Introduction: Materials Matter

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> *But why should people think with the artifacts of material culture alone? Why not also with the air, the ground, mountains and streams, and other living beings? Why not with materials? (Ingold, "Toward an Ecology" 438)*
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> *All things . . . are only momentary aggregations of material. (Appadurai, "The Thing Itself" 15)*

In August 2017, anti-racist activists pulled down a Confederate monument in Durham, North Carolina. Making for spectacular photographs, the fallen metal soldier is a clear reminder that materials matter. The statue, indeed, was not merely toppled; it was "crumpled like a beer can," as anthropologist Robin Kirk wrote in an opinion piece. The reason for the relative ease with which the statue was discarded is precisely the same that, throughout the first decades of the twentieth century, allowed for the erection of thousands of similar monuments across the United States: mass-produced, it was made of zinc, a low-cost material that manufacturers dubbed "white bronze" (Fisher; Giaimo) and that allowed for thin wall casting. Ironically, most of these manufacturers were initially based in the industrial North, where both Union and Confederate statues were cast from the same molds (Grissom).

How materials matter can further be illustrated by the so-called Golden Coach (*Gouden Koets*), the Dutch royal carriage gifted by the people of Amsterdam to Queen Wilhelmina of the Netherlands on the occasion of her coronation in 1898. Used throughout the twentieth century to carry the monarch on festive occasions, the Golden Coach had become subject to controversy due to one of its wooden panels called "Tribute of the Colonies," which depicts Black people stooping down in front of the monarch and presenting her with a variety of colonial goods, including sugarcane and cocoa. This representation of the Kingdom of the Netherlands extended

to the materials used to make the coach. Modeled after carriages used by Javanese rulers such as the Sultan of Yogyakarta, the coach was made of teak from Java, while the ivory for the handles originated from Sumatra. The gold leaf to which it owes its name was mined in Suriname. Other materials came from different places in the Netherlands: the red woolen cloth from Leiden and the leather from Brabant.

Displaying the entanglement of material and symbolic production, these two examples illustrate the relevance of materials for studying culture. Indeed, if much of the public discussion and scholarly debate revolves around their symbolic meaning, a more material approach reveals that the materials from which the monument and the coach were made are integral, not only to their material constitution, but also to how and what they signify and to whom. In this book, we offer over twenty-five case studies of materials of culture, ranging from marble and concrete to copper, lithium, and asbestos to wool, peat, milk, coffee, ink, bacteria, and mycelium. Together, these case studies illustrate the argument that materials matter if we are to formulate a clear understanding of culture today.

This book brings materials back into the fold of cultural studies. Focusing on dimensions of cultural objects, lives, and practices long taken for granted and therefore largely left unexamined, the "materials turn" we propose here echoes with paradigmatic shifts in scholarship and resonates with a more general trend in culture and society, which has much to do with the present anthropocenic condition—climate catastrophe, mass extinction, planetary exhaustion, and energy transition. Awakening to the depletion of the Earth and its natural resources and confronted with the very material consequences of our way of life, we find ourselves lacking knowledge about materials and material life, ignorant of how they work, act, react, and interact with other materials, including those that make up our bodies. By calling for a "materials turn" within the larger sweep of the material turn in the humanities and the social sciences, we propose to adopt a materials-based perspective on culture, which has so far been lacking in cultural studies scholarship.

Toward a Materials-Based Perspective

As consumers living in the Global North, we may be aware that the stuff with which we surround ourselves is predominantly made and assembled in Asia, yet we seldom know what materials they are made from, nor do we know whence those materials have been retrieved, how, by whom, and at what cost. This "genesis amnesia," as Pierre Bourdieu termed the cultural obliviousness to how things are made (*Outline of a Theory* 79), including their commoditization and the outsourcing and offshoring of their production, applies in particular to the food we eat and the clothes we wear—the stuff we put in and on our bodies, and disperse in our surroundings (through the excretion of metabolic waste and the microfibers that detach from the

clothes, among others). We hardly know what our processed foods are made of, under what conditions the foodstuffs are produced, or how they come to us prior to reaching the supermarket or web shop. Even if care labels in clothes inform us about their place of manufacture and the materials they contain, we rarely know how those materials were produced and what journeys they underwent before reaching the garment manufacturing factories, workshops, or sweatshops. Often, we prefer to remain oblivious to how our clothes are made and the human and environmental cost of the global garment industry, even after the 2013 collapse of the Rana Plaza building in Bangladesh and the 2015 documentary *The True Cost* that revealed its devasting effects, including death, disease, and river and soil pollution.

Materials have long been used as temporal landmarks for human technological advances, as in the Stone, Bronze, and Iron Ages (Miodownik 6). Although artificial materials such as paper, glass, and textiles have existed for millennia, the recent onset of what anthropologist Adam Drazin calls a "materials revolution" ("Materials Transformations" xvi) has led to the proliferation of a variety of synthetic materials, alloys, and superalloys that are too difficult to trace in the gadgets we use, the clothes we wear, the food we eat, the air we breathe, and the bodies we have. Inscriptions such as "Designed by Apple in California. Manufactured in China" offer little help in identifying the materials used for manufacturing a MacBook, not to mention their histories and places of origin. Such blind spots in our knowledge of materials apply to almost everything that we take for granted in our lives and without which the curing of illnesses, telecommunication, the Internet, and air travel, to name only a few, would be unimaginable.

With growing awareness of the irreversible trajectory of an unfolding environmental crisis and its unequal effects across the globe, sustainability has become the order of the day. Increasingly, the drive to buy, consume, and discard is met with calls to buy less, buy consciously and ethically, and reuse, recycle, exchange, and donate. These incentives urge us to look at the things around us with new eyes. Selective garbage collection, to take a mundane example, compels us to think about the objects we want to dispose of in terms of the materials they have been made from. Used to the comfort of encountering objects as commodities ready to be used and discarded, this relatively new prominence afforded to materials is symptomatic of a shift toward a materials-based perspective in both public and academic discourse.

Materials science has been spearheading the study of the properties of materials in the service of industry, design, and engineering that have provided us with the technological feats of the Silicon Age, indispensable for twenty-first-century life (Fratzl et al.). In response to the proliferation of materials from which to choose and with which to work, so-called materials libraries have emerged, raising awareness of new innovative and sustainable materials and facilitating the transfer of knowledge about them between materials producers and users (Wilkes; Wilkes and Miodownik).

The need to become familiar with the world of materials also extends to the general public. In recent years, several books have appeared that aim to (re-)educate us about the materials that constitute our lives. A manifesto denouncing the paucity of materials education in schools and aiming to reclaim material culture from the sphere of consumption, French designer David Enon's recent publication *La vie matérielle: Mode d'emploi* (*Material Life: User's Manual*) challenges its readers to re-acquaint themselves with the material world through a series of practical exercises. In the same vein, in *Stuff Matters: Exploring the Marvelous Materials That Shape Our Man-made World*, London-based materials scientist Mark Miodownik takes us on a tour of the materials in his immediate vicinity while drinking coffee on his rooftop and groups them according to qualities such as indomitable, trusted, fundamental, and delicious to foreground the sensuous ways in which we encounter them as parts of objects. For instance, explaining how a range of volatile organic molecules are responsible for the peculiar smell of old books, he mentions how research into the chemistry of book smell can help libraries to monitor and preserve extensive collections (Miodownik 37).

Recently, claims for increased material literacy have been made outside materials science. Evoking László Moholy-Nagy's injunction to incorporate sensory experiences in education, art historian Ann-Sophie Lehmann defines material literacy as "a broad sensitivity to materials and their diverse meanings," which differs from the in-depth knowledge of materials scientists and the specialized skills of craftspeople ("Material Literacy" 22). Seetal Solanki, founder and director of the relational practice called Ma-tt-er and author of *Why Materials Matter: Responsible Design for a Better World*, advocates for a similar kind of material literacy—one that would make the academic knowledge production of materials accessible beyond university campuses and research laboratories ("Material Literacy"). A related term with a slightly different emphasis is "material intelligence," coined by Glenn Adamson, author of *Fewer, Better Things: The Hidden Wisdom of Objects*. Adamson defines material intelligence as "a deep understanding of the material world around us, an ability to read that material environment, and the know-how required to give it new form" (4). While material literacy foregrounds the importance of sensorial exposure to materials, material intelligence emphasizes the hands-on knowledge of working with them—a largely instinctive faculty "that can flourish or fade depending on how it is nurtured" (Adamson 4). Finding ways, methods, and a language to reconnect—and literally get in touch—with the world of materials is also the aim of the recently launched online journal *Material Intelligence*, which Adamson coedits with Carolyn Herrera-Perez. Each issue is dedicated to a specific material—thus far including copper, rubber, linen, and oak—approached from a variety of disciplinary, artistic, and craft-related perspectives.

Material literacy should also include materials that we mostly perceive as nuisances, such as dust and pollution. A closer look at dust reveals it as "a gathering

place, a random community of what has been and what is yet to be, a catalog of traces and a set of promises: dead skin cells and plant pollen, hair and paper fibers, not to mention dust mites who make it their home" (Marder xi–xii). In his 2009 project "The Ethics of Dust," preservation architect Jorge Otero-Pailos used innovative technology to clean a wall surface of the Doge's Palace in Venice and preserve the pollution removed from the wall in a layer of latex, which he exhibited in the palace. Revealing the pervasiveness of pollution as a civilizational product, Otero-Pailos's project configures dust as a material of culture (Ebersberger and Zyman).

Energy is also material and should not remain in the background when thinking of materials of culture. As a subset of the Environmental Humanities—a developing interdisciplinary field that brings Humanities perspectives to pressing environmental problems—"Energy Humanities" (Szeman and Boyer) draws attention to the role of energy in modern societies and examines the cultural, political, and ethical aspects of their current reliance on fossil fuels. What matters is not only the amount of extracted gas and oil burnt but also their properties and affordances. In *Art and Energy: How Culture Changes*, Barry Lord argues that human creativity is deeply linked to the resources available on Earth and that each new source of energy, from the ancient mastery of fire through the exploitation of coal, oil, and gas, to the development of today's renewable solar and wind energy sources, fundamentally transforms art and culture. Similarly, in "The Problem of Energy," sociologist John Urry calls for social thought to engage with energy, pointing out how curious it is that Zygmunt Bauman's famed analysis of modern life as "liquid" did not include a consideration of how the "literal liquid" oil enabled this modernity (6). This oversight of social thought derives from its roots in the Enlightenment and modern thought. Urry writes: "Energy especially shows what we can call the 'hubris of the modern'. The human and physical/material worlds are utterly intertwined and the dichotomy between the two is a construct that mystifies understanding of the problem of energy" (7). A decade later, the energy crisis in Europe in the wake of the war in Ukraine and the global energy transition have further underscored the need to theorize energy and address it as a material of culture, as some of the chapters in this book do.

Whereas the recent material turn in the humanities and social sciences has yielded an upsurge of interest in objects, things, commodities, and the materiality of the body (Attala and Steel; Bogost and Schaberg; Cornish and Saunders; Del Val; Salamon), materials have, thus far, remained a largely uncharted terrain in these fields. Arjun Appadurai's influential 1986 volume, *The Social Life of Things: Commodities in Cultural Perspective*, inspired a reevaluation of commodities through the lens of the cultural practices whereby they are invested with value and meaning in the longue durée of what he terms their "social life" (e.g., Boscagli; Miller). In response to the spate of such inquiries, fellow anthropologist Tim Ingold proposes that studies in material culture focus less on materiality in the abstract and more on the properties of the materials that things are made of, their "fluxes," as he writes in "Materi-

als against Materiality," and their movement and lines of flow, as he discusses in "Toward an Ecology of Materials." In his 2006 essay "The Thing Itself," Appadurai had already conceded that "[i]n some way, all things are congealed moments in a longer social trajectory. All things are brief deposits of this or that property . . . they are only momentary aggregations of material" (15). In the face of a materials revolution and concomitant concerns about sustainability, we believe it is high time that Appadurai's temporary approach to things, as moments in a longer trajectory, is updated to encompass the lives of materials in a critical and socially engaged manner. This update would recognize that materials are emergent and the product or result of historical relations; and that, "birthless and deathless as materials are," their trajectories are more about transformation than biographies (Drazin, "To Live in a Material World" 14).

The proposed update, moreover, is made all the more pertinent by the circulation of an unprecedented diversity of materials that, as Drazin contends, are extracted from sources that are often scarce or located in conflict zones ("Materials Transformations" xvi). The use and circulation of materials, he adds, is therefore "not politically or economically neutral" (xvii). In addition, legislation regulating the use of materials also affects their use and presence in culture. A case in point is asbestos, which is the subject of Chapter 8. Long valued for its fire-resistant properties, its toxicity (leading, among others, to lung cancer) led to an asbestos ban in many countries of the Global North. However, due to the high cost of its safe removal and recycling, the dismantling of cargo ships owned by Western corporations and containing large amounts of asbestos is outsourced to the Global South, where safety and environmental regulations are often unenforced, attesting to the persistence of lingering colonial and imperial fault lines. Other examples discussed in this book include the effects of legislation on the material proliferation of the banana and its cultural uses and significance as a material of popular film culture in Chapter 18 and those of legislation facilitating the commodification of cocaine in Chapter 19. By adopting a materials-based perspective within the interdisciplinary field of cultural studies, the essays in the present volume set out to respond to this call.

Materials of Culture

The approaches featured in this book are centered on "materials of culture"—a notion that we employ to account for the ways in which materials enable the emergence and transformation of cultural practices or evince a life of their own that may thwart such practices through their combinations, affordances, and agency. We use this notion in two interrelated senses. First, "materials of culture" denotes the material foundations of cultural and artistic practices, namely that our corporeal existence and day-to-day actions in life are entangled in, and facilitated or hampered

by, materials of all sorts. Second, "materials of culture" also highlights the ways in which materials are invested with meaning once encountered in the form of objects, things, commodities, and bodies. Culture, in this sense, refers to the ways in which materials are negotiated, both physically and discursively, as well as sensorily and affectively. While enacting different approaches—from the material to the cultural and vice versa—the essays in this book demonstrate that these two senses are inextricably entwined.

A case in point is the gold leaf covering the above-mentioned Golden Coach, the origin of which had been the subject of some speculation until recently. Ultrasensitive analysis of gold samples retrieved from the carriage allowed researchers to examine lead isotopes formed by the radioactive decay of uranium and thorium that vary by geographical region. The analysis provided conclusive evidence that the gold had been extracted in the former Dutch colony of Suriname. From the perspective of the present publication, the methods employed in this research and the discourse that its results have engendered calls for the recognition of materials as "actants" in Bruno Latour's sense, rather than merely the inert constituents of objects. The gold used for the carriage can be visualized as a rotating vortex generating both centripetal and centrifugal forces that illustrate the two senses that we ascribe to materials of culture. The former pulls us into the spectroscopic realm, to analyze the very fabric of the gold and its chemical properties that supplied scientists with information on its geographical origin, while the latter highlights the widening gyre of cultural practices, networks, discourses, and emotions attached to the material. The inward- and outward-directed currents of this vortex delineate the contours of an affectively charged material-discursive forcefield within which material evidence of the gold's colonial origins is negotiated through cultural practices, including King Willem-Alexander's decision to refrain from using the carriage.

A materials-based perspective on culture, therefore, requires that we attend to the operations of such forcefields around materials in cultural practices. In order to do so, however, we need to learn about materials just as much as we need to unlearn our inclination to think of them as less important than the objects made from them. It is only by way of releasing the world of materials from the hold of objects that we are able to follow materials, as Ingold insists in "Bringing Things to Life" (8). Representing a wide range of theoretical and methodological traditions within cultural studies scholarship, each of the chapters in this volume is centered on a particular material and leads readers through their transformations in a variety of artistic and cultural practices. The following section maps the trajectory of scholarship that provides the theoretical backbone for the present volume.

Materials in Cultural Studies

Much of the thrust of the material turn in Western academia has been geared toward unsettling the deeply entrenched precepts and methodological instincts of the linguistic turn that dominated scholarly inquiry in the humanities and the social sciences for the bulk of the twentieth century. Reacting to the linguistic turn's propensity to interpret culture in terms of texts, signs, and signification, the material turn entails a vast body of interdisciplinary scholarship that constitutes a paradigm shift in conceptualizing materiality, material agency, human-nonhuman relations, and the life of things in general. Challenging such foundational binaries of modern Western thought as nature versus culture, object versus subject, and human versus thing, the theories of the material turn have sought to redress implicit anthropocentric biases, which are seen to have led to the current ecological and civilizational crises. One of the ways in which these biases can be challenged is through the strategic mobilization of a terminology originating in a variety of philosophical traditions, including (but in no way limited to) Merleau-Ponty's phenomenology, the philosophy of Heidegger, Spinoza, Deleuze, and Guattari, as well as in recent feminist, non-representational, new materialist, and environmentalist thought. A bird's-eye view on the terminology emerging in the wake of these diverse trends reveals a discursive shift: from essences to flows; from meanings to forces, becomings, and assemblages; from inert objects and human agency to actants and material agency; and from apparatuses of interpretation toward the sensorial and the affective. While the conceptual paradigm shift that such changes in terminology indicate has affected cultural studies in a variety of ways, thinking with and from materials (rather than things, objects, and materiality in general) is still an unexplored path in the field. It is, therefore, necessary to assess preexisting approaches that can facilitate a "materials turn" in the field.

One of the nodal points in the debate concerning materiality has been the question of agency. In this regard, Bill Brown's "Thing Theory" has been an often-quoted reference for the distinction it draws between objects and things. According to Brown, objects are easily recognizable, nameable, and usable, while things undermine schemes of categorization and control. We usually encounter the "thingness" of objects, he argues, when they stop functioning in ways that we expect them to do. The distinction between objects and things is not based on ontological differences between those categories, but on the different ways in which we experience the material world around us. Brown distinguishes between three manifestations of thingness that are helpful when trying to discern material agency: first, "the amorphousness out of which objects are materialized by the (ap)perceiving subject;" second, "as what exceeds their mere materialization as objects or their mere utilization as objects—their force as a sensuous presence or as a metaphysical presence;" and, third, "as the before and after of the object" in the form of latency or,

its counterpart, excess (5). Although Brown says little about materials themselves, these conceptualizations of thingness gesture toward a form of material agency that manifests itself in the experience of excess that transgresses physical, temporal, linguistic, and conceptual borders.

The interdisciplinary field of material culture studies more broadly, and the work of Daniel Miller in particular, conceive of agency as the potential of material things in the formation of social relations (*Materiality* 11–15). Preexisting work on the analyses of patterns of consumption (Bourdieu) and practices of everyday life (Barthes; De Certeau; Lefebvre), on material production vis-à-vis systems of signification and symbolization (Williams), as well as the notion of object biographies (Appadurai, *The Social Life*; Kopytoff) have been instrumental to this conceptualization of agency. Although material culture studies have drawn heavily on science studies, particularly Bruno Latour's Actor-Network Theory, as well as social anthropology, for example, through Alfred Gell's work on the agency of art objects, its focus on social relations is predicated on the human and thus reinforces the human/nonhuman binary. Edited by Tony Bennett and Patrick Joyce, the contributions to the 2010 volume *Material Powers: Cultural Studies, History, and the Material Turn* constitute a pioneering interdisciplinary effort in thinking through the problem of material agency and state power in relation to, among other themes, colonial infrastructures.

A significant movement in philosophy that challenges this binary is new materialism, a multifaceted area of inquiry associated with the work of, among others, Rosi Braidotti, Karen Barad, Jane Bennett, and Manuel DeLanda. New materialist conceptualizations of material agency shift the focus from human-nonhuman relations toward the ontology of things. In her *Vibrant Matter: A Political Ecology of Things*, Bennett presents the notion of thing-power as a political and ethical category that "gestures toward the strange ability of ordinary, man-made items to exceed their status as objects and to manifest traces of independence or aliveness, constituting the outside of our own experience" (xvi). Drawing on Spinozist understandings of affect, she regards the intensity of impersonal affect as the catalyst of thing-power and goes as far as equating affect with materiality (xiii). While Bennett admits to the necessity of a modicum of anthropomorphism to ensure the political force of thing-power in language, Karen Barad's theory of agential realism destabilizes the material/discursive binary ("Posthumanist Performativity"; *Meeting the Universe Halfway*). Drawing on quantum physics and Judith Butler's theory of performativity, Barad introduces the term "intra-action" to relocate agency in the dynamic forces in which things are constituted. Replacing "interaction," which presupposes the existence of preexisting entities exercising their agencies, intra-action also entails that discourse is not imposed on, but rather is co-constitutive of, material relations, engendering what Barad calls material-discursive phenomena ("Posthumanist Performativity" 825).

Archaeology and anthropology have yielded significant contributions to the debate on material agency. Like in material culture studies, the influence of Actor-

Network Theory makes itself felt in both fields. The archaeologist Bjørnar Olsen, for instance, criticizes preexisting approaches to material culture in archaeology as a "mediating window" (25) onto social relations, while the anthropologist Tim Ingold takes a fundamentally different angle on agency. Ingold takes issue with proponents of agency by emphasizing its counterproductive tendency to "re-animate a world of things already deadened or rendered inert by arresting the flows of substance that give them life" ("Bringing Things" 7). Ingold relegates this approach to what he calls the hylomorphic model of the world, in which "[c]ulture furnishes the forms, nature the materials" ("Toward an Ecology" 432). Drawing on Deleuze and Guattari's idea of forces and Heidegger's understanding of things as gatherings, Ingold redefines things as a "gathering of materials in movement" (439) and advocates abandoning the concept of agency for what he describes as "life"—a "generative capacity of that encompassing field of relations within which forms arise and are held in place" ("Bringing Things" 3). Thinking of materiality as raw and situated in relation to human agency ("Toward an Ecology" 432) is, as Ingold reminds us, one of the pitfalls of the hylomorphic model. Instead, he makes a plea for materials as "matter considered in respect of its occurrence in processes of flow and transformation" (439). This is akin to Barad's understanding of matter as "ongoing historicity" ("Posthumanist Performativity" 810). To underline the co-constitutive power of such transformations in Barad's sense, Ingold upgrades Actor-Network Theory's focus on networks by introducing the term meshwork instead. He does so in order to highlight "the fluid character of the life process, wherein boundaries are sustained only thanks to the flow of materials across them" ("Bringing Things" 12). Rather than capturing or pinning down such relations, Ingold defines the task of the researcher as following these lines (8).

Adam Drazin and Susanne Küchler's 2015 edited volume entitled *The Social Life of Materials* represents a significant shift of interest from objects and material culture toward materials in the field of anthropology. Challenging views that associate materials with nature yet are devoid of a social component, their volume sets out to relocate materials in society, asking: "what is it that materials actually do?" (Drazin, "Materials Transformations" xviii). While our project on "materials of culture" has clear affinities with their "anthropology of materials," our focus nonetheless differs fundamentally, inquiring instead into what happens when we think of culture as materially constituted and "follow" such materials in artistic and cultural practices. In doing so, we build on earlier work, notably *Materializing Memory in Art and Popular Culture*, in which we explored the materiality of memory, inquiring into the previously overlooked material dimensions of "technologies" and "performances" of cultural memory (Munteán, Plate, and Smelik; Plate and Smelik). Discussing a wide range of memory objects, things, and practices, from miniatures, monumental books, and souvenirs, to ruins, techno-fashion, the Internet of Things, and traumatic reenactment, *Materializing Memory in Art and Popular Culture* sought to account

for the material form and substance of acts of memory while illuminating the agency of objects and things in remembrance.

Yet our turn to materials in cultural studies does not stand in isolation. Rather, it is accompanied by parallel inquiries, notably in art history and fashion studies. Let us return for a moment to art historian Ann-Sophie Lehmann's call for material literacy. Discussing the role of education and the legacy of the Bauhaus school in promoting material literacy, Lehmann underlines that material literacy entails unlearning the impulse of privileging form over material: "Increasingly, therefore, material—long perceived as merely a dull prerequisite to the far more important notion of 'form'—is returning to creative curricula as a meaningful agent" ("Material Literacy" 26). In a similar vein, fellow art historian Edward S. Cooke Jr. emphasizes the role of the sensorial in giving a fuller account of the world of materials in scholarship:

> When we privilege sight and visual analysis alone, we fail to use a full battery of analytical tools deploying our eyes, touch, *and* embodied experiences to understand the material world. How might we link visual, haptic, and tacit knowledge of the material world when we have become distant from *making* and are more comfortable with approximations? ("The Need for Material Literacy")

Anneke Smelik's work in critical fashion studies, bringing new materialism and posthumanism to a domain long dominated by visual analyses, is crucial here. Smelik shifts the emphasis to materials, examining non-human factors in the field of fashion, ranging from so-called raw materials (cotton) to so-called smart materials (solar cells), and from the texture of the garment to the tactility of the human body ("New Materialism"). Introducing the notion of material agency, which "helps to understand fashion as materially embedded in a network of human and non-human actors . . ., expanding fashion beyond the frame of the human body and human identity to the non-human world of technology and ecology" (34), Smelik discusses the intertwinement of human bodies with the non-human—fibers, silicones, garments, and technologies—in the fashion of Dutch designer Iris van Herpen in the light of posthumanist theory ("Fractal Folds"). It parallels work in literary studies, for example Kiene Brillenburg Wurth's work on "book presence" and the materiality of the book (*Book Presence*), and Liedeke Plate's efforts to (re-)materialize literary studies, discussing the lack of a language to speak of the materiality of reading, the resulting impoverishment of sense experience, the reduction of a multisensory experience to a mental activity, and the ensuing neglect of the act of reading's many and diverse social and cultural meanings ("Doing Things with Literature"). Similarly relevant is the work of anthropologist Birgit Meyer in materializing the study of religion, building on the precept that the dimension of the material, including the sensing body, is integral, rather than supplemental, to religion (Meyer and Houtman).

A parallel track of inquiry concerns space and the built environment. In "Bringing Things to Life," Ingold refers to the theoretical works of Finnish architect Juhani Pallasmaa, who conceives of buildings not as fixed structures, but as ongoing processes laden with life that entail all the materials used for their construction being exposed to, and transformed by, their inhabitants and elements (5). In order to follow this meshwork of processes, one needs to practice haptic vision, which "seeks not to freeze the surface corrugations in some momentary form, so that they may be modeled in the mind through a one-to-one mapping of data points on the surface and in the model, but to join with the currents and with the wind" (Ingold, "Surface Visions" 103). Although working toward different ends, a similar disposition toward materials can be traced in the work of Eyal Weizman, founder of forensic architecture. In Weizman's view, "[d]eterioration and erosion continue the builders' processes of form-making. Cracks make their way from geologic formations across city surfaces to buildings and architectural details. Moving within and across inert matter and built structures, they connect mineral formations and artificial constructions" (7). A similarly materials-based perspective can be traced in anthropologist Gastón Gordillo's notion of rubble (in relation to ruin) as a process of disintegration imbued with colonial histories unclaimed by the heritage industry in his native Argentina. Drawing on these ideas, László Munteán's work on plaster archaeology has attempted to engage with architectural façades as layered surfaces holding information about the urban past unintentionally preserved in plaster.

Material Vocabularies and Methodologies

To think of culture as materially constituted, and to propose to follow these materials of culture as they gather in artistic and cultural practices, entails rethinking what the object of cultural studies is and how it works. Such a reframing, moreover, calls for alternative approaches, and we will need to acquaint ourselves with material vocabularies, methods, and methodologies if we are to pursue cultural studies in a way that gives materials their due.

As Drazin explains, materials "may be distinguished in a number of different ways: by chemical atomic composition, chemical or crystalline structure, origins, or the ways they are used in a particular place" ("Materials Transformations" xxvi). Depending on how one frames the material, one will follow different things. The differences are disciplinary, of course, although part of the present argument is that the study of materials should not continue to be confined to a separate area of the natural sciences but that more knowledge of materials should be integrated with cultural studies scholarship. Following Sophie Woodward in her practical guide to doing materiality studies, *Material Methods: Researching and Thinking with Things*, we might say that a material understanding of culture requires two initial steps: first, to frame an

issue, object, or practice as material; and second, to frame the material in a particular way (24). All of the authors in this book took a discrete material as their point of departure, framing it from the onset as material. However, how they framed the material depended on their understanding of how art and culture are constituted in materials. The chapters, therefore, present an array of material understandings, with authors sometimes discussing the chemical composition or structure of their selected material, and other times focusing on the latter's material properties or material effects.

However, how does one "follow" materials of culture as they gather in artistic and cultural practices and in processes of flow and transformation? To pose the question is to raise the issue of method. With the shift of perspective from text, sign, and meaning to materials in flux come serious methodological and terminological challenges for cultural studies.

To begin with the latter: a focus on materials requires a vocabulary to talk about them—a "jargon" that is often the preserve of the professionals that work with them. Robert Macfarlane's acclaimed *Landmarks* brought to the attention of the wider public the disappearance of words to speak of landscape, nature, and the weather from our lexicons. This impoverishment of language is also an attrition of our empirical, phenomenological, and material experience—the words falling into disuse being on a par with a lack of need for them. Such linguistic attrition we find reflected in the chapters on peat and wool, whose respective authors both observe how the words used to talk about the materials are better known in proverbs and metaphorical uses than in their literal meanings denotating material condition, property, or use. However, wielding specialized vocabularies as they write about materials, the authors in this book also unlock these terminologies for the benefit of a more material understanding of art and culture.

Method, which etymologically means "mode of proceeding" or "mode of investigation," can be defined as "the way in which research is done." And surely, this way is different when one's research centers on materials. While there is no shortage of methods in cultural studies to research art objects or cultural things, materials of culture require new methods and experimentation. In the above-mentioned *Material Methods*, alongside methods for researching (with) objects and things, Woodward outlines some methodological possibilities (and implications) for researching materials. Here we limit ourselves to those most pertinent to the study of materials of culture as we have defined them, thus focusing on methods for researching materials as they gather in cultural things (and leaving aside methods that are more focused on, or using, objects, such as object interviews, object elicitations, and object biographies).

The methods for researching materials outlined by Woodward are derived from the field of archaeology, for instance, excavation, but also methods exploring surface assemblages and depositional practices, which can provide insight into how an as-

semblage came into being, as well as into the effects of things being drawn or placed together (77–79). They are adapted from anthropology, for instance, ethnography, observation, and participation, which allow "for different ways of knowing—the embodied, multi-sensory, material, and kinaesthetic" (139). Furthermore, they are borrowed from creative material practices, for instance, arts-based and design-led methods such as model building and prototyping, which, as methods that foreground materials and their transformations as part of a creative and embodied multi-sensory process, can be reframed as a material method (67).

Finally, there is the method of "follow-the-thing" or "follow-the-materials," which may or may not concur, not least, as "things can endure when materials decay or things fall apart yet their materials endure" (Woodward 110). Akin to, yet different from, Appadurai's and Kopytoff's "cultural biography of objects," this method may involve following the trajectories of things and of materials but differs, as Drazin points out, insofar as "[m]aterials have no births and deaths but emergences and re-emergences in reconfigurations of matter" ("To Live in a Materials World" 27). Whereas the Life Cycle Assessment (LCA) or cradle-to-grave analysis, which follow a product through its different phases, from the extraction of materials to manufacture to use and disposal, have become standard methods of measuring the environmental impact of products for companies, governmental institutes, and NGOs in all sectors and around the world, following the thing in the opposite direction—in "reverse commodity flow," that is—"opens up the possibilities for seeing things as just assemblages of materials that come together or are disassembled" (Woodward 113).

Of course, one can follow materials in many different ways. For instance, the essays in a 2013 edited volume, *Meaning in Materials, 1400–1800,* are predicated on the tripartite criteria of interaction, attribution, and comparison in their approximations of the relation between materials and meaning-making in art (Lehmann, "How Materials Make Meaning"). In contrast, in his recent book, *Global Objects: Toward a Connected Art History,* Edward S. Cooke Jr. takes a different path by dedicating the first part of his book to an extensive survey of materials, focusing both on their entangled histories and global circulation, and on their movement across continents and cultures, in order to provide a more holistic—and indeed alternative—understanding of the interrelation of materials, craft, artistry, and culture that only a materials-based perspective on objects can disclose. Discussing the agency of materials in relation to their properties and affordances and the way in which they have been extracted, processed, and worked on, Cooke lays bare the hidden histories they hold and suggests that scholars "resist the tendency to become medium specialists which precludes an understanding of material flows and a fuller sense of artistic, social, and historical context" (25).

While few of the essays in this volume explicitly address the question of method, all of them, in one way or another, engage with it through the framing of their "ob-

ject" of study as material and their chosen mode of proceeding to do research. In the section that follows, we describe these material approaches to materials of culture.

The Content of This Book

The first part of the book, "Materials of Art," focuses on the materials of which art is made and discusses the performative power of art in relation to the ontology of its materials. It opens with Hanneke Grootenboer's "Stitched into Material: On the Makeability of Shells," which argues that shells, as hybrid things—part nature, part artifice—assume a particular position as materials of culture. A thrill to the senses, shells have been mysterious and awe-inspiring objects of nature ever since they flooded the exotica markets of early modern Amsterdam. Grootenboer uses this early modern fascination for shells to rethink "materiality" and "the material." In "Celluloid," Wilco Versteeg discusses Jean-Luc Godard's practice of filmmaking as "*penser avec les mains*" ("thinking with the hands") as a material practice of resistance foregrounding the material of film—celluloid—against domineering Hollywood-modes of filmmaking predicated on plot, characters, and visual effects. Focusing on *Le livre d'image* [*The Image Book*] (2018), the culmination of Godard's sixty-plus years of cinematic experimentations with film, Versteeg demonstrates how Godard "thinks film" through his material practice as a filmmaker, seeking to understand the possibilities and limits of celluloid through radical montage.

The second part of the book, "Materials of Empire," explores materials that have been central to the expression and manifestation of Ancient Rome's imperial power. In "Roman Concrete," by tracing its material histories, Astrid Van Oyen discusses how *opus caementicium*—Roman concrete—helped produce the imperial Roman world. Rather than tracing a Roman cultural revolution via proxy evidence, such as the shape of pots or styles of wall painting that effectively leave matter and materials silent, Van Oyen explores how a more fundamental rethinking of concrete's historical role can lead to new historical insights. In "Postclassical Marble: Reclaiming Flux in the Reception of Marble in Contemporary Art," Maarten De Pourcq takes materials as his starting point for his postclassical inquiry into the reception of Greco-Roman antiquity. Concentrating on Kara Walker's installation *Fons Americanus* (2019), his chapter takes a materials-based postclassical stance, first, on the way in which white marble became a central element of the art-historical paradigm of classicism and, second, on the role played by white marble in contemporary artworks that question classicist paradigms by calling attention to their materials and the contingency of their presence, monumentality, and social use.

The third part, "Extractivism and Toxic Colonialism," highlights lingering colonial routines in practices of material extraction and the disposal of toxic materials. In "Asbestos: The Fallout of Shipbreaking in the Global South," László Munteán

focuses on asbestos, a carcinogenic material once used extensively for fireproofing and insulation. Munteán's chapter explores how the high costs of recycling asbestos in the Global North have led to the outsourcing of this task to the shipbreaking yards of Bangladesh, India, and Pakistan, where lenient environmental, safety, and health regulations allow for the recycling and reselling of asbestos stripped from ships built in the 1970s and 1980s. The chapter highlights the damage caused by asbestos in these countries as one engrained in lingering colonial and imperial power dynamics that continue to ravage and exploit human lives, the environment, and the economies of the Global South. In her chapter "Copper's Suppressed History Unearthed in Otobong Nkanga's Sensual and Embodied Art Practice," Mette Gieskes discusses the Belgian-Nigerian artist's work exploring the ecological damage and human suffering caused by the extraction of materials such as copper. Her chapter highlights the uneven distribution of resources in the circulation of materials in the globalized world via an analysis of a number of Nkanga's installation, sculptural, and performance works, which critically explore the scarred landscape of a former Nigerian copper mine, but also poetically articulate the metal's sensory qualities and potential to connect people through the soil. This part is concluded by Oscar Ekkelboom's "The Coloniality of Materiality: Brazilwood, or, Unlearning with Anton de Kom in the Mauritshuis," which provides a powerful critique of "materials" as a concept that is predicated on an extractivist practice that reinforces the logic of coloniality. Using the wooden interior paneling of The Hague's Mauritshuis as a case study and taking into account that the original brazilwood paneling has been lost to fire, Ekkelboom's decolonial approach opens up thinking about the afterlives of things in the absence of their materiality, underlining how slavery's history often hides in intangible legacies.

The essays in the fourth part of the book, "Energyscapes of the Future," delve into the ethical dimensions of cultural discourses on energy resources supplying new technologies. In "Lithium for the Metaverse: Myths of Nuclear and Digital Fusion," Niels Niessen argues that lithium may prove essential in the development of virtual worlds and the virtualization of the material world, destroying natural and human ecosystems in the process. The lightest metal and the least solid of all solid elements, lithium is used in batteries, but it is also essential to nuclear fusion, potentially introducing humankind to a new space-time currently imagined as the "Metaverse." Rianne Riemens' chapter, "Harnessing the Sun in Tech-On Climate Discourse," focuses on representations of the Sun in promotional materials by Big Tech companies, examining the energy imaginaries created by Apple's "Better" (2014) and Amazon's "The Future of Energy" (2020) commercials, both of which propose solar energy and technological innovation as critical solutions for a green future. Riemens argues that these discursive texts harness the Sun as a limitless and immaterial source of energy, just as "the cloud" metaphor is used to frame the Internet as limitless and immaterial.

"Materials of the Nation," the fifth part of the book, discusses the role of certain materials in imaginaries of national identity. Tom Sintobin focuses on the peat and bogs that once played a vital role in the production of fuel and, even after their replacement with charcoal fuel, remained nostalgic reference points for regional, national, and even transnational identities and memory in Dutch literature and regional museums after 1950. Sintobin's chapter explores contemporary discourses on peat and bogs in the Netherlands facilitated by, and woven around, a range of site-specific artworks. In her chapter on milk, Tess Post examines the ways in which cow's milk has been construed as a material domain for the negotiation of Dutch national identity from colonial times to the ongoing farmers' demonstrations. Discussing the recent upheaval about the waste of Dutch wool, Michiel Scheffer argues that the commotion is misplaced, the result of a misunderstanding of the materiality of wool. Whereas the recent shift toward sustainability is revitalizing a European wool industry on the verge of extinction, any rebirth of the industry, Scheffer contends, is dependent upon a thorough knowledge of the material intricacies of wool and of the physical and chemical processes required to produce an acceptable woolen product.

The sixth part is dedicated to "Affordances of Edible Matter." Timotheus Vermeulen's chapter considers the life of the banana in art and popular culture to both problematize and instantiate the relationship between object and thing in Heidegger's sense (i.e., a thing understood exclusively in relation to a subject, which is to say, as use or value) and between metaphor and materiality in twenty-first-century discourse. Tracing how the banana's diverse cultural narratives are afforded by the berry's qualities and properties, Vermeulen proposes that the banana may always be the actualization of one or more of its material affordances in a specific interaction. In her chapter "Coca(ine)," Brigitte Adriaensen discusses a variety of perspectives on the ontological categorization of the coca leaf and examines their relationships with indigenous cultural perceptions of coca(ine). Challenging the tendency to discuss coca and its derived alkaloid, cocaine, mainly from the perspective of commodity studies, Adriaensen argues for the recognition of their material agency and invites us to think of them as semi-subjects.

Part seven explores "Material Practices in Digital Culture." In his contribution, "The Ephemeral Materiality of Sound," Vincent Meelberg highlights the material and agentive qualities of sound. Taking the Tasty Chips GR-1 granular synthesizer as a case study, his chapter explores how digital technology has changed the affordances of sound for composers, performers, and sound artists. Centering his argument on interface, movement, and affect, Meelberg demonstrates how digital technologies have turned sound from an intangible thing into a tangible object and, in doing so, radically changed the material nature of sound. In his chapter "Tracing the Voice's Digital Materiality," Nuno Atalaia takes Amazon's voice assistant Alexa and its devices as a case study and undertakes a technical analysis of voice-user-interface sys-

tems, focusing on their mechanisms of vocal digitization. These, he claims, impose on the voice a condition of "brute materiality" available for human commodification. Atalaia demonstrates that this newfound posthuman materiality opposes the historical framing of the voice as a human-exclusive vehicle of subjectivity. In "Interface," Nishant Shah proposes that the Graphical User Interface (GUI) was the cornerstone by which the ephemerality of computation could be understood as a material, embodied, and techno-cultural practice. The emerging AI-driven, self-learning, computational networks, however, produce a machine intimacy that does not need the mediation of an interface. Drawing on feminist and queer interventions in digital cultures, Shah's chapter considers how, in a post-GUI world, the interface enables us to think about the materiality of ephemeral digital practices and the methodologies that we need to rescue them from the realm of the ineffable.

The eighth part of the book, "Enfolding the Body," focuses on materials used for covering human bodies. In their essay "Becoming-with: On Textile Companions and Fungi Friends," Daniëlle Bruggeman and Lianne Toussaint focus on textile design practices that reinvent the aesthetics, matter, and meaning of fashion, and on the emotional connections between human subjects and the new material "things" they can wear. Using innovative Dutch design practices as a source of inspiration, the authors think through their new materialist and posthuman theoretical and methodological implications. In the essay "Clothing For/Against Walking," Anna Geurts explores how shoes, coats, skirts, and the materials of which they were made impacted past cultures of mobility, in particular walking. In doing so, Geurts examines their own walking experiences as part of their methodological approach. In his chapter "Mylar Foil: Blankets of Silver and Gold," Jeroen Boom attends to the materiality of the mylar foil used as a protective cover for shipwrecked or freshly arrived migrants. Apart from its compression of different plastic and metallic materials, the reflective thermal material, Boom argues, also produces, and is imbued with, conflicting layers of signification replete with tensions between various connotations and affects that stick to this material, from its hopeful humanitarian promises to its dehumanizing threats.

The contributions in the ninth part, "Touching Texts," delve into materials that influence practices of reading, writing, and engaging with texts in general. Frederik Van Dam and Ghidy de Koning examine Thomas Pitfield's *The Poetry of Trees*, a hand-bound booklet from 1942, the carved oak cover of which encloses a series of linocuts of trees that are accompanied by hand-calligraphed prose-poem descriptions. Van Dam and De Koning highlight the political and ecocritical implications in Pitfield's work: absorbing the fleeting presence of each human generation they outlive, the multiple trees of which the book is made, and which it depicts, ask that readers pay attention to the natural world in an age of nuclear war. In her chapter "Soft Leather, Wounded Buttons, and a Silk Ribbon: Clothing a Birgittine Rule Manuscript," Kathryn Rudy analyzes the chemise binding of a medieval rule for Brigittine nuns.

Considering the various skills and crafts required to manufacture, such a binding and relating those skills to those required for manufacturing clothing, Rudy's chapter explores how the nuns' clothing of the Rule contributed to asserting their Birgittine identity.

The book concludes with "Materials of Scholarly Performance," containing three essays that ponder some of the material dimensions of academic life. In "The Arts Classroom," Edwin van Meerkerk sketches new directions for research on arts education. Focusing on the materiality of the classroom (the art objects, chairs, and tables, the smells and the sounds that direct the artistic and teaching practice in school) and taking a Post-Qualitative Inquiry (PQI) approach, van Meerkerk analyzes two case studies to bring the art classroom to the fore as a space and a terrain of non-human actors, without a pre-determined, neo-positivist methodological framework. In her chapter "Ink on Paper," Carlijn Cober considers ink as an emblem of academic material culture by looking into the history and connotations of different types of ink pens. Mobilizing Barthes's notion of *tangibilia*, she goes on to examine ink as the point of connection between material and affective elements of academic culture. In "The Scholar's Coffee," Liedeke Plate breaks a lance for materializing theories of embodied subjectivity by discussing the relationship between food and the performing body of the (cultural studies) scholar, focusing on coffee. Given the colonial roots and neocolonial dimensions of this foodstuff in the context of the academic culture of the Global North, her chapter addresses the material and biochemical dimensions of the embodied subject of academic scholarship, and inquires into the coloniality of academic scholarship understood as a competitive, high-performance sport.

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