

Kirsty Robertson
Plastiglomerate

The conditions that obtained when life had not yet emerged from the oceans have not subsequently changed a great deal for the cells of the human body, bathed by the primordial wave which continues to flow in the arteries. Our blood in fact has a chemical composition analogous to that of the sea of our origins, from which the first living cells and the first multicellular beings derived the oxygen and the other elements necessary to life ... The sea where living creatures were at one time immersed is now enclosed within their bodies.
 – Italo Calvino, *Blood, Sea*¹

What is a beach actually? It is marginalia, a footnote to the essay that is the ocean. Beaches are many things and can range from rocky outcrops to lush vegetation. But the sandy beach of popular imagination is made up of sediment, of particles coming from eroded coral reefs in the ocean, sediment from the sea floor, eroded sections of the continental shelf, or weathered and eroded rocks from nearby cliffs.² In Hawai'i, volcanic basalt sometimes contributes to the mix, creating black beaches of small-to-tiny particles that are eroded by the constant, lapping wave action of the ocean. Beaches are far from sedentary. They are in constant motion, as wind and water wear away at rocks, coral, shells, and other matter. They also stretch across time as certain minerals, such as quartz and feldspar, are chemically stable and strong enough to last well through erosion, often forming the base of beaches millennia old.³ When plastics are released into the ocean, they join this process, being broken down into smaller and smaller parts and adding to the sand mixture on almost all coastal beaches. Note: an archive of pure sand is an impossibility. No wonder that sand is often seen to flow through time, through the glass timer, to ebb and flow, to move liquidly across the face of the Earth.

Kamilo Beach, Hawai'i is a node where the ocean gets rid of foreign substances. The beach has long been known as a way station: stories are told that pre-contact, native Hawai'ians used the beach to harvest logs that had drifted into Kamilo from the Pacific Northwest, and that shipwrecked bodies often turned up there.⁴ Currently, Kamilo is a terminal point in the circulation of garbage. The beach and adjacent coastline are covered in plastic: as much as 90 percent of the garbage accumulated in the area is plastic. So much garbage collects here that Kamilo Beach can be found on *Atlas Obscura's* compendium of bizarre and obscure places to visit, where it is described as "constantly covered in trash like some sort of tropical New

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Plastiglomerate sample/ready-made collected by geologist Patricia Corcoran and sculptor Kelly Jazvac at Kamilo Beach, Hawai'i, 2012. Photo: Kelly Wood. Courtesy of the artist.

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This and all subsequent images: plastiglomerate samples/ready-mades collected by geologist Patricia Corcoran and sculptor Kelly Jazvac at Kamilo Beach, Hawai'i, 2012. Photos: Jeff Elstone. Courtesy of the artist.



York City gutter.”⁵ It is a site of immense efforts at cleanup organized by the Hawaii Wildlife Fund, a group that must constantly contend with the ocean’s supply of new materials.

In 2012, geologist Patricia Corcoran and sculptor Kelly Jazvac travelled to Kamilo Beach, following a tip from oceanographer Charles Moore that the beach was covered in a plastic-sand conglomerate. Moore suspected nearby volcanoes were to blame. In fact, the plastic and beach detritus had been combined into a single substance by bonfires. Human action on the beach had created what Corcoran and Jazvac named “plastiglomerate,” a sand-and-plastic conglomerate. Molten plastic had also in-filled many of the vesicles in the volcanic rock, becoming part of the land that would eventually be eroded back into sand.

The term “plastiglomerate” refers most specifically to “an indurated, multi-composite material made hard by agglutination of rock and molten plastic. This material is subdivided into an in situ type, in which plastic is adhered to rock outcrops, and a clastic type, in which combinations of basalt, coral, shells, and local woody debris are cemented with grains of sand in a plastic matrix.”⁶ More poetically, plastiglomerate indexically unites the human with the currents of water; with the breaking down, over millennia, of stone into sand and fossils into oil; with the quick substration of that oil into fuel; and with the refining of that fuel into polycarbons – into plastic, into garbage. From the primordial muck, to the ocean, to the beach, and back to land, plastiglomerate is an uncanny material marker. It shows the ontological inseparability of all matter, from the micro to the macro.

Following the research excursion to Kamilo Beach, Corcoran and Jazvac argued in *GSA Today* that plastiglomerate was evidence of a plastic marker horizon that could contribute to the naming of a new era. The naming and dating of the Anthropocene, an as-yet formally unrecognized and heavily debated term for a geologic epoch evidencing human impact on the globe, relies “on whether humans have changed the Earth system sufficiently to produce a stratigraphic signature in sediments and ice that is distinct from that of the Holocene epoch.”⁷ While it is incontrovertible that humans have impacted the planet, the strata to measure that impact in the global geological record remains controversial. Is the signature change a layer of plastic sediment from the mid-twentieth century’s “Great Acceleration” of population growth? Does it begin with the Industrial Revolution’s massive deposits of CO₂ into the atmosphere? Or perhaps it is lithospheric, with

evidence found in the rise of agriculture some twelve thousand years ago? Maybe the start date of the Anthropocene can be traced to a single day, that being the first nuclear test – the Trinity test – in 1945, which deposited an easily measured layer of artificial radioactivity into the global soil.⁸ The term “Anthropocene” remains stable/unstable, “not-yet-official but increasingly indispensable,” writes Donna Haraway; near “mandatory” in the humanities, arts, and sciences, if not elsewhere.⁹ Whichever (if any) start date is chosen, plastiglomerate – a substance that is neither industrially manufactured nor geologically created – seems a fraught but nonetheless incontrovertible marker of the anthropogenic impact on the world; it is evidence of human presence written directly into the rock.

After collection, the samples gathered at Kamilo Beach were analyzed so as to categorize the plastics and the natural sediments that together created the plastiglomerate whole. Following this, Jazvac showed the plastiglomerate in art exhibitions as sculptural ready-mades, to demonstrate human impact on nature. Finally, museums, among them the Yale Peabody Museum, the Het Nieuwe Instituut (Rotterdam), and the Natura Artis Magistra (Amsterdam), reached out to collect and display the samples as specimens that captured changing natural history. These three paths bring up a number of questions. What does it mean to understand part of the geologic record as a sculptural object? Can art make visible a problem too large to otherwise understand? What can we learn from approaching the fraught term “Anthropocene” as a creative undertaking on a massive scale, even if the end result of that creativity is the demise of a hospitable environment for most species? What can art tell us that stratigraphy cannot?

Cynical Smog and Mermaid’s Tears

The invention of plastic is so recent. Its rapid accumulation is as young as it is overwhelming. Considered against Earth’s five-billion-year life span, it appears to arrive and cover the world in one simultaneous instant, unfolding through time and space into a future we cannot yet see. Noted for its convenience and durability, plastic emerged in part as a promise to displace other products that relied on animal remains and natural resources: bone, tortoiseshell, ivory, baleen and whale oil, feathers, fur, leather, cork, and rubber. “As petroleum came to the relief of the whale,” stated one pamphlet advertising celluloid in the 1870s, so “has celluloid given the elephant, the tortoise, and the coral insect a respite in their native haunts; and it will no longer be necessary to ransack the earth in

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pursuit of substances which are constantly growing scarcer.”¹⁰

Invented just after the turn of the twentieth century, the mass production of the synthetic organic polymers of plastic only began in the 1950s. Bakelite®, Styrofoam®, and Nylon® gave way to thermoplastic polymers, which could be molded and melted and remolded.¹¹ Roland Barthes starts his meditation on plastic in *Mythologies* by noting, “Despite having names of Greek Shepherds (Polystyrene, Polyvinyl, Polyethylene), plastic ... is in essence the stuff of alchemy.” Plastic is the “transmutation of matter,” the transformation of primordial sludge into the modern, malleable, and convenient. Every fragment of plastic contains the geologic memory of the planet: “at one end, raw, telluric matter, at the other, the finished, human object.”¹² Barthes wasn’t actually thinking about oil when he wrote this; rather, he was focused on the idea that plastic could be seemingly made into anything. He was taken with the plasticity of plastic, and unconcerned with the backstory or future impact. Plastic allowed for social mobility, increased consumption, and a seemingly bright, hygienic, and accessible future for all.

Plastic soon shed its utopian allure, becoming hard evidence for the three c’s – the triple threat of capitalism, colonialism, and consumerism – as well as a kind of shorthand for all that was inauthentic and objectionable about postwar everyday life. Plastic was just the latest evidence of bio-cultural cynicism. As earlier forms of extraction – such as the exploitation of rubber from trees and animals for their products – became unfeasible, the continued expansion of the three c’s was made possible through new forms of extraction, such as resource mining and oil-field development.¹³ While the site of exploitation may have moved, the underlying patterns of accumulation, colonization, and consumption remained unchanged.

Was Barthes correct in saying that plastic can be made into anything? In the past, it might have been assumed that “nature” was the one thing that could never be made from plastic. Plastiglomerate suggests that this is no longer the case. It is an ecological paradox such that the mind struggles to separate its plasticity from its telluric oily past. Take, for example, a sample collected from Kamilo Beach that is clearly a lighter and sand. And yet it is not. These are not two substances glued together, but multiple substances that are one another. The lighter was likely one of the billion plus made in China and Taiwan each year from parts sourced all over the world.¹⁴ It had already traveled the globe prior to ending up on Kamilo Beach, where it melted, along with other microplastic flakes and confetti, into a single substance, a glomerate with a

history as long as the sand and as short as the invention of plastic polymer in a war-time laboratory in the 1950s. As Pam Longobardi writes, “Plastic objects are the cultural archeology of our time, a future storehouse of oil, and the future fossils of the Anthropocene.”¹⁵

Plastic production has quintupled globally since the 1970s to 265 million tons per annum in 2010.¹⁶ As Heather Davis notes, plastic is immensely destructive, ecologically devastating both in the intensity of resource extraction required to make it (a staggering 8 percent of the world’s oil production goes into the manufacture and production of plastics) and in its disposal.¹⁷ The few minutes or days in which it might be used as a takeaway container, a lighter, or a toothpaste tube belies both the multimillion-year process of its making, and the tens of thousands of years it is expected to last before breaking down, finally, into its molecular compounds.¹⁸ In its plastic state, it is usually quickly disposed of, making its way to landfills, but also into sewers or streams, where it often ends up in waterways and on shorelines.¹⁹

Plastic is not the irreducible product that was once thought. Plastics do not biodegrade, but in water, solar radiation on the surface leads to photodegradation, which is amplified by embrittlement and fragmentation from wave action.²⁰ The plastics in the ocean are mostly particles smaller than one centimeter in diameter, commonly called microplastics, but more poetically referred to as “mermaid’s tears.” Although only 0.1 percent of plastics production is thought to end up in the vast islands of microplastic debris in the world’s oceans, plastics are nonetheless the primary source of marine pollution. Highly durable, these microplastic fragments will last for hundreds or thousands of years.²¹ Notes Davis, “After digging up the remains of ancient plants and animals, we are now stuck with the consequences of these undead molecules, the ones that refuse to interact with other carbon-dependent life forms.”²²

Most plastiglomerate is made from abstract “plastic confetti,” “the embrittled remains of intact products.”²³ The lighter-conglomerate is exceptional for the legibility of the lighter as a human-made object. Where ropes, nets, jars, toothbrushes, bottle caps, can lids, and cigarette lighters can be recognized, plastiglomerate becomes figurative, realistic. The plastic aspect gains a longevity and aesthetic vibrancy that it would not otherwise have. The combination of rock sediment and plastic creates a charismatic object, a near luminous granite, pockmarked with color. Plastiglomerate is trace evidence of human-nature interaction: plastic is made by an anthropogenic action, and plastiglomerate is

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made by a series of anthropogenic gestures that create fascinating, disquieting objects.

Five Gyres

Consider the subtleness of the sea; how its most dreaded creatures glide under water, unapparent for the most part, and treacherously hidden beneath the loveliest tints of azure. Consider also the devilish brilliance and beauty of many of its most remorseless tribes, as the dainty embellished shape of many species of sharks. Consider, once more, the universal cannibalism of the sea; all whose creatures prey upon each other, carrying on eternal war since the world began.

Consider all this; and then turn to the green, gentle, and most docile earth; consider them both, the sea and the land; and do you not find a strange analogy to something in yourself?

– Herman Melville, *Moby Dick*

Whose lighter was it? A smoker in Los Angeles? Possibly in Tokyo? Maybe in Ojai? Or perhaps someone rivers and canyons away.²⁴ Upstream in

a thousand human settlements where a lighter can be bought and thrown away. Perhaps on the western coast of North America. Perhaps on the eastern coast of Asia. The lighter ends up in the gutter. It waits for a storm. The water takes it. It ends up in the sewage. In the sliver of water. In the river. In the bay. In the ocean. In the Kuroshio Current. In the great churning mass of the Pacific from where somehow, in a storm, in the winds, it ends up on Kamilo Beach in Hawai'i.

Or possibly, more likely, someone drove over the rocky terrain of the Hawai'ian Island, hiked in to a deserted and plastic-strewn beach, lit a fire to keep warm, and left the lighter behind. One more piece of plastic on the sand. This is how it is with objects. They are mostly mute about their journeys, though most of them have traveled much farther than any of us.

Covering almost 70 percent of the Earth's surface, "oceans define, sustain and characterize the planet's ecology. More than half of our oxygen supply is produced by the microscopic plant life that suffuses the earth's oceans, though for how much longer is unknown. This is where all life on this planet began and if it dies it will take all of us with it."²⁵ After leveling off between six and seven thousand years ago, oceans and seas have provided a sense of

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constancy, a rhythm to the Earth's movement through space. Whereas on land, humans built up from agricultural settlements to choking cities, the seas seemed relatively changeless, bringing death and fear in the form of storms, attacks, the transport of enslaved captives, and sunken ships, but also providing seemingly endless navigable passages full of life and profit (for the few) – a largeness full of largesse. But now, through the loss of megafauna from overfishing and habitat destruction, massive pollution, and high levels of phosphorus and nitrogen flowing into the oceans due to fertilizer use, dumping, and climate change, oceans are under extreme threat. As the oceans heat up, coral reefs are dying, and “jellyfish have bloomed to such an extent they threaten to extinguish all other ocean life. They are an organic form of junk.”²⁶ Overfishing has decimated many populations, particularly of large animals such as whales, dolphins, sharks, turtles, and blue fin tuna. Oil and gas exploration threatens fragile ecologies across the globe, ranging from the Arctic to the Gulf of Mexico to the tip of Argentina, and nearly all major bodies of water in between. And on top of all of this, garbage and effluents pour into the oceans at ever increasing rates.²⁷

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It is not known how much plastic waste oceans and waterways currently hold. Measurements were last taken in the 1970s, and even then they were largely guesswork and focused entirely on “visible” plastics, that is, those floating on the surface. Current estimates range in the order of tens of thousands of tons of plastic in surface waters of open oceans.²⁸ But plastics floating on the surface represent but a small fraction of the total, and that total is difficult to ascertain because microplastics below a certain size (half a centimeter) are largely absent on the surface of the oceans. We don't know why.²⁹ Additionally, as Ian Buchanan writes, microplastics form “a ‘strange attractor’ for all the toxic scum floating elsewhere in the ocean.”³⁰ The microbial communities that flourish on plastic microfragments are present “at a density and diversity much greater than that of the surrounding ocean water.”³¹ Perhaps mistaking the small fragments for food, marine life eats these toxic microfragments, at which point they enter the food chain, “completing the vicious circle of toxins out and toxins in.”³²

The constant movement of the Earth, the tide, and winds produces ocean currents that act at surface and depth in roughly unchanging patterns over thousands of years, affecting land



temperature, the movement of water, and now, the movement of pollution detritus.³³ The same currents that are used by the shipping industry to map the fastest passages across the globe, the same currents that opened the world to the age of plunder and colonization in the fifteenth century, currently churn the detritus of that system into smaller and smaller fragments of microplastic. As C  zar et al. write, “[the] large-scale vortices act as conveyor belts, collecting the floating plastic debris released from the continents and accumulating it into central convergence zones.”³⁴ The Coriolis effect, deflecting air along curved paths against the Earth’s rotation, has created five gyres, one in each ocean – five giant slow-moving vortexes determined by the circulation patterns of wind curl and torque.

The Great Pacific Garbage Patch, centered in the Northern Pacific Gyre, is a combination of ocean currents, climate change, and unchecked plastic pollution. As plastics move from source to ocean in the Pacific they get caught up in the ocean’s currents until a veritable soup of mermaid’s tears churns. Though huge in size (often compared to “the size of Texas”), the tiny size of plastic particles and the fact that they are below surface means that the garbage patch is invisible to the naked eye. Perhaps the five gyres overwhelm all forms of thought in their destructive totality. Trying to describe the indescribable nature of the thinness of plastic sludge in the ocean, Max Liboiron has called it “plastic smog,” less like a garbage patch and more like insidious but invisible pollution.³⁵

Vibrant Matter

If the gyres are largely invisible, the release of surface plastics and microplastic fragments to Kamilo Beach, where they are combined with sand into plastiglomerate, presents an interesting visual dilemma. Susan Schuppli writes, “It seems we still need visual evidence before we can act as moral agents. This regime of visibility is a huge challenge. How do we act as ethical agents when there are all kinds of events that don’t produce coherent visual evidence?”³⁶ We might ask the same question of this newly demarcated substance. As a geological artifact, plastiglomerate is an indicator of human impact on the ecology of the Earth. As an artwork, plastiglomerate makes the familiar unfamiliar. It reifies the unfathomable, consolidating and attesting to difficult-to-substantiate material and social-political issues. Plastiglomerate is a remainder, a reminder, an indicator of the slow violence of massive pollution. It brings together deep geological time and current consumerism. It also takes on the properties of what Jane Bennett calls “vibrant matter,” a lively thing

made by certain actions and off-gassing in its own strange geological matrix.³⁷

When it comes to using plastiglomerate as part of a plastic marker horizon in determining the potential start date of the Anthropocene, there is more at stake than simply whether or not the International Commission on Stratigraphy and the International Union of Geological Sciences can agree that we have met all of the criteria to define a new epoch. The hubris behind self-naming an era is inescapable. As M  tis scholar Zoe Todd reminds us,

The current framing of the Anthropocene blunts the distinctions between the people, nations, and collectives who drive the fossil-fuel economy and those who do not. The complex and paradoxical experiences of diverse people as humans-in-the-world, including the ongoing damage of colonial and imperialist agendas, can be lost when the narrative is collapsed to a universalizing species paradigm.³⁸

The history of plastics, tied up as it is in colonization and resource extraction, clearly illustrates the unevenness at the heart of defining the Anthropocene. Additionally, the way that the Anthropocene tends to be used as always-already underway highlights a distinction, and by proxy a hierarchy, between humans and nonhumans (or “more-than-humans”) that perpetuates a nature-culture divide and suppresses ways of understanding the world that might be more relational than taxonomic. Todd writes, “I think that the danger in any universal narrative or epoch or principle is exactly that it can itself become a colonizing force.”³⁹ She reminds us that Indigenous knowledges have space for the connection of all matter, while by contrast, settler knowledge requires the vibrant matter of a plastic stone to tell this story.⁴⁰

If we are in a period highly impacted by human presence, it is worth remembering that the land is ahead of us in time, already aware of and influenced by the processes of extraction and depletion whose effects are often only recognized too late. But so too, human actions are part of a complex series of incursions that affect more-than-human critters, the land, the air, and even the depths of oceans and substrates of soil. The same is of course true of plastic pollution. Plastics are bought and discarded in much larger quantity in the Global North, but the gyres ensure that the distribution of microplastics in fact affects nonhumans prior to humans, while floating plastic depots tend to accumulate in areas without the resources to clean them up or hide them, and in the bellies

and digestive tracts of those who would not recognize such a foreign substance as not being edible.

Plastiglomerate clearly demonstrates the permanence of the disposable.⁴¹ It is evidence of death that cannot decay, or that decays so slowly as to have removed itself from a natural lifecycle. It is akin to a remnant, a relic, though one imbued with very little affect. As a charismatic object, it is a useful metaphor, poetic and aesthetic – a way through which science and culture can be brought together to demonstrate human impact on the land. Thus, to understand plastiglomerate as a geological marker is to see it as unchanging. Plastiglomerate speaks to the obduracy of colonialism and capitalism. The melted veins of plastic that actually become the rock speak to how difficult it is to undo unequal relations of destruction. The scraping out of plastic from the rock, melting down to separate the plastic from the sand, would result most obviously in the destruction of the new object and likely also the destruction of its constituent parts.

Nevertheless, plastiglomerate is a seductive substance, attracting artists to both collect and display it, and to make it. What does turning plastiglomerate into an artwork do? To

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understand it as art is, potentially, to see it as a call to action. But that latter interpretation demands seeing it as art made by the Earth, with humans only as anonymous actors, as midwives lighting the fires on the beach. After all, it is made from the most banal of substances: rock and plastic, both easily available and easily melded into one. Most artists *making* plastiglomerate are doing so as a commentary on human-made pollution. Although there are plenty of artists using plastic to comment critically on waste, labor, and production, it appears that those specifically drawn to plastiglomerate seem rather to be oddly inspired by it, occasionally even going so far as to erroneously report that volcanic action creates plastiglomerate, and that this in turn is evidence of “nature adapting to technological surplus.”⁴² Such statements are categorically incorrect, and hint at how, if the Anthropocene is a narcissistic category, then the art world is the mirror. To make such an object in order to question its making seems a deeply problematic tautology, implicated in an impulse that sees the Anthropocene as a kind of celebratory mechanism for human interaction with the world. It suggests a constant search for new and novel material with which to make a mark, a



gesture that is cognizant of capitalism's love of the new, even as it replicates it. Such impulses also echo Jodi Dean's perceptive analysis of a faction of the global left who experience a certain *jouissance* at being in the know – to find satisfaction in evidence of catastrophic climate change while doing nothing to stop it (or actively perpetuating it). "Anthropocenic enjoyment," she calls it.⁴³

But why should finding plastiglomerate and displaying it as a ready-made be any different? Plastiglomerate is what Heather Davis calls "accidentally or incidentally" aesthetic.⁴⁴ It is precisely the facticity of plastiglomerate, its infrangibility, its constituent components and analysis as both artwork and geological specimen that make it fascinating. Plastiglomerate demonstrates an already existent artistic relationship between human and planetary action that can't really be improved by rendering that relationship as solely human. Or perhaps more disturbing still, it demonstrates the Anthropocene as a performance, an artwork with the end act of planetary destruction.

The extensive life span of thermoplastics and rock do not need any further intervention to illustrate their force. Perhaps, as Jazvac does when she shows the plastiglomerate as ready-made sculpture, we need to delve into what we already have, using plastiglomerate as object, sample, metaphor, talisman, and evidence. Following on Todd, Jazvac remarks on her uneasiness with the way that she is often described as having "discovered" plastiglomerate, a word that has strong colonial connotations, and that imagines a manufactured landscape as something like a frontier to explore and possess. Every time plastiglomerate is shown, Jazvac notes, it is evidence of removing and describing something from a land that is not hers – an action that is misunderstood and perpetuated constantly in the coverage and use of plastiglomerate as material. Perhaps, then, it is an anticolonial and a feminist action to refuse to see plastiglomerate as an ideal object or substance that can be discovered, extracted, gathered, and used to bolster careers in a capitalist system or to highlight the "newness" of an anthropogenic substance.

Refusal is a radical gesture in the contemporary art world, and drawing attention to the complexity of plastiglomerate as a ready-made that is more than a ready-made, that is more than a new material, challenges the

extractive gaze ... of the explorer, the prospector, the cartographer or the lumberjack [that] reduces nature to what Martin Heidegger (1977) called a "standing-reserve," a cache of inert matter to be

dammed, dug up, cut down, flattened out, raised up, divided and sub-divided, harvested, photographed, mapped, assayed, bought, and sold and generally manipulated in order to serve all-too-human purposes.⁴⁵

An extractive and capitalist gaze renders plastiglomerate as matter and metaphor all too closely connected to a romanticization of the Anthropocene. As Jazvac understands, the ways landscapes are idealized, used, and viewed are ideological.

Understood in this way, plastiglomerate has multiple overlapping identities. Pushing the metaphoric understanding of its ontological nature as far as possible, perhaps we can find in the chemical chains of synthetic polymers melded with the craggy scraps of sand a useful theoretical model of the molecular, in line with that of the plant-life rhizome (Deleuze and Guattari) that so dominated Anglo scholarship in the 1990s and 2000s.⁴⁶ The ready-made geologic being of plastiglomerate speaks to more than pollution: also geology, the deep time of Earth, colonization, human-animal knowledges, currents of water, and the endless unfolding and collapse of life on Earth. We might conclude that "we have come into existence with and because of so many others, from carbon to microbes to dogs. And all these creatures and rocks and air molecules and water all exist together, with each other, for each other. To be a human means to be the land and water and air of our surroundings."⁴⁷

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- 1
Thanks to Jayne Wilkinson, "Bodies Beneath," *Drain (Junk Ocean)*, vol. 13, no. 1 (2016) <http://drainmag.com/bodies-beneath/> for pointing me to Italo Calvino's text.
- 2
In his forthcoming book, journalist Vince Beiser traces the black market of sand, noting that the seeming ubiquitous substance is actually under threat, disappearing, and often controlled by organized crime. Sand, he notes, is the most used natural resource in the world: "Sand is the thing modern cities are made of." Vince Beiser, "The World's Disappearing Sand," *New York Times*, June 23, 2016 <http://www.nytimes.com/2016/06/23/opinion/the-worlds-disappearing-sand.html>.
- 3
Many beaches now have to be maintained, as human impact has undermined the natural life cycle of beaches. Dams on rivers, industry, building, and so on have all impacted beaches, such that many have to be resupplied with sand, often termed "nourishment sand."
- 4
Kenneth Weiss, "Plague of Plastic Chokes the Seas," *Los Angeles Times*, August 2, 2006 <https://web.archive.org/web/20121210215429/http://www.latimes.com/news/la-me-ocean2au.02082177579.full.story>.
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Atlas Obscura, "Kamilo Beach" <http://www.atlasobscura.com/places/kamilo-beach>.
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Patricia L. Corcoran, Charles J. Moore, and Kelly Jazvac, "An Anthropogenic Marker Horizon in the Future Rock Record," *GSA Today*, vol. 24, no. 6 (June 2014) <http://www.geosociety.org/gsatoday/archive/24/6/article/i1052-5173-24-6-4.htm>.
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Colin N. Waters et al., "The Anthropocene is Functionally and Stratigraphically Distinct From the Holocene," *Science*, vol. 351, no. 6269 (January 8, 2016) <http://science.sciencemag.org/content/351/6269/aad2622>.
- 8
Corcoran, Moore, and Jazvac, "An Anthropogenic Marker Horizon."
- 9
Donna Haraway, "Tentacular Thinking: Anthropocene, Capitalocene, Chthulucene," *e-flux journal* 75 (September 2016) <http://www.e-flux.com/journal/75/67125/tentacular-thinking-anthropocene-capitalocene-chthulucene>. Other terms, such as Haraway's "Chthulucene," or "the Capitalocene" and others, are also useful, though the proliferation of neologisms may simply work to cloud the issue of
- whether we are in an era distinct from the Holocene.
- 10
Susan Freinkel, "A Brief History of Plastic's Conquest of the World," *Scientific American*, May 29, 2011 <http://www.scientificamerican.com/article/a-brief-history-of-plastic-world-conquest/>.
- 11
Ibid. Most household plastics are synthetic organic compounds. They are synthetic (human-made), organic (carbon-based) chains of monomers.
- 12
Roland Barthes, *Mythologies* (New York: Farrar, Straus and Giroux, 1972), 110–11.
- 13
Many of the oil fields in North America, among them the Bakken oil fields in North Dakota, the tar sands in Alberta and Saskatchewan, and deposits in the Arctic, are on land that has never been ceded. Further, the US-led invasion of Iraq in 2003 has been oft characterized as an act of neocolonialism for oil.
- 14
Lighters are manufactured all over the world: BIC maintains factories in France, Spain, Brazil, and the United States. Zippo also manufactures in the United States. The vast majority of cheap plastic lighters, however, are manufactured in China and Taiwan, many of these in the Chinese city of Wenzhou. Michael Backman, *Inside Knowledge: Streetwise in Asia* (London: Palgrave MacMillan, 2005), 23.
- 15
Pam Longobardi, "The Ocean Gleaner," *Drain (Junk Ocean)*, vol. 13, no. 1 (2016) <http://drainmag.com/pam-longobardi-the-ocean-gleaner/>.
- 16
Andrés Cózar et al., "Plastic Debris in the Open Ocean," *PNAS* vol. 111, no. 28 (July 15, 2014): 2 <http://www.pnas.org/content/111/28/10239.full.pdf>.
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Heather Davis, "Life & Death in the Anthropocene: A Short History of Plastic," in *Art in the Anthropocene: Encounters Among Aesthetics, Politics, Environments and Epistemologies*, eds. Heather Davis and Etienne Turpin (London: Open Humanities Press, 2015) <http://heathermdavis.com/wp-content/uploads/2014/08/Life-and-Death-in-the-Anthropocene.pdf>.
- 18
Plasticizers are correlated with infertility, recurrent miscarriages, early-onset puberty, obesity, diabetes, reduced brain development, cancer, and neurological disorders such as early-onset
- senility in adults. Ibid.
- 19
Corcoran, Moore, and Jazvac, "An Anthropogenic Marker Horizon."
- 20
Cózar et al., "Plastic Debris in the Open Ocean," 1.
- 21
Ibid.
- 22
Davis, "Life & Death in the Anthropocene."
- 23
Corcoran, Moore, and Jazvac, "An Anthropogenic Marker Horizon."
- 24
This passage echoes and draws from some of the theories around object-oriented ontology, among them Timothy Morton's notion of hyperobjects. In fact, Morton's work is applied to a discussion of plastiglomerate in the catalogue for "Another Land ... And in the Other, Our Own," an exhibition that took place in Norway in 2015 (Ian Cofre, "Another Land ... And in the Other, Our Own," *Prosjektrom Normanns*, 2015 <http://www.prosjektromnormanns.com/new-index-1/#/pedro-gomez-egana/>). "Nature-culture," Bruno Latour's term for the intermixture of the organic and human-made, could also be applicable.
- 25
Celina Jeffery and Ian Buchanan, "Introduction," *Drain (Junk Ocean)*, vol. 13, no. 1 (2016) <http://drainmag.com/junk-ocean/>.
- 26
Ibid.
- 27
Callum Roberts, *The Ocean of Life: The Fate of Man and the Sea* (London: Viking, 2012), 1–20.
- 28
Cózar et al., "Plastic Debris in the Open Ocean," 6.
- 29
Hypotheses include sink processes that take place through micro-fragmentation and submersion into the sediment, or ingestion by marine organisms, specifically mesopelagic fish, who in eating and defecating the plastic add weight to it that causes the formerly buoyant substance to sink to the bottom – in sum, "microplastic fragments could also reach the bottom via defecation," a proposition, it is noted, that requires further quantitative testing. Cózar et al., "Plastic Debris in the Open Ocean," 2–5.
- 30
Ian Buchanan, "What Must We Do About the Rubbish?" *Drain (Junk Ocean)*, vol. 13, no. 1 (2016) <http://drainmag.com/what-mus>
- t-we-do-about-rubbish.
- 31
Erik R. Zettler, Tracy J. Mincer, and Linda A. Amaral-Zettler, "Life in the 'Plastisphere': Microbial Communities on Plastic Marine Debris," *Environmental Science and Technology* 47 (2013): 137–46. The importance of microbes to ocean, and hence planetary, health, cannot be underestimated. It is not yet proven but hypothesized that plastics in the ocean will attract and allow the proliferation of certain kinds of microbes, thus altering the chemical makeup of the world's oceans.
- 32
Buchanan, "What Must We Do About the Rubbish?"
- 33
Ocean currents are extremely complex, and at depth, remain only partially understood and mapped.
- 34
Cózar et al., "Plastic Debris in the Open Ocean," 1.
- 35
Daniel Engber, "There is No Island of Trash in the Pacific," *Slate*, September 12, 2016: http://www.slate.com/article/s/health_and_science/the_next_20/2016/09/the_great_pacific_garbage_patch_was_the_myth_we_needed_to_save_our_oceans.html?wpsrc=sh_all_dt_tw_top;MaxLiboirn, "Redefining Pollution and Action: The Matter of Plastics," *Journal of Material Culture*, vol. 21, no. 1 (December 2015). Liboirn's article focuses on the distinction between plastic polymers (nontoxic) and the hormone-disrupting plasticizers added to those polymers (toxic). The idea that plastic itself is not toxic, but plasticizers are, massively complicates the stories of harm that can be told about plastics, and confuses meanings of pollution, health, and harm.
- 36
Lucas van der Velden and Rosa Menkman, "Dark Matters: An Interview with Susan Schuppli," *Dark Ecology*, 2016 <http://www.darkecology.net/dark-matters-an-interview-with-susan-schuppli>.
- 37
Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham, NC: Duke University Press, 2010), 1–20.
- 38
Caroline Picard, "The Future is Elastic (But it Depends): An Interview with Zoe Todd," *Bad at Sports*, August 23, 2016 <http://badatsports.com/2016/the-future-is-elastic-but-it-depends-an-interview-with-zoe-todd/>.
- 39
Zoe Todd, "Fish Pluralities: Human-Animal Relations and Sites of Engagement in

Paulatuq, Arctic Circle," *Inuit Studies*, vol. 38, no. 1–2 (2014): 217–38.

40

Distinct from but paralleling Todd's argument is that of Rob Nixon, who addresses what he calls environmental "slow violence," the violence enacted by extraction, emissions, and pollution, which unveils itself slowly across time, as an "unevenly universal" burden, one that will tend to be experienced inequitably. Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge: Harvard University Press, 2013).

41

Heather Davis, "Toxic Progeny: The Plastisphere and Other Queer Futures," *PhiloSOPHIA*, vol. 5, no. 2 (Summer 2015): 233.

42

Elise Lammer, "Review," *Mousse Magazine*, July 19, 2014 <http://moussomagazine.it/salts-artbasel-2014/>.

43

Jodi Dean, "The Anamorphic Politics of Climate Change," *e-flux journal* 69 (January 2016) <http://www.e-flux.com/journal/the-anamorphic-politics-of-climate-change/>. Dean is not totally on board with art-science collaboration, which she sees as a repetition of past failed experiments writ anew. She argues for an anamorphic approach to climate change activism – an approach from the side. Perhaps our approach to plastiglomerate fits this criteria, moving beyond a traditional art-science collaboration.

44

Davis, "Life & Death in the Anthropocene."

45

Peter Hodgins and Peter Thompson, "Taking the Romance out of Extraction: Contemporary Canadian Artists and the Subversion of the Romantic/Extractive Gaze," *Environmental Communication*, vol. 5, no. 4 (2011).

46

See Heather Davis on the molecular: H. Davis, "Molecular Intimacy," in *Climates: Architecture and the Planetary Imaginary*, ed. James Graham (New York: Columbia Books on Architecture and the City, 2016), 205–11.

47

Heather Davis, "The Land and Water and Air That We Are: Some Thoughts on COP 21," *NYAQ*, March 15, 2016 <http://sfaq.us/2016/03/the-land-and-water-and-air-that-we-are-some-thoughts-on-cop-21>.

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e-flux journal #78 — december 2016 Kirsty Robertson
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