

I. Hooke: Sense, Memory, Reason

1665. London, England. Sense. Memory. Reason. Robert Hooke sits at his desk, eye pressed to the ocular lens of his self-assembled microscope. The tool extends the capacity of his eyesight and he sees samples which he has prepared and placed in the apparatus as a way of exploring frontier scales. *Cork Cut with a penknife sharpen'd as keen as a Razor.* For Hooke, drawing can be understood as an articulation of his theory of scale. It makes what he sees manageable. Quantifiable. Observable. Cork.

But, to return to our Observation. I told several lines of these pores, and found that there were usually about threescore of these small Cells placed end-ways in the eighteenth part of an Inch in length, whence I concluded there must be neer eleven hundred of them, or somewhat more then a thousand in the length of an Inch, and therefore in a square Inch above a Million, or 1166400. and in a Cubick Inch, above twelve hundred Millions, or 1259712000. a thing almost incredible, did not our Microscope assure us of it by ocular demonstration; nay, did it not discover to us the pores of a body, which were they diaphragm'd, like those of Cork, would afford us in one Cubick Inch, more then ten times as many little Cells, as is evident in several charr'd Vegetables; so prodigiously curious are the works of Nature, that even these conspicuous pores of bodies, which seem to be the channels or pipes through which the Succus nutritius, or natural juices of Vegetables are convey'd, and seem to correspond to the veins, arteries and other Vessels in sensible creatures, that these pores I say, which seem to be the Vessels of nutrition to the vastest body in the World, are yet so exceeding small, that the Atoms which Epicurus fancy'd would go neer to prove too bigg to enter them, much more to constitute a fluid body in them. And how infinitely smaller then must be the Vessels of a Mite, or the pores of one of those little Vegetables I have discovered to grow on the back-side of a Rose-leaf, and shall anon more fully describe, whose bulk is many millions of times less then the bulk of the small shrub it grows on; and even that shrub, many millions of times less in bulk then several trees (that have heretofore grown in England, and are this day flourishing in other hotter Climates, as we are very credibly inform'd) if at least the pores of this small Vegetable should keep any such proportion to the body of it, as we have found these pores of other Vegetables to do to their bulk.

Sense. Scale. Observation. Drawing. He believes in development of self through his experience with a tool that extends the body's capacity. As human, this is his human imperative. There is an element of exosomatic ontogenesis here. Google's Gemini feature built into its search functionality define this as the philosophical and theoretical concept of human development (ontogenesis) through the creation and use of external, non-bodily (exosomatic) technical objects and systems. This is Stiegler before stiegler but after prometheus. He is quick to acknowledge it is a world afforded to him by his tools. World building through tools. A new subjectivity afforded by tools. Drawing mobilizes his artistic agency to make sense of something operating at a scale beyond his own. The best way to understand a black box is to play with it. This is what René Thom said in 1971. I am interested in the fact that he spends a lot of time drawing pests. Lice. Ticks. There are techniques here. This is technics. Alongside his copper plate etchings of his forensically illustrated observations Hooke wrote that our sense and our memory are flawed. This is the fault of man. This is the fault of Epimetheus. To Hooke, sense and memory are the foundational agreements to reason. His argument, of course, is that if sense and memory are flawed, and they are the foundation of our reason then it too will be flawed.

As for the actions of our Senses, we cannot but observe them to be in many particulars much outdone by those of other Creatures, and when at best, to be far short of the perfection they seem capable of: And these infirmities of the Senses arise from a double cause, either from the disproportion of the Object to the Organ, whereby an infinite number of things can never enter into them, or else from error in the Perception, that many things, which come within their reach, are not received in a right manner.

The like frailties are to be found in the Memory; we often let many things slip away from us, which deserve to be retain'd, and of those which we treasure up, a great part is either frivolous or false; and if good, and substantial, either in tract of time obliterated, or at best so overwhelmed and buried under more frothy notions, that when there is need of them, they are in vain sought for.

The two main foundations being so deceivable, it is no wonder, that all the succeeding works which we build upon them, of arguing, concluding, defining, judging, and all the other degrees of Reason, are lyable to the same imperfection, being, at best, either vain, or uncertain: So that the errors of the understanding are answerable to the two other, being defective both in the quantity and goodness of its knowledge; for the limits, to which our thoughts are confin'd, are small in respect of the vast extent of Nature it self; some parts of it are too large to be comprehended, and some too little to be perceived. And from thence it must follow, that not having a full sensation of the Object, we must be very lame and imperfect in our conceptions about it, and in all the propositions which we build upon it; hence, we often take the shadow of things for the substance, small appearances for good similitudes, similitudes for definitions; and even many of those, which we think, to be the most solid definitions, are rather expressions of our own misguided apprehensions than of the true nature of the things themselves.

Stiegler thinks the problem is not just weak faculties, but how tools can strip knowledge out of us, proletarianise (UK) us, even as they extend us. Proletarianization (US). What Hooke proposes is a problem is in fact a different problem for Stiegler. If we can't trust our ability to reason, then what can we trust? Compute. Should we put it in a box? Compute. Should that box be black? The only way to figure out what's going on inside a black box is to play with it. This is what René Thom said in 1971. Reza told me. Frontiers of manipulation. I think there's some truth in that. The fear, of course, is that if you open up the black box, it might be empty. Someone else wrote that. I don't remember who. My memory is fickle. I've thought about too many things. Have I remembered the wrong things? I can't stop. I'm reading. I'm reading. Is this research? Is this mania? Am I manic? The mental state of noise. Ratley and Sands told me. Harvard. 1986. Can I trust what I know. Can I trust what I think? What I remember?

II. Parasite, Lab, Umwelt

1980. Paris, France. Michel Serres. The parasite. The pest. The rat. Two rats on the rug. A noise. The tripartite arrangement. Parasite. The word with a triple meaning. Noise. Host. Guest. I am all three. You could also be all three. The un-paying guest offers a story in place of capital. Story can be fiat capital if you are un-paying. The noise interrupts. Here is my story. I am the host. This foyer is the host. The lab is the host. I am the parasite. The lab hosts me. I stay in the lab, even after my body is gone. I am there.

Saved in the memory of the computers. Some of the computers in the lab are from the 80s. They still use light pens. If it ain't broke don't fix it. Aphorisms are getting into Nietzsche. My father told me a prof once warned him about writing like Nietzsche. That is a memory I have. My work is saved in the memories of men. Are these memories alive? Are they only dead skin? Fallen from my body and mixed with the dust that populates a world we can't see. They are my ghost. They are my files. They are a memory of my work. It is in Chase's memory. It is in Corey's memory. Scott's memory. Ben's memory. Chase ruins a sample, but creates a new thing. He ruins a sample but its contingent result spurs in him a memory of me. His mind hosts me for a moment. My work. My ghost. I am still in the lab. I am gone, but I am still in the lab. Noise. The parasite. The tick. The flea. Noise.

2025. Cambridge, Massachusetts. Dead skin. Dead skin. I'm in a bunny suit. What the fuck is a bunny suit? I'm in the bunny suit. Dust bunny. I'm in the lab. The light is orange. It's very orange. I wear orange glasses in the evenings to try and calm myself down. Cortisol is through the roof from working in that place all day. The mental state of noise. They are called blue blockers. Sort of the same vibe as the lab. I don't feel well after I've been in the lab all day. Not blue but anxious. My anxiety is through the roof. The mental state of noise. My expectations, which governs my confidence have been destabilized by this place. The complexity of it all exceeds my expectation. Its potential exceeds my expectation. Total loss of confidence. This brings on a state of mental noise. The possibility of some transformation is enmeshed with a degree of contingency which is destabilizing. Malaspina told me. Reed says that this is in a closer reading of Lewis Gordon's readings of Fanon. I have read this in Lenin as well. And Marconi. The Problem of scale in Anarchism and the case for cybernetic Communism. Complexity is required. What comes after the revolution? Who will manage the railroads? Day 2. After the revolution of great change. What structure emerges. Who can be counted on. Who will have confidence. Put your sample in upside down and you'll destroy a thirty thousand dollar oven. I just used 3 tools which carry a price tag north of two point six million dollars. I wonder what Hooke spent on his tools? I used to believe that tools were a way to feel free, a way to build and develop my own subjectivity. Nothing in here is free. Labor of the inhuman. Reza wrote about this. Simondon wrote about this. On Techno-Aesthetics. It was a letter to Derrida. He never sent it. His daughter found the letter in his desk after he died and released it into the world. What's a letter without a stamp? A hammer without a carpenter. Simondon. In On Techno-Aesthetics, he talks a lot about the joy of using tools. Sensorimotor Joy. The painter's experience with the unctuous qualities of oil paint as he pushes it across his smooth canvas support with his brush, the small wrenches under the Tour de France rider's bicycle seat. They feel good in your hand. Joy in tool use. Sensorimotor joy. We'll come back to this with Stiegler. Sensorimotor joy.

1941. California. Before the bomb. Promethean Shame. I don't feel that sensorimotor joy in the clean room. Not yet anyway. I have felt Promethean Shame. Günther Anders wrote about promethean shame in his journal which outlines a framework for what it is and what it does. Cheyney told me. Promethean shame is the feeling one has when they are confronted with something that is made and not born. Something which has been made and been given faculties that exceed those of the human who stands before it. He first observed this when he watched his friend stand before a clothes washing machine at an appliance convention. I think that's how it goes. If my memory serves me. I didn't remember it as a

journal from the first time I read it. I just came back to it recently and was surprised I forgot the original format. I have been writing a journal. Is that what this is? It's funny to forget someone else's journal. Or, at least forget that its format was a journal, but remember the ideas. What is memory? Does my memory serve me well? Computation? I am not a pan-computationalist. Hooke doesn't trust memory. I guess that's why we put everything in a book, because it is a memory, and it's better served in the book than it is in his mind. Tertiary memory. Technics and time. Epimetheus is forgetful. Prometheus' liver. Our minds are fickle. Hooke wrote about this. He doesn't trust memory. He doesn't trust sense. He doesn't trust reason. This is why he advocates for the use of technology in place of relying exclusively on given human faculties. In his mind, our memories are as weak as our eyes. They need to be extended with the use of things like the microscope. Stiegler uses the term proletarianization to refer to a loss of knowledge (savoir). What follows is another passage from Stiegler. I like this one.

For Béla Bartók, it is this loss of knowledge that is at stake in the birth of the radio. Like the phonograph, the radio enables one to listen to music without needing to know how to play music. In an interview that Bartók gave in 1937, he says that one should only be allowed to listen to music on the radio if one is reading the musical score at the same time. For him, it is evident that those who do not know how to read or play music cannot really listen to it. In 1759, Anne-Claude-Philippe de Tubières, Count de Caylus, says in his debate with Denis Diderot—and Goethe will say the same at the end of the eighteenth century—that it is impossible to talk about a canvas that one has not copied. If one looks at the canvases in which, in 1796, Hubert Robert is painting the Louvre—which had become a national museum accessible to all just three years before—one can see that the visitors, who are most definitely almost all artists, mostly reproduce paintings there. Paul Cézanne will do the same in the nineteenth century. As he explains in a letter to Émile Bernard, he thinks that one cannot see that which one cannot show by painting it, for example. One only sees to the extent to which one is capable of painting what one sees. One would have to show that what is happening here is a transformation of Jakob von Uexküll's sensorimotor loop. From this moment onward, it starts looping through artificial organs, thus making possible a noetic expression of sensibility that becomes exclamatory and sensational as a result.

The microscope affords me a whole range of scales and experiences that my eyes cannot. What can a tick see? Umwelt. Are my eyes underserving of these images? This world afforded to me by the microscope? Am I building worlds or are worlds building me? Malaspina told me. *The individual, as object of experiences, is what informs us on ourselves and on the world (constituting either a bundle of faculties or an aggregate of attributes.)* What can I know of the world I inhabit. Of the lab. Uexküll's theory of umwelt argues that a creature's understanding of the world is largely determined by the world it inhabits. Where it preforms its choreography of being in the world. Through its individual subjective experience of its own world. A private world. Private worlds unique to each individual subject. The architecture of the clean room has a specific choreography. It is a metastable environment in Simondon's sense. A hypersaturated space of constraint and potential that can change what an individual is. I'm still learning the steps. Building my world. Every other floor in the building which hosts the clean rooms are nothing but HEPA filters. They generate a constant, laminar waterfall of air that pushes every particle downward. When you enter the cleanroom there is a sign while reminds us the human body sheds tens of thousands of particulates with each movement. Skin. Hair. Fibers. Whatever escapes the suit's weave. In this environment, our movement

can't be casual. It is scripted. The cleanroom organizes you how to move. It infects. Contagious Architecture. Parisi told me. You don't swing your arms. You don't turn quickly. You pivot from the hips, you glide, you minimise(UK) turbulence. Contagious Architecture. Even the act of reaching for a wafer or stepping to the side becomes part of a protocol. Contagious Architecture. The architecture governs the body more strictly than most architectures do. Its algorithms. If you want to keep your samples clean, you obey the choreography. I obey the buildings commands. It governs my experience. It builds my world. I move according to its needs, not mine. I adjust myself so that my work can survive its encounter with me. You move like a robot. Not like the multimillion-dollar ones that shuttle wafers between tools but like a simpler machine. Up. Down. Across. Careful. Deliberate. A mechanical dance designed to keep your own biology from contaminating your work.

I have studied photonic computation. What substrates can host or accommodate the process of computation? Input, compute, output. D2NNs or diffractive deep neural networks. Run compute by pushing light through material substates. It is computation that occurs at the speed of light with significantly less cost than traditional compute. The model still needs to be trained but the operation happens in an instant. You create a material body which choreographs light to perform some form of computational operation. Could be intelligence in the future. Maybe they will get there. I told Mark I wanted to use the microscope to make dynamic images. He told me he thinks we probably mean different things when we say dynamic images. He's talking about lenses and light and its principals but in a different way. There are polarizing filters. They too change the way light behaves. Each knob I twist and button I press produces a new result. I am taken with the images the microscope produces. They are aesthetic. Gediminas reminds me that someone selling tiles means something other than this when they use this word. These images look fake. Generated. Not real. I need to give them a material body. 35mm bodies. I'll send them to California where Anders was and have them sent back to me as something else. Something real. I can run these real images through the projectors lenses with light at their backs to amplify them. Light to compute. Make them intelligible. Make them big. Make them loud. There will be noise.

2025. Cambridge, Massachusetts. Memory. Reason. All artists are men who want to become inhuman. I love this line. Lyotard opens *The Inhuman* with this quote from Apollinaire. Human is not given, but built over time slowly. Time. I got lazy and tried to use the LLM to do my translation. Proletarianization. Time saver. Labor saver. Cheaper compute. GPT 4.0 It pointed me in the right direction, or at least I trusted that it did. It was the host. I was the guest. There was noise. I put in the quote into the UI. I found it after reading Lyotard's *The Inhuman*. The LLM pushed me in the direction of this text. *Esprit Nouveau* and the Poets. 1918. I took some screen captures of the original from a book I found online and dropped them into the LLMs UI. It gave me a version of the translation. Wow. Fantastic. I love it. I need the subtleties. I read the French alongside the English translation which I had. They weren't the same at all. Noise. In fact, the one that it had translated for me was eerily uncanny. Hosting me and my interests with great delight. Somewhere, the signal got interrupted. Hallucination. Noise. There's noise in the system. The text is about poetry and technology. The spirit of the new poet. Noise. Noise. Noise. Serres reminds us that in French, *le parasite* means host, guest, and noise. Why do we keep going back to French? *Je ne sais pas, c'est pas clair, je ne suis pas sûr, je ne sais pas, je ne sais pas pourquoi. On est là, en français, toujours, il y a*

plusieurs trucs ici qui sont en français. Il y a Stiegler, il y a Serres, Simondon. Malaspina. C'est un peu bizarre, ça. Hallucination. Noise. The signal needs to be interrupted. It's only noise if it's interrupted. If it doesn't start and stop, its not noise. it's just time.

L'Esprit Nouveau et les Poètes

Guillaume Apollinaire - 1918

The new spirit that is taking shape in our time does not come to repeat the old vocabulary of feeling. It comes because our instruments have multiplied. We no longer perceive with the page alone, nor with the singing voice alone, but with lenses, shutters, receivers, recordings, projectors, processors. An art that does not make use of these new means leaves reality half unread. That is why the new spirit demands from artists — and from poets first, because they are the quickest to test language — a reconfiguration of form so that cultural production may meet the technical present, not trail behind it.

This new spirit does not reject the classics; on the contrary, it wants from them their cold virtues: clear sight, an order that can hold many elements, a discipline that contains emotion instead of letting it flood the work. But it does not want the kind of sentiment that closes the circuit around the human subject. It wants a form of clarity that can survive mediation — clarity that still works when a poem is not only read but projected, recorded, transmitted, printed over another surface, passed through a machine that redraws it. It wants, in short, forms that are plastic enough to receive other processes.

From romanticism, it keeps only the best part: the refusal to let experience be small. But it no longer wants experience to be only interior. It wants the outside — geographies, technologies, ethnographies, even the purely technical data of the world — to enter the poem as material. Not as ornament, but as actual structure. A poem, a painting, a print, should be able to hold — alongside speech — the diagram of a machine, the aerial view of a city, the static of transmission, the slight errors of reproduction. That is how the work will stop reaffirming the same “man” and begin to register the world.

Research into form, then, is not a fashion. Free verse was only the first crack. It liberated rhythm from the tyranny of count, but it did not yet integrate the page as a spatial field, nor time as cinema knows it, nor repetition as the phonograph enforces it. Typographic experiments, layouts that make the eye travel nonlinearly, are not jokes: they are attempts to make the poem coexist with other media. Pushed further — into montage, into image-text constellations, into text that invites being re-scanned and re-plotted — they create a visual lyricism that belongs to our moment, where the image is the popular carrier of thought.

One must remember that earlier centuries also played with form — those endless rhetorical variations that helped ripen taste. In the same way, today's experiments — the hybrid page, the text laid out like circuitry, the poem that already imagines being read by a camera — will ripen a new taste: a taste for works that expect to be technically processed. It is no scandal if a poet composes with an eye toward reprinting, projecting, or letting a machine redraw the text. That is simply writing for the world as it exists.

Today the popular arts — above all cinema, but we could now say recorded sound, the reproducible image, the procedural graphic — are so allied to image and signal that poets and artists would be at fault not to try to reclaim them for subtler uses. We have too long left these channels to commerce. Yet it is easy to foresee that these very channels will become the main vehicles of literary and artistic impression. Then creators will enjoy a liberty unknown before: to write for page and screen and sound and machine in one gesture. This is close to what you call a metamodel — one generative structure, instantiated differently across media.

Let us be clear: among us there are those already able to separate what belongs to the past from what is still alive. Their task is to prepare what is coming. Just as a conductor disposes of the entire orchestra, the modern artist must be able to dispose of the world's semiotic resources — spoken languages, notation systems, dance, photographic images, field recordings, sensor data — and arrange them into a single composition. The work will no longer be a single voice but an orchestrated interaction among heterogeneous processes. One could almost say: the work is not the poem, it is the setup.

And because France (Apollinaire insists) does not like disorder, the new spirit must show that this proliferation does not mean chaos. We will hope for a liberty of unimaginable richness in the matter and means of art, but we will ask this liberty to submit to invention. Today's creators acquaint themselves with an encyclopedic freedom, but their freedom cannot be less than that of a newspaper page that, in one surface, gathers distant events. Why should the poet, the artist, not enjoy a freedom equal to the telephone, the wireless, the airplane — all these devices that abolish distance and make immediate contact possible? If communications can leap space, art must be able to leap media.

The speed with which minds now name and manipulate complex entities — nations, networks, planetary crises — proves that our epoch seeks synthesis. What people, what culture, does not have its poets now? Then poets, artists, can create synthetic works: new entities that have a plastic value equal to any scientific compound. A poem can hold, in one arrangement, the infinitely small (grain, noise) and the infinitely large (global signals, planetary sameness). A print can hold an image and its own means of production. A film can show not only scenes, but its own process of capture.

Humanity has grown familiar with machines; it has peered into the microscopic; it is opening to the cosmic; and the domain of foresight — what you would call prototyping or speculative modeling — is opening as well. Do not believe, however, that this makes the new spirit heavy. On the contrary, like Saint Francis shedding everything before the altar, the artist today sheds rhetorical excess. We no longer wish the fogginess of Wagnerian romanticism or the syrupy eloquence of Rousseau. We want a nakedness equal to technical reality — an economy that can pass through scanners, cameras, networks, without losing its form.

It is here that a warning must be made. One may admit that imitative harmony — reproducing sounds, gestures, machine-noises — has a place. But it must not be the foundation of an art in which machines

now intervene. A poem or a sound-work composed for recording can very well be made of chosen sounds, lyrically arranged, juxtaposed in ways the ear has never heard. But I cannot admit that poetry consists simply in imitating a noise to which no lyrical, tragic, or pathetic sense adheres. If some artists do this, one must understand it as exercise — as test files, as process notes — which will later be embedded in a fuller work.

This is, I think, where your own distinction between imitation tests and interaction tests appears *avant la lettre*. Imitation pushes the capacity of a system to resemble; interaction pushes its capacity to transform and be transformed. Apollinaire is saying, in 1918, that in an art where machines have entered the loop, imitation alone is too poor to found anything. It can probe the flexibility of the medium, but the work requires plasticity — the irreversible remodeling that comes from real encounters among heterogeneous processes.

All these trials obey a concern for truth — not “objective” truth, but plausibility with regard to the actual conditions of perception. We should not be surprised if many attempts are momentarily sterile or even ridiculous. The new spirit is full of traps. To condemn the whole lot would be like those who, seeing the first trains, declared them toys and doubted there was enough iron to connect Paris and Marseille. We must let these awkward, procedural pieces exist; they are accruing a substrate of technique and perceptual habits that later works will activate.

Later readers will wonder that poets and artists, like alchemists, undertook such investigations without even the pretext of some final stone, and that they did so despite the mockery of journalists and salon taste. Yet their investigations will have served. They will have laid down a modest but exact layer of reality — the reality of how media actually behave — on which a new realism can stand. Not naturalist realism, but a realism of apparatuses.

The new spirit, eager for universality, does not in fact wish to flatten difference. An entirely cosmopolitan expression would risk being vague, toneless, like the hollow international rhetoric of parliaments. Even cinema, the most international of arts, shows immediately recognisable differences. In just that way, the new spirit, which wants to speak for a humanity entering the same networks, nonetheless insists on a particular lyricism — in his case French, in ours perhaps situated in specific techno-cultural practices. It knows that intellectual conquest can be more dangerous than military conquest.

That is why this spirit allies itself with order and duty — classical virtues — and adds to them liberty. This fusion is its force. It allows it to range over all media and materials without dissolving. It keeps machinic art from becoming merely mechanical. It is, in your terms, what keeps the metamodel from becoming a blob.

And we can say, looking ahead, that art will only cease to be modern on the day when the entire world, living under the same climate, in dwellings built on the same model, speaking the same language, feeling

the same emotion, has exhausted invention. That day is not ours. For now, sameness is precisely the danger that obliges artists to keep inventing.

Artists are, above all, those who want to become inhuman. Not to abandon life, but to refuse the narrow sentimental genre of “man” that culture keeps trying to reinstall. To become inhuman is to let one’s practice be reshaped by media, by machines, by global simultaneity, by technical images — to accept plastic change instead of flexible compliance. It is to use imitation only as a trial, and interaction as the real site of art. It is to seek forms that can circulate across devices, be reprinted, rescanned, reinterpreted by nonhuman agents, and still produce lyric effect. It is, finally, to make work that lives where your work lives — in the space between human intention and machinic transformation.

III. Metabolism, Waste, Screentone

1970. Kalamazoo, Michigan. Noise. Reason. How do you make noise. Epistemology of noise. Malaspina told me. Feedback as generative thrust. How do you control the uncontrollable. The RAT pedal is an archetypal, nasty but smart distortion box, halfway between overdrive and fuzz, with a particularly mid-range bark. I like it loud. Drone metal, harsh noise and power electronics help me focus. Calm my mental state of noise. Lots of rats. It was born in the 1970s out of a rat-filled basement workshop. The classic version uses a single LM308 op amp slammed into hard-clipping diodes, which are grainy and compressed, and that is where the distortion comes from. The noise. It sits in the family with Tube Screemers and DS-1s, but it is more aggressive, more compressed, and darker unless you dial it the other way. More noise. Rats. Rats. I want to bathe in the noise. Anxiety bath. Keep it just at the edge of feedback. For me, Simondon implies that a metastable environment is a promissory one. That an environment with an excess of energy is required for transductive individuation. Disparity. Multiple incompatible potentials co-present, like a crystal that grows in a supersaturated solution. The lab is this metastable environment. It is supersaturated. Noise. Brimming with anxiety. It can change me. Individuate me transductively. This is metabolic. Something goes in. A new thing comes out. Or two new things come out. This is compute. New me. New waste.

1937. Hillside, Illinois. Dead skin is metabolic. Use value. What is the cost of material use? Sometimes it can feel expensive. Use value. How long can a technical object maintain its utility? Screen tone. Screentone started out as a tool for architects. It was a convenient way of adding gradients and shading to their work. Technical drawings. Technical objects. Depth. Perspective. This is a way of sense making. Is it a drawing of space without any perspective? Without any depth? Is a drawing a good way of articulating scale? Of world building? Screentone went out of fashion with the advent of computer assisted design. Proletarianization. The computational cost of using the material was too high. It was easier to use a computer which has a lower cost than it was to burnish sheets of toned dots onto your drawings by hand. A skill lost. Proletarianization. Manga found it. Manga likes it. Manga is world building. Amateurs would do their drawings and then import the effects of mechanical reproduction into their drawings as a way of making it seem like their work was done by a machine. Benjamin. The work of art in the age of

mechanical reproduction. Why would you want your work to be done by a machine? Benjamin. Does it have more value if it is done by a machine? Machines are not born. They are made. Anders reminds us. Promethean shame. I take these transparent sheets imprinted with halftone patterns. They come with adhesive on their back. I stick them to the floor. I am gathering the dead cells. Am I making skin. Judith has taught me a lot about bio art this year. The dead cells run through the materials capacity for use. Half man, half machine. Is this a cyborg? The dead cells are the things that we are supposed to be scared of in the lab. Does my dead skin really ruin my work? Is this bio art. It is everywhere. Pounds of it. Pounds of it have fallen off my body. Pounds of it. There are pounds of me in the world. They are not with me. They are out there. How many pounds in my 37 years have I lost? If it is two pounds a year, then it is north of 70 pounds. That weighs more than my son. He is a piece of me too.

2025. Cambridge, Massachusetts. I started out the year thinking a lot about metabolism. I was thinking about building our own subjectivities, that the idea that human was not given but built would be the direction I would go with this. Metabolic transductive individuation. I was told that all construction necessarily creates waste. All computation has a cost. Reza told me. It is an editing process, the things we keep and the things we leave behind. What is the waste produced through the process of building one's own subjectivity? Computational cost of Reason. Labor of the inhuman. Is it subject to Marx's metabolic rift? It's construction, right? Labor of the inhuman. We're building ourselves, but what becomes of that waste that the construction of our subjectivity produces? Metabolic rift. I love the way Kojin Karatani frames it in *The Structure Of World History*. Let's stick to it. Metabolism. Things go in, they're used, things come out. Compute. Some of it is productive, some of it is waste.

IV. Lift, Tick, Blindness

I take pictures with my iPhone's camera. They get stuck in my camera roll. In its memory. Some 16 thousand pictures are there now. Many of them are waste. How many are in my head? What is their weight. I'll take little sections of them and drop them into a nice 200mm tondo in Photoshop. These are photograms. The promissory structure and potentiality of the digital space offering some novelty. Leaving sections blank makes sense to me. I'll fill them in with Firefly's native in-painting feature. There is lift here. Marek told me. Roberto told me. Exo-whatever. Its leaving me behind. Maybe it was never mine to begin with. Lift.

I open Adobe Photoshop which depends on firmware and a boot chain that start with a UEFI or BIOS implementation stored in flash memory, which depends on microcode updates from CPU vendors such as Intel, AMD, or Apple that are loaded by the operating system kernel; the operating system itself, macOS, depends on a scheduler, memory manager, filesystem drivers, and process isolation that keep Photoshop, browsers, and background services from corrupting each other, and depends on a windowing system, graphical compositor, and font rendering stack that allow Photoshop to draw its UI; Photoshop depends on GPU drivers supplied by Nvidia, AMD, or Apple, which depend on graphics APIs such as Metal, DirectX, or OpenGL, which depend on shader compilers, runtime libraries, and microarchitectural quirks of the GPU silicon; the laptop depends on DRAM chips from memory vendors, SSDs from storage vendors, Wi Fi and Ethernet chipsets, batteries, chargers, and mainboards assembled by an OEM that depends on contract manufacturers, component suppliers, and logistics companies

across several continents; the laptop depends on an internet connection provided by a local ISP, which depends on a residential router and modem, which depend on DOCSIS or PON standards on the last mile, which depend on street cabinets, central offices, and metro aggregation routers, which depend on regional fiber backbones, long haul carriers, and consortia that own and maintain undersea cables; every HTTPS request that Photoshop makes to Adobe depends on the global DNS hierarchy to resolve hostnames to IP addresses, which depends on root name servers, TLD operators, and recursive resolvers operated by ISPs or public DNS providers, and also depends on BGP announcements propagated through routers from vendors like Cisco, Juniper, and Arista so that packets know where to go; the TLS connection that secures Photoshop traffic depends on certificate authorities that issue X.509 certificates, on hardware or software random number generators in the laptop, and on cryptographic libraries such as OpenSSL or platform equivalents that implement key exchange and ciphersuites; Photoshop depends on the Creative Cloud desktop application and Adobe ID sign in system, which depend on OAuth style identity flows, on Adobe's identity and access management services, on password and token storage schemes, on device binding, and on risk scoring systems that flag suspicious logins; those identity and licensing services depend on relational databases, caching layers, and configuration services running in Adobe's application stack, which depend on build pipelines, container registries, and deployment tools managed by internal platform teams; the subscription itself depends on payment processors such as Visa, Mastercard, PayPal, or Stripe, which depend on acquiring banks, card networks, fraud detection engines, and regulatory regimes for know-your-customer and anti money laundering compliance; once authenticated, Photoshop depends on APIs that describe license entitlements and feature flags, which depend on internal configuration services that decide whether Firefly options are enabled for that account or region; the Firefly integration in Photoshop depends on an API client inside the app that prepares prompts, masks, and image fragments, which depends on local serialization standards, compression libraries, and HTTP stacks, which then depend again on the network and TLS path out to Adobe; at the other end, the Firefly API layer depends on API gateways, load balancers, and rate limiters that sit in front of microservices, which depend on service meshes, autoscaling groups, and configuration stores that route traffic to the correct region and the correct model; those microservices depend on containers orchestrated by systems such as Kubernetes or proprietary schedulers, which depend on container images in registries, on base operating system images, on glibc and language runtimes, and on patched kernels that incorporate a stream of security updates; the containers depend on virtual machines provided by Amazon Web Services or other hyperscalers, which depend on hypervisors and hardware assisted virtualization, which depend on racks of physical servers with BMC controllers, redundant power supplies, and network interface cards connected to top of rack switches; those servers depend on GPU accelerators such as Nvidia A100 or H100 cards and on custom accelerators such as AWS Inferentia, which depend on chip packages soldered to boards, on high bandwidth memory stacks, and on power delivery networks tuned to dense AI loads; the GPU dies themselves depend on design work done inside Nvidia and similar firms using electronic design automation tools, IP blocks for PCIe, memory controllers, and interconnects, and standard cell libraries tailored to specific foundry processes; fabrication depends on foundries such as TSMC, which depend on EUV and DUV lithography machines supplied by ASML, on deposition, etch, and metrology tools from Applied Materials, Lam, KLA, and others, on photoresists and gases from chemical suppliers, on ultrapure water plants, cleanroom facilities, and control systems, and on a large workforce of operators and engineers that keep multi billion dollar fabs running; Firefly models depend on training data assembled from Adobe Stock and other licensed or curated sources, which depend on photographers, illustrators, and agencies that upload work, on contributor contracts and royalty schemes, on moderation pipelines that reject unlicensed or illegal material, and on legal teams that negotiate indemnity positions; the creation of training data also depends on labeling work, either by in house staff or outsourced annotation firms, which depends on task platforms, quality control systems, and labor markets that pay workers to tag, classify, and rate images and outputs; the optimization and safety shaping of Firefly models depend on internal research teams, on frameworks such as PyTorch or TensorFlow, on linear algebra libraries like cuBLAS and cuDNN, on distributed

training libraries such as NCCL, and on experiment tracking systems that store checkpoints and metrics in datastores; the deployment of trained models depends on model serving infrastructure that shards parameters across GPUs, on quantization and compilation steps that turn weights into inference graphs optimized for specific hardware, and on caching and autoscaling rules that keep latency within acceptable bounds; the datacenters that house all this compute depend on leasing or ownership arrangements between hyperscalers and landlords such as Digital Realty or local real estate entities, which depend on site acquisition, planning approvals, local tax agreements, and economic development incentives; each datacenter depends on high capacity substations and power purchase agreements with utilities, which depend on generation fleets that include gas, coal, nuclear, hydro, wind, and solar assets, which depend on fuel extraction, refining, and equipment supply chains, and on transmission networks that carry power from plants to loads; cooling systems in these datacenters depend on chillers, cooling towers, pumps, and heat exchangers, which depend on water rights, environmental permits, and climate conditions that dictate how much heat can be rejected into air or water; backup systems depend on diesel generators, fuel contracts, UPS units, and battery strings, all of which depend on further mining, manufacturing, and logistics chains; Adobe's cloud storage for Photoshop working files depends on object stores such as S3 that replicate data across availability zones, which depend on erasure coding libraries, background repair processes, and monitoring systems that detect disk failures, which themselves depend on HDDs or SSDs from storage vendors and on firmware that reports errors correctly; cross region replication depends on inter data center fiber links, optical transport gear, and routing policies that keep copies consistent under normal conditions and under failure modes; other Adobe products, such as Acrobat AI Assistant and Experience Cloud generation tools, depend on Microsoft Azure and the Azure OpenAI Service to process language prompts, which depend on additional GPU clusters and control planes with their own layers of servers, switches, storage, and datacenters that mirror the AWS stack, while some Firefly modes depend on external models hosted by providers such as Google Cloud, which adds further regions, fiber routes, and corporate boards into the same extended diagram; all of these technical systems depend on corporate structures and finance, on Adobe's board and executive team, on large institutional shareholders such as index funds, on regulators that govern antitrust, privacy, labor, and securities, and on standards bodies such as ISO, IEEE, and IETF whose protocols and recommendations underwrite everything from floating point formats to Ethernet and HTTP; when the user finally clicks Generative Fill and sees a patch of pixels inside a single Photoshop document change on screen, that moment depends at once on firmware, operating systems, compilers, cryptography, ISPs, fiber, DNS, certificates, payment networks, code repositories, continuous integration servers, cloud regions, GPUs, fabs, chemical plants, water systems, grid operators, mines, content contributors, annotators, lawyers, regulators, financiers, and elected officials, all chained together so tightly that the failure or absence of any one cluster of these actors would interrupt the apparently simple act of editing an image.

When I reflect on on this it is impossible not to feel like Uexkull tick. Umwelt. Do I really know anything of the world in which I exist. From the world that gives me life? There is information here but it does nothing for me. It left me behind. It is noise. It has potential to generate something. Some understanding, but it is not and understanding of the world. It is a new understanding of myself. I feel blind. Tick.

V. Wafer, MLA, Black Silicon

The images I produce with photoshop become images I will embed in the surface of my silicon wafers. By manipulating the python code that transforms these images from PNG to GSD I can assert some agency over the constituent elements that constitute the images graphic undergirding. I can push it from simple

geometric shapes to something with meaning. I will start with Micrographia itself. How many times can I put the book on a wafer. ChatGPT looks at the result of my code and lets me know its close to 12 times. The printed copy of the book stands at 274 pages. That's about 3288 pages. 10.2 million characters total. Tiny letters measured in micro and nano meters populating the surface of the wafer composing an image. What about something more native to the environment that is the cleanroom? A photonic ring oscillator is a tiny loop of waveguide etched into silicon. Light goes in, circulates, and comes back around again, but only certain wavelengths fit neatly inside the loop, like notes that can actually resonate in a bottle. When the conditions are right, the light reinforces itself each time it completes the circuit, building a stable oscillation. If the refractive index shifts even slightly heat, charge, strain, whatever the resonance shifts. It's basically a nervous system made out of light. Sensitive, anxious, reactive. I am anxious. It doesn't do anything by itself unless you feed it a signal. Noise. Anxiety. It needs a signal. Without a fiberoptic line driving pulses through it, it's just a geometry, a potential. Elam is right about that. It is not noise until something perturbs it. It is not alive until it's interrupted. Rats on a rug.

The MLA is a maskless aligner, a machine that writes patterns onto wafers without needing a physical mask at all. I have to wear a mask to use it. What the fuck is a bunny suit. It keeps my dead skin close to my body. It uses projected light. Steered. Modulated. Sliced into machinic choreography. Exposing a photosensitive layer on the wafer's surface. You feed it a GDS file, a map of lines and shapes measured in nanometers, and the machine turns that abstract geometry into chemistry. Python writes the code for me. Ben wrote the code for me. Snakes eat rats. It does this one field at a time. Stitching them together with sub-micron precision. The wafer sits perfectly still. The optics move. Or sometimes the optics sit still and the wafer shifts under them in tiny controlled steps. It depends on the model. ChatGPT told me. I needed it to explain this world to me. I didn't have access otherwise. The MLA is a choreography of stage, mirror, and ultraviolet light. You don't see the exposure happen. You only see the aftermath when you develop the wafer, and even then it's invisible until the etch makes the pattern bite into silicon. It is not a camera, not really. It is the inverse of a camera. Instead of capturing an image formed by light, it imprints one, pushes it into matter. It turns files into physics. Hook was already considering some of this in 1665. A Peacock's feather. It is a black box for drawing at a scale the body can't touch. It feels like cheating, but it's not. It is just a tool whose sensorimotor joy has been outsourced to a robotic arm and an optical train. Tool.

VI. Noise, Metastability, Computation

1999. Harvard, Massachusetts. Noise. Black silicon was discovered by mistake. Contingent birth. It existed in a speculative sense, but it wasn't achievable until a lab error produced the right kind of surface roughness. Science discovers science. A stochastic forest of nano-spikes that trap almost all incoming light. It absorbs 99.9% of the light that hits its surface. That remaining 0.1% that comes back off the surface, is that the noise? It is an interruption in the system. The system would be less interesting if it absorbed 100% of light, but that's a fantasy. Total absorption, no leak, no signal. No me. I don't think I want to get all the way there. Corey and I worked on the chemistry for a while. There are a number of tests. They are saved on the Asher in the clean room. Other people working there can load the recipes and try them out

if they are keen. Iterating is important. It's recursive. Callback. It makes progress by going back to the thing, looking at the errors, and mobilizing judgment.

Noise is first a structural feature of systems. It is embedded in computation. Then it is lived as anxiety. Noise is not glitch. I am anxious. This is not about glitch. Computation is indeterminate. It has the potential to create novelty. Fazi promised. We pretend it is only capable of predictable outcomes because machines look so certain when they run. When they work. Compute. It is a process. Noise. But underneath their surface there's Gödel whispering that no formal system can ever prove all of its own truths. This is not about glitch. There will always be propositions that escape, unresolvable statements that force the machine to admit its own incompleteness. Fazi told me. Parisi picks this up in Contagious Architecture. The algorithm is not absolute. It doesn't grunt from input to output with perfect fidelity. It leaks. Noise. It mutates. It encounters incomputable probabilities. It takes in noise and sometimes becomes noise. Noise. Computation isn't a sealed logical order but a dynamic field where rules meet contingencies. Where discrete operations generate unexpected forms. Contingent Computation. Representation. The indeterminacy is not a flaw. It is the condition. The machine doesn't just execute a model. It exceeds it. It produces results that weren't fully contained in the initial parameters. This is not glitch. This is why every run is a little different, why stochastic processes are not just algorithmic features but philosophical ones. The algorithm is not a law. It is a tendency. A vector. Compute. A gesture towards order that always carries the possibility of surprise. I am anxious. I am noisy.

My work is the host. My work is the noise. Parasite. My work is the guest. The space is the host. The space is the noise. The space is the guest. My body is the host. My body is the noise. My body is the guest. Tick.