed of many histories, extended and unintended, drawing out stories therein setting the conditions of possibility.

The multiplicitous building connects various ways: guiding movement through spaces, demarcating privilege, segregating, refining of my question, then, is how concrete multiplicity, affect the health of bodies of women office workers in the historically predominated in the grunt labor of work. Which is not to say that they were also gendered and raced bodies dressed, differentiating themselves from factory work, were only social; they were also organic organ systems, biochemical cycles, and organic body deciphered and anatomized
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Material limits in knowledge provoke debates over the existence of chemical exposures, sometimes conflicting traditions with popular epidemiology, for example. I have layered and contrasted sets of histories in which scientific and lay ideas about chemical exposures as events are layered on one another. I will call the way a person perceives and does not perceive these events. They involve litigation, workplaces, and buildings, as well as government administrations, have been deeply invested in these chemical exposures. Such actors have invested in chemical protection and their health is that one cannot do something about it. The century's imperceptibility itself, it is traced through the design of expertise and expertise to render claims of chemical exposures. Laypeople and experts have nonevidentiary and technologies to produce evidence of chemical exposures. Through their institution, expertise, and technologies, through the design of expertise, they have become populated with all sorts of specificity, complexity, and so on.

The notion of imperceptibility because what is imperceptible could be generated as perceiving the confluence of different regimes. I show that imperceptibility was not always the case, particularly, but not exclusively, by the genealogies, this book suggests regimes in making chemical exposures the thing. I throw imperceptibility into relief by making genealogies and the second argument about the ways are many things at once.

Multiplicities and Assemblages

A useful way to begin thinking about the historicity of chemical exposures in ordinary buildings, like the one you may be sitting in right now, is to see them as one of the ways buildings are physically connected to bodies. We can then ask about the buildings themselves. What is an office building? It is a real estate venture, built to maximize the developer's profit. And at the same time, a building has a mechanical physicality; it is a structure of steel and concrete, walls and ventilation ducts that mechanically delivers an indoor atmosphere. It is a structure for efficiently organizing the work of late capitalism, giving material form to economy, and dividing people into function and rank. Its potted plants, logos, and design are symbols of a company's prestige. Office buildings are repetitious, using the same mass-produced elements over and over, so that one becomes disoriented in a built space that seems to be the same no matter what the particularities of its location. Once an office building is launched into the world, it becomes its own unique hive of activity, bringing people together, spawning meetings, hierarchies, friendships, and sexual encounters both wanted and unwanted, worn out in one area and neglected in another. There is this office building I work in, and the one I used to work in, and the one next door, and... In short, office buildings, like all objects, are multiplicities composed of many histories, of "ands," that link in ways intended and unintended, drawing out some attributes and not others, thereby setting the conditions of possibility for buildings.¹

The multiplicitous building connects with the bodies inside in myriad ways: guiding movement through space, indicating appropriate behaviors, demarcating privilege, segregating by race and gender. The first refinement of my question, then, is how did buildings, in all their concrete multiplicity, affect the health of bodies? Not just any bodies, but the bodies of women office workers in the late twentieth century, who numerically predominated in the grunt labor of American information work. Which is not to say that they were only laboring bodies; they were also gendered and raced bodies dressed in middle-class clothes, differentiating themselves from factory workers. Which is not to say bodies were only social; they were also organic, composed of flesh and bone, organ systems, biochemical cycles, and immunological reactions, an organic body deciphered and anatomized by the practice of biomedicine,
that in turn drew on instruments, laboratories, and clinical practices to apprehend and monitor sickness and health. All of this is to say that bodies, like buildings, can concretely be many things at once—they are also multiplicities. Instead of a simple is, they are made possible by ands: woman and worker and flesh and . . . and . . . and . . . Put simply, objects are constituted through their manifold material relationships, and these relationships have different histories. This is not to say that a sum total of ands can add up to a full understanding of a building. Multiplicities are not like the interlocking pieces of a jigsaw puzzle, which fit together to reveal a single picture. Histories may overlap and contradict each other, have varying intensities, durations, and stabilities. Instead of asking, What is a building? I will be asking, What are its ands? What did its historical relations make possible?

Buildings and bodies were often connected. A building was built with bodies in mind; it became a prosthesis of the body, extending its functions. The body, in turn, became a mobile part of the building; it was vulnerable without the shelter of the building, which supplied the milieu that organized its movements. Buildings and bodies were caught up in one another, sharing themselves in each other’s conditions of possibilities, tracing each other’s contours. They were in a relationship of mutual presupposition, a mutual capture in which they altered one another. Each was an integral element in the chains of “ands” that made up the other. A building is derelict without bodies inhabiting it. It is very difficult to be a body without the shelter of a building.

I use the term assemblage to describe the historically specific patterns through which buildings and bodies were connected, or assembled, to each other and to the objects and practices around them. I define “assemblage” as an arrangement of discourses, objects, practices, and subject positions that work together within a particular discipline or knowledge tradition. It is not the list of elements that make an assemblage consequential, it is what they made possible by the ways they articulated each other. In describing the assemblages within different traditions of knowledge production, I have tried to attend to how arrangements of words, things, practices and people drew out and made perceptible specific qualities, capacities, and possibilities for buildings and bodies. In other words, how an assemblage created a regime of perceptibility.

To get at a given assemblage, I have “cracked open” the archive of
When technical guides, minutes of meetings, questionnaires, instruments, and body parts that made up a scientific discipline or lay epistemological tradition. By cracking open, I am looking for an abstract regularity to the way objects, subjects, practices, and words articulated each other. What I am trying to describe by writing about assemblages are historical regularities. Regularities are not simply a set of objects or phrases that appear often in the historical record. What I am calling regularities are not hidden, though historical actors may not necessarily recognize them. Regularities are the pattern of arrangement that is repeated, concealed, and constitutive of a scientific discipline or epistemological tradition. I use the abstraction of the assemblage as a means to investigate these concealed conditions of possibility for an archive, what was and was not sayable, perceivable, doable, natural, possible, and so on about buildings and chemical exposures in a particular historical circumstance. To get at these regularities, I examined archives belonging to ventilation engineering, feminist labor activism, and toxicology (to name a few examples) and sought to describe the assemblage of practices, technologies, and words that governed what was historically possible.

I find the idea of the assemblage a very useful concept to talk about the historically specific ways chemical exposures were apprehended, that is, became events that one could or could not say something and do something about. When I used the concept of assemblage, it became clearer to me that objects existed by virtue of their historically specific and yet very tangible and material circumstances. Assemblages are formed of organic and inorganic objects, technologies, bodies, and architecture, and not just of words. In this way, I wish to convey that chemical exposures in the twentieth century were materialized as events with particular kinds of qualities—and not others—by virtue of concrete technical and social arrangements. I therefore use the concept of the assemblage to describe the material and yet relational way things came to matter. An assemblage materializes an object by placing it in a specific social and technical constellation, making it perceptible, outlining form, drawing out possibilities and investing meanings by virtue of its linkages, effects, and relationships. Or conversely, by ordering an object in an assemblage, that object could be disinvested of qualities, capacities, and possibilities, thereby becoming dematerialized, even deemed nonexistent.

Buildings and bodies were called into being in as many ways as there were assemblages that seized them. A building could be part of both an
an assemblage of ventilation systems, engineers, and standardization, and
an assemblage of office work, workers, and occupational health prob-
lems. A body could be part of both an assemblage of doctors, insurance
companies, and diseases, and an assemblage of feminism, consciousness-raising, and personal experience. This is what makes them multipe-
licities. When I traced any given assemblage by following its history and
asking how it works, I found out that each element itself already had
many other histories running through it. Our interior landscapes are
embedded in a multitude of histories that do not necessarily sit well with
each other. Objects or qualities vital in one assemblage may not be
relevant in another. One assemblage may bring into being what another
disavows or simply does not register. It is precisely by understanding sick
buildings as materialized in the encounter of disciplinarily specific as-
semblages (from engineering, management, toxicology, feminism, popular
epidemiology, cybernetics, etc.) that I hope to better understand not
only how chemical exposures became part of everyday privileged Ameri-
can culture, but also how chemical exposures became quintessentially
uncertain events.

Office workers, thus, did not magically make sick building syndrome
out of thin air—poof, now there is an object where before there was
nothing. It is not so easy to materialize a new object. First, despite what
we might wish, the world is not passive and cannot be made to work in
whatever way we might hope. Objects were successfully materialized
when they captured some of the potentialities and possibilities in our
world. Moreover, once materialized, objects were not neutral. They re-
sisted in the manner with which they had already become present. Thus,
materializations are always rematerializations.21 Such rematerialization
can sometimes be a form of resistance, not in the sense of liberation but
in the sense of maintaining or producing possibilities counter to or
cutting across dominant ways of apprehending reality.22 Or an encounter
can result in a dematerialization, in which what is done in one
assemblage is actively undone in another.

This book tries to show in empirical detail how sick buildings were
formed by different, often conflicting, histories that remade and som-
times undid the “reality” of chemical exposures. Sick buildings existed
in between office worker protests, feminism, ventilation engineering,
toxicology, popular epidemiology, corporate science, and ecology. Many
different ways of connecting buildings and bodies seized on seemingly

safe workplaces, and no two seized it in quite the same way. The
intersection of making and unmaking became events about which little could
be said in writing a history of the contested historicity of what counts as real, of
doing this, I have conveyed matter, not in
rather in terms of the processes of histo-
rical arrangements and the effects of pow-
erialize. At the same time, and like most of
the importance of environmental chemi-
cules, questionnaires, immune systems,
physical actors in this process.

Sick building syndrome as a topic raises questions about the relationship between history, materiality, and the materiality about sickness that is very dif-
cult to understand. In debates about sick building syn-
drome, environmental experts were the
experts. I had to explore my own difficul-
ties along with scientific ones. Chemical exposure
was a topic of materiality, and imperceptibility was the

The chapters that make up this book attempt to mak
not explanations of specific events. My na-
tural language 

regularities I encountered in my empirical
tradition buried deep in my methods: It is
clearly. In trying to be clear, I fear my nar-
row thinking, leaving out much of the messiness. In try-
ing histories about buildings and chemi-
the structure over the confusion. Despite this,
reader will likely not be able to imagine how these others could also be exploded into multiplicities
ously rematerialized.

The book nonetheless remains an en-
try into the history of an important subject—chemical exposures—and
such lengths to think about materiality are by
very seriously the problem of writing a his-

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Engineers, and standardization, and engineers, and occupational health problems, and the assemblage of doctors, insurance, and an assemblage of feminism, consciousness. This is what makes them multi-assemblage by following its history and what each element itself already had through it. Our interior landscapes are not what do not necessarily sit well with the. In one assemblage may not be to bring into being, what another may bring into being. It is precisely by understanding sick of disciplinarily specific assessment, toxicology, feminism, populations, that I hope to better understand not the part of everyday privileged American exposures became quintessentially people.

Sick building syndrome is a topic necessitated thinking about the relationship between history, materiality, and uncertainty. There is a materiality about sickness that is very difficult, and indeed dangerous, to deny. In debates about sick building syndrome in the recent past, medical and environmental experts were the ones most often claiming that sick building syndrome was not real, while workers were more likely to say it was. In order to understand the coming into being of indoor chemical exposures, then, I had to examine lay knowledge practices along with scientific ones. Chemical exposures, moreover, remain notoriously difficult events to prove. The subject itself both provoked questions of materiality and imperceptibility and made them unavoidable.

The chapters that make up this book are about historical regularities, not explanations of specific events. My narratives are abstractions of the regularities I encountered in my empirical research. Yet there is a contradiction buried deep in my methods: I was trying to explain a tangle clearly. In trying to be clear, I fear my narratives are too rigid and simple, leaving out much of the messiness. In trying to diagram the overwhelming histories about buildings and chemical exposures, I have stressed the structure over the confusion. Despite this limitation, I hope that the reader will be able imagine how these other words, objects, and subjects could also be exploded into multiplicities and how they, too, are contentiously rematerialized.

The book nonetheless remains an empirical investigation into the past of an important subject—chemical exposures. I have only gone to such lengths to think about materiality and history because I have taken very seriously the problem of writing a history of the twentieth century's
polluted backdrop and its largely unregistered health effects. It is in this spirit that I have used the terms *assemblages, materialization, and regimes of perceptibility*, not just as colorful speech but as means of interrogating a problem. I have used the terms as my toolbox, and I try to make them do useful intellectual work. I have no illusion that my methodological toolbox forms an architecture of propositions that finally solves the problem of the relationship between history and materiality or the uncertainty of chemical exposures. A book is also an assemblage, of words, paper, and reader, and I invite you to make use of it as you will.

**Map**

Though they can be read separately, together the chapters in this book operate as a single argument about the historicity, multiplicity, and imperceptibility of chemical exposures. Each chapter cracks open the practices through which a discipline or epistemological tradition connected buildings and bodies. Most chapters emphasize a disciplinary assemblage of objects, practices, and discourses and the way that assemblage materialized bodies and building and thus rendered chemical exposures perceptible and imperceptible. Some technologies and practices, such as environmental chambers and surveys, reappear in different chapters, so that in reading the book as a whole one might see how these technologies performed differently in various historical circumstances.

Chapter 1 cracks open ventilation engineering and the experiments that set the criteria for the construction of mid-century buildings as machines that provided indoor weather. By examining the assemblage by which ventilation standards were established in the interwar years, I argue that building-machines generated a standardized “comfort” that required a standardized body, while at the same time leaving chemical attributes of the indoor atmosphere as outside of mechanical control, irrelevant to comfort, and imperceptible. How work was organized in office buildings, from Taylorism to cybernetics, is the subject of chapter 2, which examines how distributions of desks, pathways of paper, and the exertion of equipment formed tightly knit material and social assemblages for choreographing the labor of office workers. This chapter outlines the history of the material organization of office work and the ways the exercise of power depended on not only gendered and classed subjects but also machined subjects. By the 1970s the material organization of office work materialized as parts within a larger complex of a regime of perceptibility between its comfortable and actual status of most office workers. Can we unpack the women’s office worker movement in terms of how it rematerialized the comfortable illusion, and then toxic exposure, that work was “only” office work. This chapter argues that through surveys to gather “experience” that in toxic locations, setting the stage for the 1980s. Moreover, the way the movement rematerialized causal narratives untenable.

In chapter 4, the book turns to the prunings themselves were investigated. The and toxicologists, which had developed a complex of toxic waste activists. This allows the debates in the clash between two different versions produced by toxicology and popular epistemologies in the 1980s and their efforts to define the FPA. This chapter links the invisibility of racial and social privilege to its beneficiaries with the emergence of privately contracted building inspectors and the practice of building ecology. An emphasis on management, relationships, taking a managerial approach to indoor environments, assisting the antiregulatory politics of the day, how multiplicity was made a crucial past time used to shore up imperceptibility, how chemically injured, this chapter seeks to celebrate the glory of multiplicity.

The book’s seventh and final chapter turns to the celebration of chemical sensitivity (MCS), a controversy...
registered health effects. It is in these assemblages, materializations, and assemblageful speech as well as means of intervention, sometimes as my toolbox, and I try to use them. I have no illusion that my methodological propositions that finally map between history and materiality or practice. A book is also an assemblage, of which I hope you to make use of it as you will.

Together the chapters in this book explore the historicity, multiplicity, and immanence of sickness. Each chapter cracks open the praxisthelosophical tradition connected to assemblage theory. We emphasize a disciplinary assemblage, as well as the way that assemblage theory renders concrete, the ways that technologies and practices, such as building, emerge in particularities, yet reappear in different chapters, so that one might see how these techneous, historical circumstances are at play.

Engineering and the experiments in the design of mid-century buildings is the subject of chapter 5. The establishment of the standardization of comfort that took place in the 1960s and 1970s indexed the same time leaving chemical exposures as outside of mechanical control, observable. How work was organized in this way, in the chapter on the history of the assembly of desks, pathways of paper, and the materiality of the office as a whole. This chapter on the organization of office work and the office not only gendered and classed subjects but also machined subjects. By this I mean the way bodies were materialized as parts within a larger corporate apparatus. I argue that by the 1970s the material organization of office work encompassed a growing tension between its comfortable and middle-class milieu and the actual status of most office workers. Chapter 3 traces the history of the women's office worker movement in the 1970s and 1980s, examining how it rematerialized the comfortable office as a site of gender oppression, and then toxic exposure, that was dispersed in the minutiae of office work. This chapter argues that the office worker movement used surveys to gather “experience” that in turn materialized office buildings as dangerous locations, setting the stage for the sick building episodes. Moreover, the way the movement rematerialized toxicity rendered specific causal narratives untenable.

In chapter 4, the book turns to the practices through which sick buildings themselves were investigated. The methods of industrial hygienists and toxicologists, which had developed for the study of acute industrial exposures in the first half of the century, are contrasted with the methods of the social survey movement and later popular epidemiological practices of toxic waste activists. This chapter situates sick building syndrome in the clash between two different domains of imperceptibility produced by toxicology and popular epidemiology.

The racialization of privilege and imperceptibility is the subject of chapter 5, which takes as its case study activism by EPA scientists in the 1980s and their efforts to define the EPA headquarters as a sick building. This chapter links the invisibility of racialized distributions of environmental privilege to its benefactors with ways of explaining the presence of chemical exposures in buildings. Chapter 6 turns our attention to the emergence of privately contracted building investigators in the 1990s and the practice of building ecology. It argues that system ecology's emphasis on management, relationships, and multiplicities facilitated a managerialist approach to indoor chemical exposures as well as assisting the antiregulatory politics of the tobacco industry. By looking at how multiplicity was made a crucial quality of ecologies and at the same time used to shore up imperceptibility and unaccountability to the chemically injured, this chapter seeks to problematize any uncritical celebration of multiplicity.

The book's seventh and final chapter looks at the history of multiple chemical sensitivity (MCS), a controversial illness associated with indoor
pollution in the late twentieth century. This chapter examines the coping strategies of people whose bodies reacted to the indoor environment in ways unacceptable to dominant medicine. It argues that domains of imperceptibility, unintelligibility, and impossibility can nonetheless be densely populated. I trace how chemically injured people practiced experimental divestments and reinvestments in order to bring intelligibility to their bodies and create safe spaces in which to live. I argue that this experimentation was necessary to materialize MCS from below and at the same time dangerous in its reification of unintelligibility to others.

This book sets out to show that sick building syndrome and chemical exposures cannot be adequately understood by answering the question, “Is it real or not?” The chapters’ narratives accumulate to argue that the very terms of this question can be understood as an effect of historical processes. Exposures are made to matter.

Crack open an office building century and you will find a much behind suspended ceilings and ducts, wires delivering electrical signals, boiling fans caged by grates. Office buildings were machines engineered to control these machines designed to encourage the buzz and to produce a clean, orderly corporate polluted outdoors and the dangerous face.

Office buildings were not just luxury managerial class; they were also constant labor of the droves of mostly women in the physiological needs of the very pipes and ducts of office buildings. The passive backdrop, the office building’s material manifestation of a historically simple way of apprehending the relationship between spaces that ordered their labor. More specifically, air conditioners and thermostats was a mechanical assembling bodies and buildings together. It was a relatively simple assembly of that era, and thus the building-as-machine open first. While at initial glance an air conditioning engineering is installed in virtually the late-twentieth-century United States university library, or even your home, you fo