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Politics of Orbits: Will We Meet Halfway?

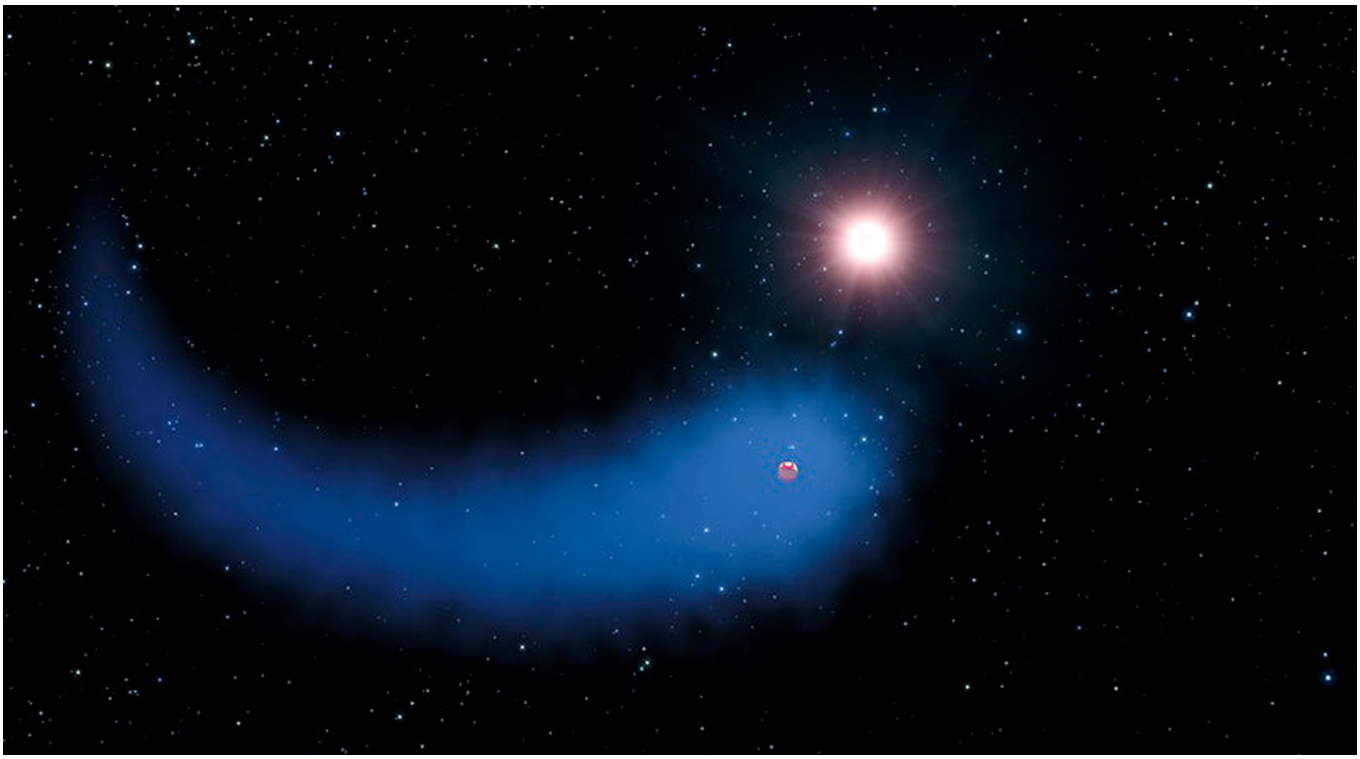
1. The Barycenter of Life on a Planet

Can we live like a planet? Or, can planets live like us?

What kind of life a human being should lead is a critical issue in social theory, involving ontological, epistemological, political, and ethical dimensions. What kind of life a planet should live, a query that seems guilty of literary anthropomorphism, touches the fundamental question about what a planet is. The Greek etymological root of the word "planet" means "wanderer." It refers to those celestial objects that once seemed to revolve around us, from a human embodied perspective, such as the Sun, the Moon, and Venus. We used to think that our abode was stable, and we regarded the earth's intermittent shaking as divine condemnation. We believed the earth was the center of the universe, just as our individual bodies are the center of our various sensory functions in the lifeworld. Even after science proved that the earth revolved around the Sun, we could only make contact with the world from our physical bodies that inhabit the earth. However, to be precise, the earth does not revolve around the Sun. All celestial bodies in the solar system, including the Sun, revolve around the center of total mass, i.e., the barycenter, which is not fixed but changes position continually depending on where the planets are in their orbits. Even the largest celestial body in the system, the Sun, has to be drawn in by every planet and countless other objects, especially the most massive planet, Jupiter. Likewise, the Moon does not revolve around the earth; the two bodies revolve around the center of this system's mass.[1]

What is the barycenter of our life on earth? We do not revolve around an invisible center of mass like celestial bodies do. However, maybe we revolve around each other in another way. As James Lovelock and Lynn Margulis's Gaia hypothesis implies, our revolving around each other is not just a metaphor, but represents the complex biochemical evolution of life on earth.[2]

Not only do we revolve around each other, but we also wrap around each other, establishing a new form of life. In this sense, it's clear that we are not merely humans, but always already trans-species hybrids, in terms of the boundaries within and without human species or individuals. In a controversial 1967 paper, Margulis argued that three organelles – mitochondria, chlorophyll, and flagellum – were once "free-living prokaryotic cells."[3] Incorporating different cells that were once living biological individuals may not be as smooth a process as we might imagine. It could work through processes as varied as predation, parasitism, invasion, or capture. Different narrative tropes tell different stories of value, but



An artist's rendition of “The Behemoth,” an enormous comet-like cloud of hydrogen bleeding off of a warm, Neptune-sized planet. Also depicted is the parent star, which is a faint red dwarf named GJ 436. Image credit: NASA, ESA, and G. Bacon (STScI).

there is rarely a fully confirmed narrative. The complex life forms we see now have undergone a series of dynamic redistributions. The narrative metaphors can be as rosy as symbiosis; they can also highlight the power struggle inherent to these processes. Paleontologist Martin Brasier used the term "enslavement" to describe the formation of multicellular algae. From their multiple cell walls, it can be inferred that cyanobacteria were "engulfed" by early eukaryotic cells, resulting in chloroplasts with double membranes in the algae. Red algae and green algae also resulted from such "enslavement," and they were "engulfed" by different eukaryotic cells, producing brown algae with a three-layer membrane. In the process, the internal symbionts gradually lost essential genes and can no longer "escape."[4] The narrative of "enslavement" certainly reflects the capitalist ideology of military colonialism, but it also resonates with postcolonial and anti-colonial politics of boundary negotiation.

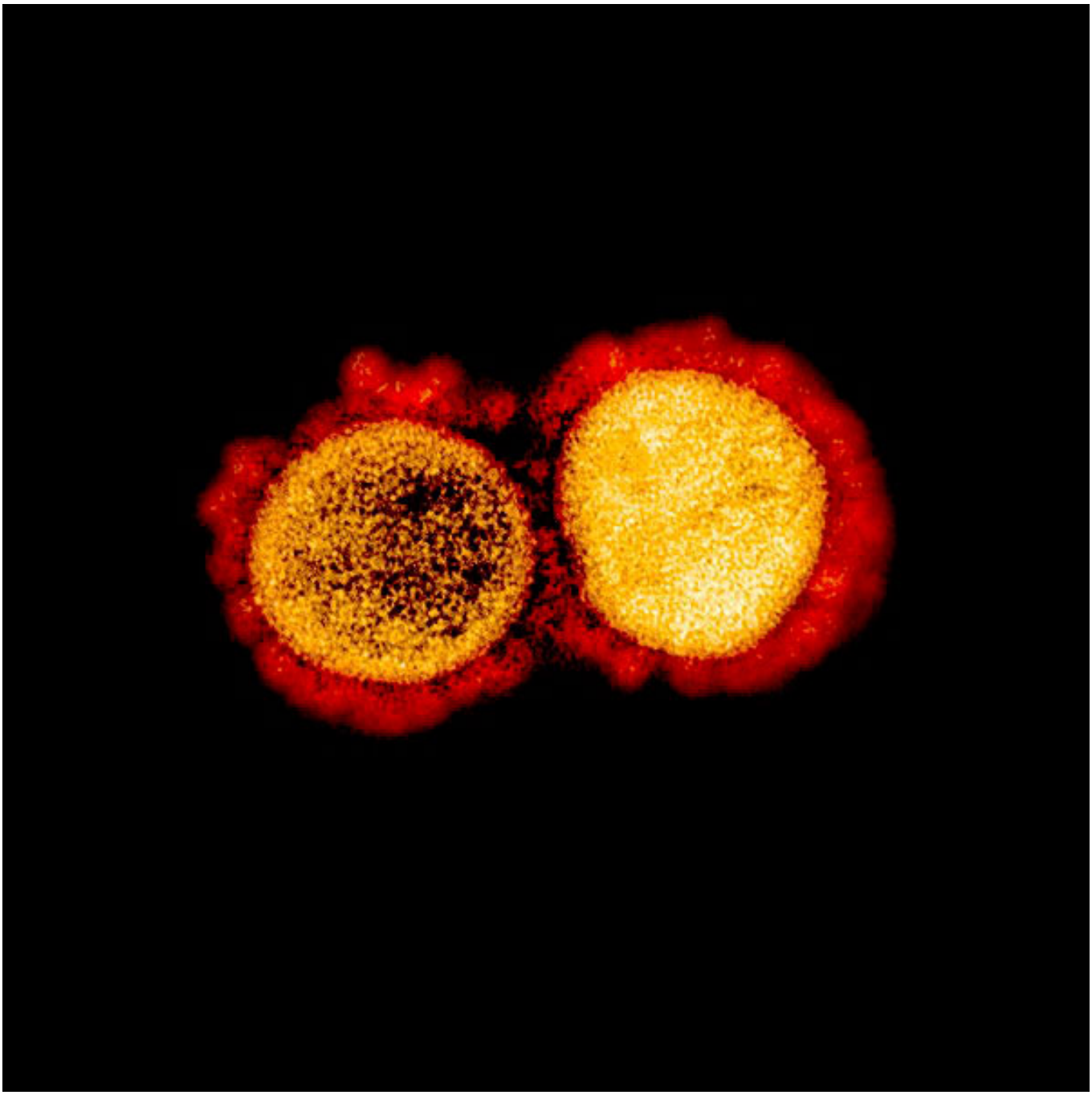
Enfolding, folding, unfolding, and entangling – in the solar system, where everything is revolving around everything else, the Baroque formation of life on earth is always already a work of art. Meanwhile, it is a definite politics of boundaries that we cannot ignore.

2. The Molecular Scribbling of Historical Consciousness

Our world's center is wobbling because of the complex and varied dynamic actors in the entire system. The epistemic transition from the visible earth and Sun to the invisible center of mass reveals the evolution of our cognitive devices as physical beings. This evolution spans the intuition and concepts inherent to naked-eye science and the increasingly complex assemblages of extended cognition. While the concept of the system allows us to see the bigger picture, we are also urged to see the processes on a smaller scale. Since the late seventeenth century, the rapid proliferation of imaging technology has led to the molecular turn in science and philosophy. As Donna Haraway says, we live and participate in the implosion of subject and object, of culture and nature, of biologics and informatics, of organism and machine, in fact, of multitudinous categorical oppositions.[5] The generative dynamics in multifarious implosion can be understood as the "intra-active becoming of the world," in Karen Barad's terms. In this process, the agential participants (potential agents) include humans and nonhuman assemblages and their acts of measurement.[6] In recent years, Bruno Latour has drawn on the geological concepts of critical zones and metamorphic zones to highlight the redistribution of different kinds of agency. The configuration of a specific place is not given or engineered. It is produced by the endless encounters and collaborations between heterogeneous forces.[7] Human actors need to actively participate in "composing the common world," precisely because commonality is not to be taken for granted. The dichotomy of human and nonhuman is obsolete. We need to observe and act on a smaller scale, and we have already done this, especially in science, but we need to continue to do so with a heightened sense of historical precaution. The crossing and reconstitution of boundaries on any scale is consequential and not without risks for the agents involved.

Certainly, "we" are not entirely humans in terms of the cross-boundary linkage involved in our extended cognitive practice, and the trans-species coevolutionary composition of the human genome. Eight percent of the human genome is made of viral gene sequences, called "endogenous retroviral sequences." They came from the deep common history of humans, other primates, and mammals, embodying the trans-species memory of infection, inheritance, and continuous symbiotic evolution ever since ancient, prehuman times.[8] In a sense, the significance of assemblage or hybridity transverses the nonlinear temporality between the posthuman and the prehuman. We have never been merely humans; we are no longer just humans. We are witnessing the intersection of two modes of the deconstruction of anthropocentrism. In the conjuncture of the Anthropocene, the hybrid consciousness of postcoloniality acquired a new value, which goes beyond what Dipesh Chakrabarty puts forward when he rethinks history through the challenge of climate change: "The cross-hatching of species history and the history of capital is a process of probing the limits of historical understanding."[9] As a matter of genomic fact, postcolonial hybridity goes way back to the nonlinear evolution of trans-species deep history, where historical understanding constantly rewrites its boundaries when intertwined with the process of evolution.

Cross-hatching is a drawing technique commonly used in shading. By hatching and cross-hatching, one can create different values, tones, and shadows with a single pencil using simple parallel lines. Even though it is handy, cross-hatching might not be the most appropriate metaphor for considering the deep history of trans-species or multispecies beings ranging from the prehuman to the posthuman. The scribbling technique widely used in art therapy is probably a more becoming metaphor. Scribbling uses flowing lines to visualize the object's outlines, the unfolding of the event, the



Transmission electron micrograph of SARS-CoV-2 virus particles, isolated from a patient. Image captured and color-enhanced at the NIAID Integrated Research Facility (IRF) in Fort Detrick, Maryland. Credit: NIAID / CC BY 2.0.

entanglement of forms, the direction of momentum, and plural, nonlinear temporalities. Our historical understanding is not without limits. It is not only expanding its scale from the local to the planetary. One will undoubtedly encounter unscalability at some point, as Anna Tsing points out.[10] More than that, our historical understanding continuously reconstructs the semantic boundaries of history via the molecular turn of contemporary science. Under the regime of molecular visualization and measurement, all limitations or boundaries have undergone quantitative and qualitative changes. Quantum mechanics, born nearly a century ago, began with an epistemic gap between the large and the small: scientists discovered that classical mechanics, which was perfect for explaining daily life, was at a loss when it came to the subatomic or electronic scale. This epistemic and existential crisis has never been fully resolved.[11] In our time, molecular scribbling has become an indispensable technique of historical consciousness. In the scribbling of nonlinear molecular evolution, the trans-species brushstrokes of life are mixing, crossing, merging, and collaborating; simultaneously, they are conflicting, pushing, tearing, and continuously unsettling the borders between life and death, not unlike the ecology of postcolonial politics. As an illustration, take an indigenous artist's work. When the work appears too "hybrid" or "modern," its cultural authenticity may be questioned. The same interrogation happens with the works of other minority groups. Contemporary, non-Western artists and thinkers tend to face a similar dilemma as well. In the high-tech, capitalist era, all kinds of material and semiotic elements continually flow and hybridize. However, some subjects remain marked and have to work harder to mark their subjectivity in the thick of hybridity.

The postcolonial molecular scribbling must not erase boundaries; instead, it has to draw out the boundaries amongst the entanglement, no matter how transient those boundaries are. In the intricate connection of trans-species, multispecies, and interspecies, the most crucial task of posthuman ecological politics is to mark the destructive consequences of speciesism. In the era of industrialized farming, the Covid-19 pandemic invokes an Althusserian ideological interpellation. We can no longer bypass the trans-species zoopolitics that the virus materializes. The postcolonial ethnic and cultural wars have already expanded to the nonhuman through what Vandana Shiva has called the "Second Coming of Columbus."[12] The molecular scribbling extends its brushstrokes into deep history and the far future in the cross-hatched dividing lines of class, gender, ethnicity, and species. Thanks to molecular imaging technology, humans can no longer turn away from the evolutionary entanglement between themselves and other life forms on the planet. As such, they are also crossing the line between art and science. In the twenty-first century, contemporary art, like contemporary science, must engage in the transvaluation of all boundaries.

3. The Scale of Division and the Meaning of Travel

Every era is divided, and our division is both molecular and planetary. Utilizing extended cognitive devices, we can send florescent molecular DNA sensors to help visualize a cell's forces; and we can transform the earth into a planet-sized astronomical telescope to take pictures of a black hole fifty-five million light-years away, a massive cluster of entropy or disorder.[13] However, we fail to properly understand earth's biodiversity, resolve conflicts due to cultural differences between human groups, and trace the source of disorder in human society and politics. We cannot see our faces; we cannot feel our hearts. The Anthropocene's epistemic and ethical ambiguity lies in the fact that the expansion of human cognitive devices and the technosphere has threatened biodiversity, and has also frequently forced humans to face their hybridity, dependence, and vulnerability. The related political paradox is that we, who can only live on the same planet, are divided, having lost or never acquired the ability to compose a shared world.

In the time of Covid-19, the agential image of the virus has become an unexpected mode of communication in our divided world. However, it also highlights the existing inequalities and barriers in our global society. Perhaps this planet does not belong to humans. It is a planet of viruses. In the nonlinear loop connecting the prehuman and the posthuman, viruses have been practicing cross-hatching and molecular scribbling across different species, mapping the complex boundaries in between. Viruses are the most outstanding parasite on earth, the most accurate metaphor of our times. Our shared trans-species ontology is full of consequences. Parasitism and symbiosis are intertwined in complex connections on all scales of life, from the smallest to the largest. These relationships go beyond the traditional picture of the food chain, which usually portrays the predatory relations between independent individuals. They are intelligence operations and complex linkages that are ambiguous, concealed, dark, secret, and challenging to see, continually rewriting internal and external boundaries, and forming ever more intricate molecular information evolution

networks. The moral evaluation of symbiosis and parasitism in everyday human languages has been put into question. The boundary between the two is never straightforward. By employing contemporary visualizing and measuring devices, we can observe dynamic negotiations of certain micro-boundaries, all of which continue to reshape our understanding of biological individuality, the boundary between oneself and the other. Diverse life forms, including those that were not regarded as life, or those that lacked independence, compose extended systems of symbiotic, parasitic, and holobiotic feedback loops and shared information through various evolutionary events on all scales.

When we appear to be divided on the scale of nationality, society, politics, and culture, we are already evolutionarily entangled on the molecular scale, and we continuously rotate together on the planetary scale. Our life dynamics of being divided, entangled, and in a constant state of rotation are dangerous, but full of future seeds. What viruses and planets have in common is the historicity and trajectories of evolution. This characteristic also applies to the most fundamental reality that we, who are not merely human beings, must face as life forms on this planet. Our reality is agential, but it also carries historical weight with multiple temporalities.

It all starts with searching for ourselves, but one can only find oneself by looking for others. This also applies to our planet. The Gaia theory began with humans inquiring about how this planet can support the formation of life, and then realized that once life emerged, it began its entangled scribbling at the molecular level, and facilitated the further evolution of life on earth. Nevertheless, sometimes and somehow, the misty image of some "other" in a distant spacetime overshadows life here and now. Since the mid-twentieth century, the endless stream of interstellar exploration and cyborg imagery in sci-fi films and television has betrayed this unconscious displacement. Manfred E. Clynes and Nathan S. Kline coined the term "cyborg" in 1960 while discussing how to free humans to explore outer space. Their essay began with a felicitous analogy. What if a fish wants to live on land? It cannot. However, what if this is a highly intelligent fish that happens to be proficient in biology, engineering, and cybernetics? It will realize that it must extend its organism as a control system and assemble it with a cybernetic system that simulates its habitat conditions. In other words, the fish must take its aquatic habitat with it as an extension. It must become a cybernetic organism, a "cyborg."[14] This necessity results from our physical-mental constitution's evolutionary history, be us human, fish, or another life form. Historicity makes migration and travels a source of stress because even the body's internal and external pressures have a history.

A human being who travels to outer space must carry her planet as an extension of her organism if she wants to survive. To be more precise, she needs to be a moving mini-planet. The model for this mini-planet cannot be any other than that particular planet with a specific biosphere in which she has evolved and strived, as well as the biochemical conditions and complex feedback loops that sustain life, i.e., Gaia. As Haraway stated, "Space-bound cyborgs were like miniaturized, self-contained Gaias."[15] The question is, how long can such a miniaturized Gaia be self-contained? Just like earth, as a planet with life, if somehow it left orbit and moved beyond our solar system, how long could its biosphere sustain itself, having lost the primary source of external energy?

The search for another habitable planet, earth's alter ego, abounds in science, art, and literature. Since the mid-1990s, scientists have discovered thousands of planets outside our solar system orbiting other Sun-like stars, also known as exoplanets. Now we know these planets are almost everywhere. We know because we have "seen" some of them. Through our extended sensory assemblages, we are able to visualize, measure, record, and analyze, as well as immerse our memories, concepts, and consciousness in the vast amount of information on and available images of these planets. These practices enrich our imagination, but they may also feed our symptoms of escapism. Perhaps our unconscious mind is ready to abandon earth, our ego, and flee to another "superhabitable" earth, the imaginary alter ego, that is waiting to be discovered.[16]

More recently, scientists have discovered that there may be billions of wandering planets in the universe. These planets do not orbit a star and are unlikely to be habitable. They were either off-orbit or abandoned by their parent star, or perhaps began as orphan planets, born in gas and dust but without a star. Scientists call them "rogue planets." These wandering worlds may be the loneliest unilluminated travelers in the universe. They are their own homes, and they are challenging to detect because they usually travel in the dark. Through the sensory assemblages that humans extend into space – in this case, the Nancy Grace Roman Space Telescope, which will be ready for its mission in 2025 – scientists can observe the wandering planets when they align with a distant star.[17] When that alignment happens, lasting a few earth hours or days, the spacetime around it will be bent by the planet's mass, causing changes in photons' motion,

which can be used to infer the passing planet's size. We, as human observers, have never been so occupied. We are closely recording the interaction between coronavirus spikes and human cell receptors. We are filming distant black holes with planet-sized telescopes. And we are prepared to use the physical relationship between distant celestial bodies to measure wandering planets. All living beings are observers, measuring and transforming their habitats. Human observers' regime of measurement is continually expanding, seeing ever smaller, deeper, farther, and larger. We are lost in the middle scales between the most extensive and the smallest. For humans, the middle is too mediocre, the daily routine is too tiresome, and the here and now is the barycenter of all confusion.

As Latour reminds us, "You cannot ask where you can settle if you do not say where you yourself *wish* to settle."[18] The even more urgent question is where you have to take what you carry with you. We do not belong to a place, and the place does not belong to us, but when we move, we always carry our place with us without knowing it. We carry our history, our memory, our island, and our planet – as well as the extended sensory and cultural assemblages that we have evolved together and separately – with us wherever we travel.

It is a bittersweet situation; we can only live with each other on an intermediate scale between the human and more-than-human scales. We are a multi-scaled existence, a mixture of the molecular and the planetary. Such a complicated existence can only survive in a lifeworld of intermediate scales. In the wildest extension of the human body-mind, we imagine that we can continue observing, measuring, feeling, loving, and memorizing, even if we lose our bodies. Humans yearn for wandering because there is a home planet to go back to; this home is called earth. Likewise, your soul occasionally imagines leaving your body, precisely because you think there will be a home body to return to. In the era of planetary-scale observation, the profound paradox is that we can see other planets wandering, but we cannot see the disastrous displacement occurring on our own planet. We can calculate the orbital inclination of a planet in relation to earth, but we have no idea how deviated our social, political, and cultural orbits are. A planet can only live in the solar system where it was born and has evolved, just as we can only live in the specific habitat on this planet. We are terrestrial beings.

Our place is neither conservative nor progressive. It is molecular and planetary, and in between. It is about life and technology, as well as art and politics. Our nonlinear evolution as more-than-human beings is teeming with molecular scribblings flowing from countless embodied perspectives: the art of making space, time, and matter, and the orbital politics of carpooling, parting, clashing, and secret rendezvous. We are dwelling in a lifeworld amidst endless struggles on all scales. Will we meet halfway?

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