What Is New Materialist Aesthetics?

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Where does a work of art happen? Does it happen in our body or our mind when we appreciate or judge it? Can art happen even if no human is there to experience it? Most philosophers of art have thought of art as something which occurs mainly or only in human minds. They believed that art materials were passive receptacles of beautiful forms imposed by humans. Only other humans with the same sensibilities and aesthetic judgments could appreciate these forms. This is still a popular idea about art, but what if it's wrong? What if art is not an object or an idea but a *material process* that occurs across the brain, body, and world?

This is the understanding that new materialist aesthetics proposes and is the focus of this chapter. More specifically, this chapter introduces some core ideas of new materialism and shows how they offer a new and better way of thinking about art and aesthetics. By aesthetics, I mean the philosophical study of qualities and affects. Toward the end of this chapter, I develop this definition in more detail. Although scholars have been using the term "new materialism" since the mid-1990s, it is only recently that more people have been using it to write about art and aesthetics. Here, I

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introduce readers to this exciting field of study and its consequences for art and artistic research.

So far, new materialist scholars have focused their attention on issues of ontology, politics, and science. However, since the early 2010s, more scholars and artists have been writing on art and new materialism. As I write this, there are now three published monographs on new materialist aesthetics including, Katve-Kaisa Kontturi's *Ways of Following: Art, Materiality, Collaboration,* my book *Theory of the Image*, and Gregory Minissale's *Rhythm in Art, Psychology and New Materialism*. All three were published in the last three years and will hopefully provoke further research.

In the sections that follow, I want to introduce readers to the core ideas of new materialism, the field of new materialist aesthetics, and my approach to thinking about the topic.

What Is New Materialism?

New materialism, like all relatively young theoretical approaches, has many branches. It is not a monolith but a series of experiments. They reach out like tentacles around one another but also spread in different directions. Not all new materialists agree with one another on fundamental questions about the nature of matter or its consequences for politics or science. Others like "speculative realists" and "object-oriented ontologists" are not materialists at all, but scholars frequently categorize them as new materialists based on a misunderstanding.

One can hardly blame readers for the confusion. Sorting out the exact similarities and differences between new materialists took my colleagues and me about four years. There are also several pressing criticisms of new materialism to consider. However, I will forgo a full literature review and critique of particular new materialists here because I have already written a detailed review with my co-authors, called "What is New Materialism?".[1] Instead, I want to focus on two shared ideas among new materialists and their implications for aesthetics.

One can say very few things about *all* new materialists. However, despite their diffractive differentiations, I think I can confidently identify their two core clusters. They are all *trying* to overcome the long philosophical tradition of anthropocentrism and the idea that matter is purely passive. Anthropocentrism believes that humans are the most important beings in the universe and the only ones that make meaning. If this is

true, nonhuman nature is passive, mechanical, and deterministic. In the history of Euro-Western philosophy, philosophers have mainly thought of matter as something without form or meaning. According to these philosophers, God, eternal forms, human minds, or unchanging laws of nature give form and meaning to inert matter.[2]

New materialism is "new," not because there are no historical or geographical precursors to the idea that humans are not the most important beings in the universe or that matter has agency.[3] New materialism is "new" relative to the dominant Euro-Western tradition, which has uncritically accepted the superiority of form over matter and defined itself by the progressive domination of nature.

The Euro-Western tradition has broadly defined itself by the progressive domination of nature. It has assumed the existence of a natural hierarchy in which some things, people, and ideas are inferior to others. For instance, modern European science and politics justified the treatment of nature, women, and colonies by the idea that they were passive material to be manipulated and mastered by the minds of white men.[4]

Philosophers placed certain metaphysical categories at the "top" of the hierarchy, such as eternity, God, the soul, forms, and essences, to explain the movement of matter at the bottom. The top of the hierarchy was secured, and it ordered the bottom. After thousands of years of treating nature and matter as inactive substance molded by ideal forms, we are feeling the ecological consequences of this mistake with global climate change and mass extinction.

For more than a century, though, "critical theory" has been exposing and challenging these hierarchical assumptions.[5] The premise of critical theory is that philosophers can contribute to social and intellectual transformation by showing people the dominating nature of their practical and theoretical assumptions. For example, patriarchy, capitalism, racism, and ecocide are not unrelated phenomena. Critical theorists have been arguing for decades that they are interlocking behaviors with shared hierarchical assumptions about reality. Whether or not individuals are consciously aware of it, this hierarchy persists today at a cultural level and has been shaped by ancient and modern history.[6]

This hierarchical logic places stasis above motion, form above matter, life above death, God above humans, men above women, reason above emotion, white skin above brown skin, the first world over the developing world, citizens above migrants, cisgender above transgender, cisgender above transgender, straight above queer, humans above animals, animals

above plants, and plants above minerals. At the very bottom of this chain are matter and motion. Everything above rests on their mute receptivity.

In my view, new materialism's contribution to critical theory is to challenge this hierarchy, *including* the notion that matter and motion are inferior. If all hierarchy rests on the assumption that inferior beings are more material and mutable than those above, showing that matter and motion are not inferior can help undermine this inherited hierarchy. Many humanists, including critical theorists, and scientists still think of matter as mechanical, deterministic, and passive.[7] For decades, though, environmental and feminist philosophers have argued that this hierarchical way of thinking and acting is partly to blame for present social inequality and ecological crisis.[8] For example, when humans think of themselves as superior to nature they have a historical tendency to destroy ecological systems for short term gain.

Until critical theory turns its tools on the hierarchical chain's last links of matter and motion, even the best critical thinking will remain incomplete and anthropocentric. Without a critical philosophy of matter and motion, theorists may still be able to treat human culture as distinct and superior to nature and thus justify dominating the planet and humans historically associated with nature.

The point in challenging the material base of this hierarchy is not to invert it by showing that matter and motion are superior but to indicate that all hierarchy is arbitrary and dangerous. If there is no ontological basis for natural hierarchy, then it becomes clear that all hierarchical beliefs and behaviors are blatant forms of power and domination. That does not necessarily stop the domination, of course, but it does lift the veil so people can see what they are doing. There is no ontologically legitimate justification for social, aesthetic, or scientific exclusion.

However, identifying and avoiding these delusions does not tell us what we *should* do. That is the point. Before we can begin to experiment with different ways of living, it will help us immensely to identify and clear out the most dangerous tools in the toolbox.

There are many ways to survive and flourish with others, and it is no single person's purview to dictate how that happens. If we want to survive and flourish on the planet, our best chance is to think and act without metaphysical illusions and hierarchal behaviors. Harboring such fantasies is akin to wearing a blindfold while walking on a tightrope. It can only hinder an already precarious balancing act. Uncovering our eyes does not predetermine our actions or give us an *absolute* view of reality, but it can

help us get where we want to go without falling. At least, that is how I think of the aim of the broader importance of new materialism.

Nature does not compel morality but constrains the material conditions of survival and flourishing in various ways. If we want to survive and experiment with new ways of living, we need to give up on the hierarchy of being. But we can't do this if we keep imagining all kinds of metaphysical entities and arbitrary hierarchies that dictate what we make. As long as people continue to think and act like matter and motion are subordinate phenomena, one can still wield matter and motion as weapons against people, places, and art practice itself.[9]

This brings us to the question of aesthetics. What are the implications of new materialism for art and aesthetics?

What Is Art?

The Euro-Western tradition has mainly treated art as the exclusive purview of human meaning, making matter passive. For instance, the fifth century BCE Greek philosopher Plato described all sensuous objects, including art objects, as copies of unchanging immaterial forms. Only humans could grasp these pure forms through contemplation. Plato taught that the original or model object remained static and unmoved. Artists tried to represent these forms with sensuous images but always failed. He wrote,

> Now the nature of the ideal being was everlasting, but to bestow this attribute in its fullness upon a creature was impossible. Wherefore he resolved to have a moving image of eternity, and when he set in order the heaven, he made this image eternal but moving according to number, while eternity itself rests in unity.[10]

For Plato, art and aesthetics are illusions, deceptions, and likenesses organized according to discrete numerical quantities. The true essence of things is static form. Art and nature fail to represent the truth of things because art and the human body are matter in motion. In other words, Plato's framework implied that matter and motion are why art and nature fail to achieve the true beauty of immaterial forms. This fundamental idea influenced Western representational art for over a thousand years and never disappeared.

In the nineteenth century, the German philosopher Immanuel Kant, following the lead of the Scottish philosopher David Hume, argued against Plato that the ideal forms were only in our *minds*. For Kant, all humans share the same structure of reason and aesthetic judgment. We have no way of knowing what nature is like "in itself." When humans find nature or art beautiful, they appreciate the structure of their minds as they use it to look at art. For Kant, sensations fluctuate in the perceiver's body, but the *concept* of beauty in our minds has a fixed universal form.

For Kant, the object's true nature in itself was unknown because the body and its senses are material and mobile. Movement leads the senses to *misrepresent* reality to the mind. According to Kant, one cannot trust the senses of the body in knowledge or beauty. Therefore, our experience of beauty is not the beauty of nature or even of the beauty of art, but rather the beauty of our idea, experience, or faculty of representing art to ourselves.

Nature is only the prompt for us to discover the beauty of our own aesthetic and phenomenological faculties.[11] This is the inverse of the classical Platonic idea of the model and copy. Instead, Kant subordinated art to the aesthetic structures of judgment in the mind of the experiencing subject.

This subjective theory of form pervades Kantian and post-Kantian aesthetic theories. For the Russian writer Leo Tolstoy, art communicates human forms to other humans.[12] For the German philosophy G.W.F Hegel, only the human mind can realize the ideal forms hidden in the "dead husk" of natural history and art.[13]

This theory of aesthetics also includes twentieth-century social, anthropological, linguistic, and economic "constructivist" theories. Constructivism is the idea that humans make their reality and have no access to the nature of things as they are in themselves. As part of the Kantian legacy, certain strains of social constructivism moved beyond reducing everything to the structure of reason by focusing instead on human structures of collective construction. Despite this difference, the anthropocentric premise remains intact: humans construct reality.[14] As the American new materialist Christoph Cox writes,

> Contemporary cultural theory often falls prey to a provincial and chauvinistic anthropocentrism as well, for it treats human symbolic interaction as a unique and privileged endowment from which the rest of nature is excluded. It thus accords with the deep-seated metaphysics and theology

> it aims to challenge, joining Platonism, Christianity, and Kantianism in maintaining that, by virtue of some special endowment (soul, spirit, mind, reason, language, etc.), human beings inhabit a privileged ontological position elevated above the natural world.[15]

What's the problem with this anthropocentric and formalist tradition of aesthetics? In my view, this tradition is not an accurate description of what art does and can do. Anthropocentric assumptions arbitrarily narrow the range of agents that we look at in art and aesthetics. Should humans or human minds necessarily be the only makers and recipients of art?

Anthropocentric and formalist aesthetics is like looking at a work of art through a pinhole. It introduces a cut between "art," "artwork," and "viewer." If artists and art lovers think that the matter of the artwork and their bodies and brains are purely passive, they significantly limit their skills and imaginations. As long as they believe this, artists may continue to subordinate matter to form. They may ignore the creativity of their materials and the creativity of bodies and brains in response to works of art. Human aesthetic experience, too, will likely be constrained to a limited range of meaning and forms of judgment if we ignore the full range of physical processes and sensations in works of art.

New materialist aesthetics offers an alternative to this anthropocentric and anti-materialist tradition. The Finish art theorist Katve-Kaisa Kontturi argues that "the material subtleties play a tremendous role," especially in modern art.

> Whenever we see a fascinating image, there are always multiple material processes involved, intertwined into it – whether it's in the brushstrokes, the motion of a painter's hand, the quality of paper or ink, a piece of a software code, perhaps, or movements of a poser's body before the canvas. Neither do we ever encounter art by looking and thinking only; we sense textures and haptic qualities simultaneously.[16]

Typically, we do not think of our breathing bodies as aspects of a work of art, but Kontturi does. She argues that our breathing creates rhythms that synchronize with our feelings and the room's temperature. They are part of the setting of how we experience art. Experiencing art is like a dance where our bodies respond and change at a material level in the presence of an event.[17]

> Even if a painting or a photographic installation appears to stay still, there is nevertheless movement: think of how paint cracks when it ages or is subject to changes in humidity, or how a photographic installation affects its viewer by way of its own materiality interwoven in such things as hanging.[18]

In her work, Kontturi beautifully describes how a series of large hanging photographs sway in the air currents made by viewers as they walk among them. By walking, viewers create a mobile exhibit that changes the photographs and the viewers simultaneously. The work of art is intra-active in that it changes participants and the art simultaneously.

It's not that no one has ever experienced the materiality of art before. But, we have a cultural habit of ignoring the cracks in the paint or how air movements may shape our experience and the agency of the work and its setting.[19] When artists and spectators only pay attention "to what artworks represent, or more mundanely put, depicts their content," we lose an essential dimension of the art event.[20] Kontturi claims that "if we do not pay attention to moving materialities of contemporary art, we end up with seriously restricted understandings of art's capabilities."[21]

The same is true of music and sound art, according to Christoph Cox. Sounds are not objects or properties of objects. They are events and processes. Sounds are vibrations in the air caused by vibrations in things that then vibrate our bodies. Sound waves diffract with one another through the environment in a highly non-local and non-linear way. Cox argues that

> This materialist theory of sound, then, suggests a way of rethinking the arts in general. Sound is not a world apart, a unique domain of non-signification and non-representation. Rather, sound and the sonic arts are firmly rooted in the material world and the powers, forces, intensities, and becomings of which it is composed. If we proceed from sound, we will be less inclined to think in terms of representation and signification, and to draw distinctions between culture and nature, human and nonhuman, mind and matter, the symbolic and the real, the textual and the physical, the meaningful and the meaningless.[22]

Sonic materialism does not give us access to a real essence beneath the cultural representations of music and sound. Essentialism assumes that there is an unchanging essence of art or meaning. Sonic materialism, however, focuses our attention on the continually changing and diffracting process of sound without essence or representation.[23]

Cox' sonic new materialism "enjoins us to abandon the idealist and humanist language of representation and signification that has characterized theoretical discourses on literature and the visual arts over the past half-century, and to reconceive aesthetic production and reception via a materialist model of force, flow, and capture."[24]

Earth art or geoart is another area where new materialist aesthetics can help us see the material dimensions of art. The Polish theorist Dorota Golanska argues that earth art emphasizes the materiality of art and undermines the division between nature and culture. "The work of art—as long as it lasts—remains in continuous movement, there is no stasis, no single moment when you can say 'it's ready, it's finished!' As constantly unfolding, [it is] about perpetual metamorphosis, or relentless becoming."[25]

For instance, the American artist Jim Denevan draws enormous patterns on beaches and leaves them there for the tide to wash away or the wind to erode. For Golanska, the works highlight the ephemeral nature of art, human existence, and the ubiquity of material transformation. The patterns are mainly organic fractal and iterative shapes such as spirals, circles, and flower-like designs. For Golanska, geoart.

> affects us directly (on the material level) and indirectly (on the representational level) at the same time, although the distinction between the two dimensions must only be provisional—they are entangled and co-constitute each other in the perpetual procedure of becoming. This invites a processual understanding of art—art is defined in terms of a constant material-semiotic unfolding… It is about perpetual productivity—differently from purely representational thinking (which invites recognition of the already known), new materialist approach to art invites opening to the new, which encourages a serious reconsideration of our perceptual routines and habits.[26]

Geoart, for Golanska, is not about imposing form upon the matter of the earth. Instead, it is "about cooperation and mutual co-constitution from which a work of art emerges." Geoart emphasizes the fundamentally unfinished and incomplete material aspect of art, as opposed to attaining a masterwork of near-perfect form and preserving it in a museum. The agents of the work of art are human and nonhuman forces working together to produce a new natural cultural process.

Geoart, for Golanska, is a singular site-specific dimension of the landscape itself and can, therefore, not be reproduced or moved without

becoming a "new set of procedures and transformations. It would not remain the same in a different setting. Neither does it remain the same in its original setting."[27]

Golanska concludes by suggesting that "knowledge production can learn a lot from the detailed inspection of artistic processes." This is what new materialist artistic research is all about. The attention to the detailed agencies of matter that occur in the artistic process can help train our eyes and minds to see the agencies of matter everywhere. This can have considerable consequences in every field of knowledge beyond aesthetics.

New materialist artistic research acknowledges the.

> active involvement of all factors, phenomena, and processes as well as of matter and discourse in their various, sometimes surprising ecosystemic configurations. Recognition of the fact that we (and our products) are vulnerable, fragile, and susceptible to the environment as much as the environment is susceptible to us (and our scientific achievements)—always a movement, never a stasis—fuels reflection on a more sustainable development as well as on gentle and resilient co-existence with other lives. This may help us think more productively about how we affect (not-only-human) others and are affected by them in the processes of constant transformation and metamorphosis. Such reflection is of crucial importance in the epoch of Anthropocene/Capitalocene and the Sixth Extinction connected therewith.[28]

In new materialist aesthetics, art is also a process of transformation that works directly on the materiality of our bodies and brains. By art, I mean broadly all the arts, including fine art, dance, theater, and sculpture. The New Zealand art theorist Greg Minissale has proposed an aesthetic "neuromaterialism" that focuses on the synchrony of brain activity with works of art. This resonates with Kontturi's emphasis on "following" a work of art instead of stamping form on its passive matter. In particular, Minissale argues that one of the most productive ways to make and view the material processes of art is "by relaxing rational judgment of a painting's 'meaning'" in order to "become sensitive to the rhythms it suggests."[29]

Neuroscientists who study how human brains respond to art have shown that waves of light and sound from objects enter our senses and diffract with the "spontaneous fluctuations" of the neurons in our brains. Waves or frequencies from the world interact and transform into sensory signals in our bodies. Then, they are either canceled or amplified by the

unique resting-state fluctuations in our brains. The waves of the world diffract with the waves of our bodies and brains like ripples in a pond. These unique diffracted rhythms propagate through our brains largely unconsciously and involuntarily.

If this is true, art happens mainly in the *intra-action* between brain, body, and world and only marginally in our conscious "minds."[30] When non-conscious processes occasionally bubble up to the surface of our awareness, we experience them as spontaneous thoughts, mind wandering, imagination, or daydreaming. According to Minissale,

> The unpredictable rhythms of matter exhaust attempts to take control of it, and instead our mind drifts into a kind of dreaming with eyes wide open, our imagination cued by the granular textures and rhythms, the twists and turns of the matter itself. This suggests that reverie can be extended and situated, that it is not all in the head.[31]

Art does not take place merely in our head because our head is not separate from the world. Our brains are material and are rhythmically responding to the world whether we are aware of it or not. Our eyes scatter and roam over paintings in rhythms called "eye saccades" that we are mainly unaware of but play out in our imagination.

> For example, in Giovanni Bellini's St. Francis in the Desert (c. 1480), the schist and strata of the rocks, which take up nearly all the pictorial space, can trigger involuntary experiences of staggered rhythms and mind wandering. Similarly, the depiction of clouds and earth in art can provide relief from following or constructing a narrative about the whole painting. Such intervals help to produce moments of daydreaming associated with mind wandering. This involves feeling relaxed with messy things, being absorbed in what we might call arbitrary movements of matter.[32]

One of the main ideas of Minissale's work is that the experience of the work of art is not an immaterial mental event or a judgment. It is a fully enworlded and diffractive process of play and involuntary creativity with the artwork.

New materialist aesthetics is a young but growing area of research that has enormous potential to change the current anthropocentric and anti-realist tendency in philosophy and art. In the next section, I want to introduce some of my reflections and try to bring together several critical insights into the new materialist aesthetics discussed above.

Kinaesthetics: A New Materialist Kinetic Theory of Art

I come to the field of new materialist aesthetics from my work on what I call the "philosophy of movement." It's only relatively recently that scientists have concluded that everything in the known universe is in motion, and I take this as a serious philosophical event. From the ongoing expansion of the universe and its innumerable galaxies whirling around supermassive black holes to the earth's revolution around the sun, we know of nothing in our vast cosmos that is entirely static. Even at the tiniest sub-atomic levels, there are indeterminate fluctuations of energy that never stop moving. Physicists call them "quantum vacuum fluctuations."

But what is movement? The most common definition is that movement occurs when something moves from one point to another in space and time. But what if space and time are also moving outward in all directions as the universe expands? What if the fabric of spacetime itself is woven from the same energetic fluctuations as the universe? They are, and it means that there are no fixed points in space or time and that the entire cosmos is continually changing. It also means that movement is only relative to other movements and not to any space or time points.

In my view, a significant consequence of this discovery is that if we want concepts to help us think about material reality, including human knowledge in art, science, politics, and ontology, we should base them on movement. Unfortunately, movement has suffered the same historical fate as matter has in the Euro-Western tradition. Philosophers have systematically placed it at the bottom of the natural hierarchy.[33] Almost without exception, philosophers have said that something else causes movement and is thus derivative and subordinate. In my work, however, I argue that the movement of matter is immanent and self-caused.[34] There is no higher explanatory principle.

In this sense, the philosophy of movement is a branch of process philosophy distinct from the main process traditions based on the French philosopher Henri Bergson's process vitalism or the British philosopher Alfred North Whitehead's process occasionalism.[35]

As a new materialist philosopher of movement, I aim to introduce concepts that can help make sense of a wide range of material processes at numerous scales of reality: from the quantum to the cosmic. Here, I

want to introduce my kinetic philosophy of art based on my book *Theory of the Image* and how it contributes to new materialist aesthetics.

What most people call "art" typically refers to the human knowledge of making and having sensations. But ultimately, human art is not separate from the rest of the material world. All of the matter affects and is affected in unique qualitative ways. If there is no ontological division between nature and culture, human art must be one aspect of a much larger process of *qualitative* conjunction and transformation.

For instance, galaxies, nautilus shells, whirlpools, and humans all make spirals in their own way. Why should we say that only the human spiral is "art" while the others are not? I am not saying that humans are not unique somehow, only that whatever is unique about them is no better or more unique than any other unique material process in the cosmos. That would be arbitrary and anthropocentric. I agree with Virginia Woolf when she says in her autobiography that,

> the whole world is a work of art; that we are parts of the work of art. Hamlet or a Beethoven quartet is the truth about this vast mass that we call the world. But there is no Shakespeare, there is no Beethoven; certainly and emphatically there is no God; we are the words; we are the music; we are the thing itself.[36]

But where should we draw the line between art, science, politics, and ontology? This is yet another fundamental question raised by new materialism. From a new materialist perspective, there is no ontological division between these domains of knowledge. Each domain focuses on a particular and inseparable dimension of the world. In my view, "art" is the name for what humans do when they focus on the *qualitative* dimension of things; "science," when they focus on the *quantitative* dimension; "politics," on the *relational*, and "ontology" on the *modal*. But in reality, none of these dimensions is separate from the others. It's a convention used by some human civilizations and not others. Why and how this happens is the long history of anthropology.[37]

I will use the word "art" here as the name some humans came up with to define their focused relationship to qualitative processes. I do not intend it to imply any hierarchical or ontological division.

Instead of analyzing art as primarily static, spatial, or temporal, I understand it as a *pattern of motion*. Instead of looking at subjects and objects, I look at the processes that compose and move through subjects and

objects. This method highlights two crucial theses of new materialist aesthetics shared by think theorists in the previous section.

1. Art is a material process.
2. Art involves creative diffraction between the body, brain, and world.

What Is So Kinetic About Art?

Human art is a material process continuous with our moving cosmos. There are very few things that hold for the entire universe, but one of them is entropy. The universe began as a hot and indeterminate process and has been spreading out and cooling ever since. The fabric of space-time and all known fields and particles unfolded from a single big bang of energy.

Eventually, as the Roman poet Lucretius sang two thousand years ago, the world will die. As the cosmos spreads out and cools down, flows of matter vibrate back and forth in various frequencies or wave lengths that give off heat. When these waves diffract with one another, they create highly entangled or folded regions of energy called particles.

These particle waves diffract with one another into various patterns and composites. In physics, a diffraction pattern is where two or more waves collide and either amplify or cancel one another depending on the mixture of their amplitudes (power) and frequencies (speed of oscillation) (see Fig. 1). The diffraction of energy is similar to throwing a handful of pebbles into a pool of water and watching the resulting pattern form. We call "matter" the relatively stable process of innumerable diffraction patterns sustained by the vibrating movement of energy as it spreads out through the cosmos.

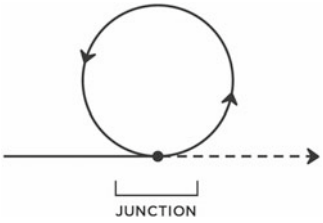

Fig. 1 Fold and junction

Lucretius called these dissipating flows of matter "simulacra" and believed that everything we see results from their weaving and unweaving. In his poem *De Rerum Natura* he writes:

> I have further shown how the nature of the mind,
> and life is braided together from matter,
> and is eventually unraveled back into its first-threads,
> now I will begin to treat for you what closely relates
> to these things: that there exist what we call simulacra,
> which, like membranes ripped from the outer surface
> of things, fly back and forth through the air.[38]

Simulacra, like energy, dissipate from matter and diffract with one another into various patterns and form various metastable objects we call reality. Lucretius continues,

> I have shown how nature is woven together
> through spontaneous flows of endless motion
> and through various formative lengths
> which measure the creation of things.[39]

For Lucretius, all matter, including our mind and our experience of art, is a process of diffracting simulacra. Form is an emergent and metastable property of how matter weaves together and diffracts. For Lucretius, diffraction is neither random nor deterministic, but is a relational pattern which emerges from the fundamental indeterminacy of matter's "swerving" movements. Contemporary quantum physicists often claim Lucretius as the origin of the idea of quantum indeterminacy.[40]

This is the broader material and kinetic story within which human art emerges. But let's look more closely at what is going on in the human experience of art from this vantage.

Have you ever closed your eyes and seen shapes while listening to music? Have you ever seen faces in the clouds looking back at you or spied a dragon on a rocky outcropping? If you have, you have experienced what psychologists call "pareidolia," finding meaningful images in visual patterns.[41] Less well known, however, is that pareidolia is the result of creative and material diffraction in artmaking and appreciation.[42]

In particular, recent scientific research into the neuroscience of "spontaneous cognitive fluctuations" suggests that the source of pareidolia may be one of the reasons we love art and nature so much.

Cognitive fluctuations are unpredictable changes in neural activity in the brain whose causes are presently unknown. Neuroscientists have been aware of these fluctuations since the 1930s but have typically averaged them out as "background noise" from other brain activity correlated to conscious thought. According to recent research, these fluctuations make up 95% of brain activity, while conscious thoughts account for about 5%. Cognitive fluctuations are like the dark matter or "junk" DNA of the brain. They make up the most significant part of what's happening but remain mysterious.

However, in the last fifteen years, neuroscientists such as Georg Northoff,[43] Robin Carhart-Harris,[44] and Stanislas Dehaene[45] have been focusing their research on these fluctuations. They have concluded that neural fluctuations are not secondary but fundamental for consciousness. Using electroencephalograms (EEG) to measure the frequency and strength of large groups of neural fluctuations in the brain, scientists have discovered that brain waves tend to nest into one another like syncopation in music. At the lowest frequencies, the drums lay down a beat. In between these beats, the bass plays a rhythm, and in between the notes of that rhythm, the guitar plays a melody. The song of consciousness builds up from spontaneous neural fluctuations.

There are similar spontaneous fluctuations in the world, our bodies, and our brains. When the frequencies of the world and brain interact, they improvise and create diffractive patterns. The world pulses with frequencies of sound and light like a drumbeat within which our bodies digest food, beat hearts, and pump lungs.

Our brains do not represent the world but rather respond to these frequencies with their own spontaneous fluctuations. They play between the waves with melodies that make up our thoughts and feelings. Like a jazz trio, the world, body, and brain have their own spontaneous fluctuations that are the basis of the creative improvisation we call reality.

These fluctuations are also the source of our experience of pareidolia.[46] When we let our minds wander and daydream, they become increasingly open to these divergent "bottom-up" diffractions and weak associations. Pareidolia occurs when we involuntarily experiment with seeing various "top-down" images such as animal shapes or faces in these fluctuations. In this improvisational state of mind, spontaneous thoughts and creative images rise like waves from the ocean of the unconscious and disappear again.[47] This back-and-forth is an improvisational process that increases

cognitive fluctuations in the brain and has therapeutic effects similar to other activities that increase cognitive fluctuation.[48]

But why do people enjoy this activity so much? Why do they tend to like some natural and artistic patterns more than others? Some sights and sounds tend to amplify these spontaneous fluctuations more than others. For instance, scientists have shown that taking a walk in nature tends to increase mind wandering due to the fractal patterns of natural objects.[49] The same thing happens when we view fractal patterns and proportions in art.[50] A fractal is a particular proportion of coarse-grained to fine-grain patterns, such as a tree whose branching pattern repeats in its branches, twigs, and leaf veins.

When we look at the world, our unconscious eye movements or "eye saccades" also have a fractal pattern as they move over images.[51] When we view fractal patterns with our fractal eye movements, our bodies become less stressed, and our brains mind wander more as images emerge and disappear from conscious awareness.[52] Even our brainwaves become more fractal and more interconnected when our minds wander.[53] And this experience of reverie often feels good.

For instance, several recent studies have shown that people prefer to look at fractal patterns and artworks more than non-fractal ones and find them more aesthetically beautiful.[54] In other words, these studies provide strong evidence that fractal images and sounds invite our eyes, bodies, and brains to play, wander, and make new associations at a mainly unconscious and involuntary level and enjoy it.

Fractals also increase pareidolia. Studies show that people tend to see more images in Rorschach ink-blot tests with a particular fractal dimension.[55]

But why is the play between body, brain, and world so widely experienced as pleasurable and beautiful? The physicist, Richard Taylor at the University of Oregon, speculates that humans are "wired" with a "fractal fluency" since we evolved surrounded by the natural fractal patterns of plants, clouds, and rocks.[56] Studies confirm that fractals increase attention, pattern recognition, navigation, reduce stress, and have aesthetic appeal. Taylor argues fractals are also the source of our "biophilia," or love of nature.[57]

From a new materialist perspective, I find it fascinating about the connection between cognitive fluctuations, mind wandering, and fractal patterns in art and nature because they tend to be good for humans in a uniquely *playful* way. Some works, natural objects, works of art, and states

of mind, tend to increase the creative aspects of diffraction between fractal patterns, or "diffractals." Nature does not dictate a single universal form of right action, healthy living, or beautiful art. Instead, some patterns let us play and experiment more or less. And it seems that we prefer to play.

But play can also be dangerous. Not all our experiments work, and some go wrong. Mind wandering can lead to negative rumination, and not everyone prefers the same fractal dimension.

We are not biologically programmed to like or this or that object, but rather inclined to enjoy the process of play, improvisation, trial, and error in all things. In other words, recent research into mind wandering and fractals suggest that the process of creativity and play involved in making and experiencing art diffractively is a crucial source of aesthetic beauty and our love of nature.

Art is always interactive and creative to varying degrees and therefore involves a degree of artistic research.

In light of this, one method of doing artistic research would be to study the entrained patterns of motion at various levels. Instead of thinking only about the form, content, meaning, or representation of a work of art, one would map out the nested patterns and rhythms across various objects and agencies.

Flows

We could start by thinking about art in terms of "flows." A flow is an indeterminate material process. As matter moves from high concentrations to lower ones, it dissipates and spreads out. This is the origin of all diffractive or diffractal events.

For instance, without the material flow of photons, there is no vision; without the flow of molecular pressure, there is no sound; without the flow of saliva, there is no taste; without the flow of air, there is no smell. Most importantly, without the flow of all matter, there is no creative diffraction or touch—the foundation of all sensation and qualitative change.

Art only emerges where matter can encounter itself—to touch itself and playfully diffract. This diffraction and differentiation occur only through movement. As matter moves and collides, it can iterate certain rhythms or patterns. These are what we call the qualitative aspects of things. Without flows of movement, we would live in a world of static vacuum-sealed entities with no sensation, affection, or art.

Flows of matter are not passive or mechanical. Their movement has a creative agency to affect and be affected in the world, just like Lucretius' swerve. This means that art objects have their own agency, activity, and movement whether we are there or not. They act on and are acted on by their environment. When humans make or experience art, they enter into a broader material process. They affect and are materially affected by the art and the environment.

This is because matter does not stay contained but flows and dissipates from artworks, human bodies, and the world. Material dissipation is the source of diffraction.

Folds

When flows of matter intersect and iterate in periodic cycles or rhythms, these are their "folds." If all sensuous reality is material flows, folds are the places where matter loops, cycles, or oscillates back and forth. In this sense, a fold is not something other than a flow. It is a place where matter touches and creates a unique quality. Matter "senses" itself.

When this quality or "fold" continues to repeat in approximately the same looping pattern, it creates a kind of mobile stability or metastability. A fold joins a flow to itself over and over again. The point where the flow returns to itself is a point of self-reference or haptic circularity that yokes the flow to itself (Fig. 1).

This is how an iterative rhythm can sustain a certain quality. For instance, flows that vibrate close together tend to be more solid than those that vibrate farther apart. All our senses translate frequencies from the world. Light and sound enter our bodies and memories as habits or recurring vibrations. In this way, the folds of the world are folded directly into our bodies. Following, Lucretius, I call these qualitative folds "images" in my book *Theory of the Image*. Images are the qualitative aspect of all things.

Fields

Kinaesthetic "fields" emerge when folds become entrained into larger patterns and rhythms of movement. In this sense, an aesthetic field is a metastable order of metastable orders. It acts less like a container than like an origami object that brings together multiple folds, changing them each time it folds. It includes the body, brain, and world together in a

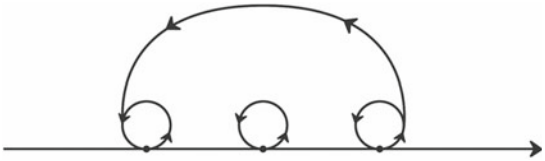

Fig. 2 Field of circulation

shared diffractal order. Flows of matter cycle through folds that nest in one another in fields of circulation. To remain stable, a field of circulation also has to keep changing at a relatively metastable rate (Fig. 2).

The folds remain distinct, but flows tie them together. Through circulation, some folds act together (by connecting flows) and become larger; others separate and become weaker. Artistic research can map out these expansions and contractions through artmaking, appreciation, or art history.

Circulation turns some folds away and merges other folds in an expanding network. As a circulatory system increases the power and range of its folds, it increases its capacity to act in more ways. In short, a circulatory field is the controlled reproduction and redirection of an ordered pattern of movement.

Instead of thinking about art in terms of subjects and objects, I propose we think about iterative and entrained processes: flows, folds, and fields. Artistic research can be a method of mapping these patterns across the various scales of an art event. Art is not a representation of the world, and neither is our experience of it. Art is a pattern of folded frequencies that directly changes the world, our bodies, and brains. Art does not signify anything but directly transmits material sensations via patterns of motion. Thinking about art in this way lets us look at the subject and object of an aesthetic process as entrained fields of circulation creatively diffracting with one another.

Conclusion

Art is the knowledge of qualities continuous with the cosmos. All things have qualitative and aesthetic dimensions because nature dissipates, swerves, and affects itself. Human artists study and compose these singular qualities into sensuous images.

In this broad definition, the work of art is not a discrete thing but an event. It is a material process that happens when qualities are brought

together for some metastable duration. An art object, its display context, and those who experience it are all processes with unique qualities that fold and diffract together. The event of a work of art is the whole metastable conjunction of these qualities together. There is no work of art in isolation. Even when no humans are around, the work persists in its entropic movement relative to its environment. Water vapor and temperature interact with the work of art, and it interacts back with them. Art is always in the process of circulation.

Artistic knowledge and research include knowing how to make art and how to be affected by it. This is because art is a pattern of conjoining qualities that diffract more or less. Art does not communicate a separate message but acts directly and materially on the qualities in the aesthetic field. Light, sound, texture, smell, and taste are material processes that touch our bodies. In experiencing a work of art, our bodies touch it back through our material presence: our breath, heat, or touch. Our presence in a room can change the room's acoustics. All sensation is haptic. Art and sensation occur when qualities touch and make something. In this sense, all art is performative. Artistic knowledge is a dance of qualities in motion.

Art is not contemplation (Plato), judgment (Kant), idea (Hegel), or communication (Tolstoy), but is first and foremost about the affectations of matter. The experience of beauty is not a judgment of the world. It is a direct sensation of the world by a body woven into the qualities of the world. In this way, new materialist aesthetics reconnects anthropocentric separatists with the rest of the cosmos.

Defining art and beauty as only some patterns of motion and not others limits the range of qualities and ways we can assemble them. Material processes play a critical role in all works of art. Still, if only humans are treated as artists or as capable of experiencing art, we ignore the vast majority of the agencies in works of art.

Why should art be reduced to function or form? Definitions can be interesting experiments, but we should be careful not to treat them as universal. Art and the cosmos move on with or without humans. We can help it along and go with the flow by playfully diffracting like everything else, or we can pretend we are separate from the world and try to prohibit the generation of new qualities.

The movement of matter produces all kinds of conjunctions inside and outside the restricted domain of human art. Art can increase the diversity of qualities by increasing the dissipative spread of matter. It can avoid

getting stuck in standards of beauty and try to play more deeply and strangely than before.

Notes

1. Thomas Nail, Christopher Gamble, and Joshua Hanan, "What Is New Materialism?" *Angelaki Journal of the Theoretical Humanities* 24, no. 6 (2019): 111–34.
2. For the full account of this history, see Thomas Nail, *Being and Motion* (Oxford: Oxford University Press, 2019), Book II.
3. See Thomas Nail, *Lucretius I: An Ontology of Motion* (Edinburgh: Edinburgh University Press, 2018); Thomas Nail, *Lucretius II: An Ethics of Motion* (Edinburgh: Edinburgh University Press, 2020); Thomas Nail, *Lucretius III: A History of Motion* (Edinburgh: Edinburgh University Press, forthcoming); Thomas Nail, *Marx in Motion: A New Materialist Marxism* (Oxford: Oxford University Press, 2020); Thomas Nail, *Virginia Woolf: Moments of Becoming* (Redwood City, CA: Stanford University Press, under review); and Thomas Nail, *Matter and Motion* (Chicago: Chicago University Press, under review). See also Jerry Lee Rosiek, Jimmy Snyder, and Scott Pratt, "The New Materialisms and Indigenous Theories of Non-Human Agency: Making the Case for Respectful Anti-Colonial Engagement," *Qualitative Inquiry* 26, no. 3–4 (2020): 331–46.
4. Raj Patel and Jason W. Moore, *A History of the World in Seven Cheap Things: A Guide to Capitalism, Nature, and the Future of the Planet* (United States: University of California Press, 2017).
5. In my view, feminist philosophers have done some of the most important work to trace out this logic. See, for example, Greta C. Gaard and Patrick D. Murphy, eds., *Ecofeminist Literary Criticism: Theory, Interpretation, Pedagogy* (United States: University of Illinois Press, 1998); and Stacy Alaimo and Susan Hekman, eds., *Material Feminisms* (United States: Indiana Press University, 2008).
6. For an excellent treatment of how the subordination of matter to form is related to political and feminist issues, see Emanuela Bianchi, *The Feminine Symptom: Aleatory Matter in the Aristotelian Cosmos* (United States: Fordham University Press, 2014). See also Emanuela Bianchi, Sara Brill, and Brooke Holmes, eds., *Antiquities Beyond Humanism* (United Kingdom: Oxford University Press, 2019).
7. Nail, Gamble, and Hanan, "What Is New Materialism?".
8. Serenella Iovino and Serpil Oppermann, eds., *Material Ecocriticism* (Bloomington, IN: Indiana University Press, 2014).
9. For one recent example of how the historical subordination of matter has justified anti-blackness and white supremacy, see Armond R. Towns,

"Black 'Matter' Lives," *Women's Studies in Communication* 41, no. 4 (2018): 349–58. See also Bianchi, *The Feminine Symptom*. For more on the ethical and political consequences of my philosophy of movement, see Thomas Nail, *The Figure of the Migrant* (Redwood City, CA: Stanford University Press, 2015); Thomas Nail, *Theory of the Border* (Oxford: Oxford University Press, 2016); Thomas Nail, *Theory of the Earth* (Redwood City, CA: Stanford University Press, 2021); and Thomas Nail, *Lucretius II*.

10. Plato, *Timaeus*, trans. R.G. Bury. Loeb Classical Library 234 (Cambridge: Harvard University Press, 1929), 37c–e.
11. We can see a later expression of a similar idea in Aby Warburg's interesting, but also socially and anthropocentrically limited, idea of the "pathos of images." Becker, Colleen (2013). "Aby Warburg's Pathosformel as methodological paradigm," *Journal of Art Historiography* (9): 1–25. And in Bredekamp's theory of the Image-act in which images have agency, but only for human reaction, will, desire, and perception. "The 'I' becomes stronger when it relativizes itself against the activity of the image." Horst Bredekamp, *Theorie des Bildakts* (Berlin: Suhrkamp Verlag, 2010), 328.
12. Leo Tolstoy, *What Is Art?* trans. Richard Pevear and Larissa Volokhonsky (London: Penguin Classics, 1996).
13. See G.W.F. Hegel, *Aesthetics: Lectures on Fine Art*, trans. T.M. Knox (Oxford: Oxford University Press, 1975). See also Joseph Tanke and Colin McQuillan, eds., *The Bloomsbury Anthology of Aesthetics* (New York: Bloomsbury, 2012).
14. Since numerous full-length works have recently been devoted to making this argument, including my own, and since this is not the primary focus of this book, I must simply refer the interested reader to those works. See: Tom Sparrow, *The End of Phenomenology: Metaphysics and the New Realism* (Edinburgh: Edinburgh University Press, 2014); Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham and London: Duke University Press, 2007); Ian Hodder, *Entangled: An Archaeology of the Relationships between Humans and Things* (Malden, MA: Wiley-Blackwell, 2013); Levi R. Bryant, *Onto-Cartography: An Ontology of Machines and Media* (Edinburgh: Edinburgh University Press, 2014); Manuel DeLanda, *Assemblage Theory* (Edinburgh: Edinburgh University Press, 2016); Diana Coole and Samantha Frost, eds.,*New Materialisms: Ontology, Agency, and Politics* (Durham and London: Duke University Press, 2010); and Thomas Nail, *Being and Motion*.
15. Christoph Cox, "Beyond Representation and Signification: Towards a Sonic Materialism," *Journal of Visual Culture* 10, no. 2 (2011): 147.
16. Katve-Kaisa Konturri, "Moving Matters of Contemporary Art: Three New Materialist Propositions," *Journal of Art and Media* 5 (2014): 43.

17. Katve-Kaisa Kontturi, "Following the Flows of Process: A New Materialist Account of Contemporary Art," *Annales Universitatis Turkuensis*, ser. B, tom. 349. (Humaniora, Turku: University of Turku, 2012), op. cit. 58–61.
18. Kontturi, "Moving Matters," 47.
19. Ibid., 44.
20. Ibid., 43.
21. Ibid., 44.
22. Cox, "Beyond Representation," 157.
23. Ibid.
24. Ibid.
25. Dorota Golanska, "Geoart as a New Materialist Practice: Intra-Active Becomings and Artistic (Knowledge) Production," *Research Catalogue*. Accessed May 21, 2021,1. https://www.researchcatalogue.net/view/427704/427706.
26. Ibid., 2.
27. All quotes in this pargraph are from Ibid., 2.
28. Ibid., 5.
29. Gregory Minissale, *Rhythm in Art, Psychology, and New Materialism* (Cambridge: Cambridge University Press, 2021), 3.
30. For a wonderful theory of "intra-action" see Karen Barad, *Meeting the Universe Halfway*.
31. Ibid., 5.
32. Ibid., 17.
33. See Nail, *Being and Motion*.
34. See Nail, *Lucretuis I*; Nail, *Lucretius II*; Nail, *Lucretius III*, and Nail, *Marx in Motion*.
35. See Nail, *Being and Motion*, Chapter 3.
36. Virginia Woolf, *Moments of Being: Unpublished Autobiographical Writings*, ed. Jeanne Schulkind (New York: Harcourt Brace Jovanovich, 1975), 72.
37. For an excellent introduction to this issue see Marisol de la Cadena and Mario Blaser, *A World of Many Worlds* (Duke University Press, 2018).
38. Titus Lucretius Carus, *De Rerum Natura (On the Nature of Things)*, ed. Walter Englert, series ed. Albert Keith Whitaker (Newburyport, MA: Focus Publishing, 2003), 4.26–32.
39. Ibid., 4.45–58.
40. See Nail, *Matter and Motion*.
41. René Müri and Nicole Göbel, "See Faces in the Clouds? It Might Be a Sign of Your Creativity," *Psyche*, July 15, 2020. Accessed May 24, 2021. https://psyche.co/ideas/see-faces-in-the-clouds-it-might-be-a-sign-of-your-creativity.

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43. Georg Northoff, *The Spontaneous Brain: From the Mind-Body to the World-Brain Problem* (Cambridge, MA: MIT Press, 2018).
44. Robin L. Carhart-Harris, "The Entropic Brain—Revisited," *Neuropharmacology* 142 (Nov 2018): 167–78.
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46. Gulsum Akdeniz, Sila Toker, and Ibrahim Atli, "Neural Mechanisms Underlying Visual Pareidolia Processing: An fMRI Study," *Pakistan Journal of Medical Sciences* 34, no. 6 (2018): 1560-66.
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48. See Susanna Crossman, "The Play Cure," *Aeon*, February 4, 2021. Accessed May 24, 2021. https://aeon.co/essays/play-is-cathartic-allowing-people-to-sit-with-their-shadows; Thomas Nail, "Most Brain Activity Is 'Background Noise'—And That's Upending Our Understanding of Consciousness," *Salon*, February 20, 2021. Accessed May 24, 2021. https://www.salon.com/2021/02/20/most-brain-activity-is-background-noise-cognitive-flux-consciousness-brain-activity-research/ ; and Thomas Nail, "Why Making Our Brains Noisier Feels Good: A Counterintuitive Approach to Improving our Mental Health," *Nautilus Magazine*, February 17, 2021. Accessed May 24, 2021. https://nautil.us/issue/96/rewired/why-making-our-brains-noisier-feels-good.
49. Avik Basu, Jason Duvall, and Rachel Kaplan, "Attention Restoration Theory: Exploring the Role of Soft Fascination and Mental Bandwidth," *Environment and Behavior* 51, no. 9–10 (2018): 1055–81.
50. Caroline M. Hagerhall, Thorbjörn Laike, Richard P. Taylor, Marianne Küller, and Theodore P. Martin, "Investigations of Human EEG Response to Viewing Fractal Patterns," *Perception* 37, no. 10 (2008): 1488–94.
51. Richard P. Taylor, Branka Spehar, Paul Van Donkelaar, and Caroline M. Hagerhall, "Perceptual and Physiological Responses to Jackson Pollock's Fractals," *Frontiers in Human Neuroscience* 5, no. 60 (2011).
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53. Antonio J. Ibáñez-Molina and Sergio Iglesias-Parro, "Fractal Characterization of Internally and Externally Generated Conscious Experiences," *Brain and Cognition* 87, no 1 (Apr 2014): 69–75.
54. Hagerhall et al., "Investigations."
55. Bernice E. Rogowitz and R. Voss, "Shape Perception and Low-Dimension Fractal Boundary Contours," *Proceedings Volume 1249: Human Vision and Electronic Imaging: Models, Methods, and Applications* (October 1990).
56. Richard P. Taylor, "The Potential of Biophilic Fractal Designs to Promote Health and Performance: A Review of Experiments and Applications," *Sustainability* 13, no. 2 (2021): 823.
57. Ibid.

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