

## THEORY BEYOND THE CODES

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### Dust and Exhaustion

#### The Labor of Media Materialism

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“Each particle of dust carries with it a unique vision of matter, movement, collectivity, interaction, affect, differentiation, composition and infinite darkness”

— Reza Negarestani, *Cyclonopedia*

#### I. Dust — The Non-Thing

There is something poetic about dust. It is the stuff of fairy tales, stories of deserted places; of attics and dunes, of places from so long ago they seem to have never existed. Dusty books — the time of the archive that layers slowly on shelves and manuscripts. Marcel Duchamp’s 1920s *Large Glass* was a compilation of dust. In a way, he allowed dust to do the work: a temporal, slow compiling by the non-human particles as a work of art installed at the museum, “a purposeful inactivity.” [1] Dust can transform, even if it can itself easily escape any grip. It is amorphous, even metamorphic, in the manner Steven Connor describes. [2] There is also a lot of it. It can be done and dusted, removed from sight and forgotten — in need of no further attention. Nanoparticles are everywhere and form societies unseen and unheard of, yet they conglomerate on a scale unimaginable to human beings. We are a minority. They have their say on human things, and cover what we leave behind intentionally or by accident — obsolescent technologies, wrecks, monuments — which remind us not only of these things themselves but of the gradual sedimentation of dust. Dust marks the temporality of matter, a processual materiality of piling up, sedimenting, and — through its own million-year process — transformations of solids to ephemeral and back. It swarms and overwhelms, exhausts and clouds. “Breathe as deeply as you will, dust will never be depleted.” [3]

There is something poetic and sometimes even romantic about lack of breath. Lung diseases are after all a sign of the delicate soul, and have a long cultural history. Tuberculosis features in a vast range of examples from a Puccini opera to Thomas Mann’s *The Magic Mountain* (1924). The pale tuberculous body feeds towards the mythical airiness of lungs, blocked by the disease. It is as if tuberculosis releases the body from matter: “TB is disintegration, febrilization, dematerialization; it is a disease of liquids — the

body turning to phlegm and mucus and sputum and, finally, blood — and of air, of the need for better air.” [4] But the lung-diseased body is easily exhausted, lacking in air, gasping for it. It is a tired body, and tiredness is one key trajectory we should be following as well: a laboring body.

This is a text about dust as well as exhaustion: about non-human particles as well as labor. It takes small things like dust as one vector for its argument, and as a vehicle in the manner of which we sometimes think through objects. Dust is, however, not quite an object, not in the intuitive sense that objects are supposed to be easily graspable. It does not fit the hand, even if it covers vast terrains. It is more environmental and better characterized as a milieu. Well, *almost* a milieu: we rarely count it among things that matter, but what if we did? What if we followed dust as a trajectory for theory — theory that is concerned with materiality and media? What if dust is one way to do “dirt research”: a mode of inquiry that crosses institutions and disciplines, and forces us to think of questions of design as enveloped in a complex ecology of economy, environment, work, and skill. Dirt brings noise, as Ned Rossiter reminds us, and dirt research can be understood “as a transversal mode of knowledge production [that] necessarily encounters conflict of various kinds: geocultural, social, political and epistemological.” [5]

Indeed, some people already take dust seriously — and not only the likely underpaid cleaning laborer. Dust consists of so many things: hair, fibers, dead skin, plant pollen, and non-organic stuff like soil minerals. Nanoparticles, smart dust, engineered tiny things that are able to invade and inhabit organisms as mechanisms of repair, improvement, and engineering. Smart dust quietly highlights the world of non-human transactions that can facilitate, track, record, and govern human affairs. We are nowadays fascinated by stuff that is minuscule, mobile, peer networked, and able to calculate, process, and further transmit the data it receives — the next phase of dust. Dust can be in this sense seen as “the minimum recognizable entity of material transformation and circulation.” [6] But the archaeology of computational dust goes much deeper into history and begins with the abacus, and the etymological root of the word in *abaq* — Hebrew for dust. Ancient dustboards were erasable calculation platforms, writing surfaces. Babylonians as well as various scholars in the early Islamic world used this platform, which consisted of “a board or slab spread with a fine layer of sand or dust in which designs, letters, or numerals might be traced and then quickly erased with a swipe of the hand or a rag.” [7]

This essay tracks this multiplicity of dust — multiplicity not only in the sense that there is a *lot of it*, but in that it forces us to rethink such binaries as One/Many. Dust takes us — and our thinking — to different places and opens up multiple agendas. In this case, I use dust to talk of global labor, media materialism of digital culture, and how to approach this topic through such non-human nanoparticles. My argument routes itself through video games to factories, where gadgets are produced, to theoretical excavations in new materialism and speculative philosophy, to science fiction and the engineering of everyday realities. Dust fills our reality as well as our fantasies: the various fiction products set in dust and dunes, with the obvious ecological example of Frank Herbert’s *Dune* (1965).

This is not a text of theory so much as a text about non-humans that persistently concern the human. The non-human refuses to leave the human. This text subscribes to recent arguments that we need to rethink our theoretical perspectives from the point of view of things — and, I would add, not only things, but also relations and almost-things, stuff that lacks the solidity to merit it being called just a thing.

In one of his essays the German philosopher Martin Heidegger talks of the *thing*:

What about nearness? How can we come to know its nature? Nearness, it seems, cannot be encountered directly. We succeed in reaching it rather by attending to what is near. Near to us are what we usually call things. [8]

But something can be so near that it loses focus, falls out of view — these not-enough-to-be-things, or too-near-for-thingness (a tongue in cheek Heideggerianism) are what might enter us through our nostrils, inhaled, and cause a cough, or a rash on the skin. Such is the other sort of materiality that does not often merit that status of a thing. They might cloud us, but they do not count only as one.

Heidegger ends his beautiful essay on the ontology of the thing:

Inconspicuously compliant is the thing: the jug and the bench, the footbridge and the plow. But tree and pond, too, brook and hill, are things, each in its own way. Things, each thinging from time to time in its own way, are heron and roe, deer, horse and bull. Things, each thinging and each staying in its own way, are mirror and clasp, book and picture, crown and cross. But things are also compliant and modest in number, compared with the countless objects everywhere of equal value, compared with the measureless mass of men as living beings. [9]

Material things are modest — their numbers can be counted — yet the immodest countlessness of dust signals something else. Are such “things” immaterial? Are they almost like the air, just a tiny bit heavier? Like gases, they are atmospheric for sure. Dust shares a lot of qualities with air as well as breath — they each force us to rethink boundaries of individuality as well as space. You cannot confine air and breath in a manner that our more stable contours, like skin suggests. Peter Sloterdijk talks of the processes of inhaling and exhaling in this manner; as deterritorialisations of sorts, like when the child blows her breath into a soap bubble, exporting a part of herself, externalization, extension. [10] Dust too, must be thought as more of an environmental and atmospheric quality through which a different spatial and temporal thinking emerges.

Perhaps dust is then not just “matter” but something that troubles our notions of matter. Steven Connor talks of it even as anti-matter: “evacuated of air, the gaps between the particles reduced to their minimum — hence its muffling, choking effects.” [11] Dust also forces us to think of surfaces — it exposes them:

At the same time, dust is characterized by a maximum of what might be

called internal exposure, in which the ratio of the surface area of particles to their internal mass is extremely high. The availability of such a large surface area for chemical reactions accounts for the effectiveness of powders in forming solutions and suspensions. And, because they have no inside, because they are all a kind of internal exposure, dust-like substances can give contours or clarifying outlines to other things. Thus, dust, itself formless and edgeless, can both dissolve form and disclose it, like the snow that, in the right amount, can give to things a magical new clarity of outline, but passing beyond that point erases every landmark beneath its featureless drifts and dunes. [12]

Indeed, in this sense, I argue that dust is a non-thing, yet remains material. Similarly, we are concerned with humans that are not considered worthy of much but rather expendable; of consumer digital objects that merit only a short-lived existence and desire, designed to become obsolete sooner than is perhaps necessary.

In the midst of this short meditation about dust, however, I want to remind that **dust is something that attaches to lungs and expresses a relation of labor**: it begs the question of who gets to work in clean spaces, and who cleans those spaces. The latter are usually the poorer ones and easier to expose to dangerous and unhealthy conditions at their workplace. One can easily at this point raise a finger and claim that *so after all, you are just using a non-human element to actually to just talk of human affairs such as labor*. Quite rightly so, especially because such regimes and elements were never separated. In this essay, I refuse to separate humans and non-humans and instead address lungs and breath, games and work, political economy as well as philosophy. Let's start with games.

## II. Playful Bodies

I begin my discussion of games — admittedly without a very amusing and entertaining angle in the conventional sense of the spectacle — with materiality, in order to address non-humans. To talk of non-humans is not only to talk about things and objects, but about long temporal, material, and sometimes even abstract networks — such as networks of labor relations, which are abstract but completely real, and also non-human in the way in which dehumanization is at work in contemporary IT-related practices. Cultural techniques of IT work are not, however, only techniques of cognitive capitalism like communication, networking, and creative expression, but the techniques that sustain even the existence of IT: in factories, as well as when discarded electronics are dismantled.

I will therefore focus on two games that address labor, materiality, and information technology. The first, and better-known of the two, takes the user to the world of iPhones, but not as we experience them in everyday life. Molleindustria's *Phone Story*, [13] which is available for Android phones and banned on the iTunes app store, elaborates the production chains and conditions of work from the mineral mines to Apple supplier Foxconn's factories in the "special economic zone" of Shenzhen; plagued by worker suicides, as well as indexical of the wider health issues having to do with aluminum dust

that is a side product of ensuring that our iPads are shiny and properly polished, such places are the murky unconscious of gadget culture. The iPhone 5 launch and shipping of millions of phones in the first days was accompanied by strikes at the Foxconn factories in Zhengzhou and earlier clashes in Taiyuan. [14] Such problems in production are cleaned away from Apple's immaculately polished marketing material that emphasizes the human-sized ergonomics of its products.

Even if, for instance, the material side of information technology — such as the mineral coltan and its importance to IT — is increasingly becoming mapped on the critical theory radar and in art projects like the *Tantalum Memorial* (2009), the wider implications of materiality in relation to affect and labor need to be mapped out. Molleindustria's painfully simple game creates a map of this darker side. This map is especially conceptual: mining, suicides, electronic waste, and planned/meticulously scheduled obsolescence form the perverted side of the attractive, entertaining end-device. [15] The device is enabled by dubious labor practices, including child labor in the mines of Congo; the appalling working conditions, which lead to a number of suicides in the Foxconn factories in China; and the planned obsolescence designed into the product which also contributes to its weighty share of electronic waste problems. To make game play out of such themes is to look at the darker, not-so-immaterial cultural techniques that sustain creative cultures of digitality.

As noted in Nick Dyer-Witheford and Greig de Peuter's *Games of Empire*, Molleindustria games effectively establish procedural critique, a mapping of the algorithmic logic into which you are sucked as the player/subject — a systematic production of a limited, repetitive, depressive, and oppressive world without an outside. [16] In another context, N. Katherine Hayles refers to Nigel Thrift and writes about the technological unconscious/non-conscious to refer to the massive conditioning of gestures, perceptions, memory, and other human characteristics in software embedded environments. [17] What if we mobilize these critiques in relation to the geopolitics of hardware? What if our mobile-consumer selves have to be understood in connection with the heavier burden of hardware, labor, and work processes? For instance, the outsourcing of production is also an outsourcing of this hardware technological non-conscious from the Western perspective to far-away places. Outsourcing is historically connected to the emergence of consumer discourses that emphasize the lightness and mobility of digital technology. But it hides the outsourced hardness. This *harder* perspective does not downplay the thesis concerning games and immaterial labor — that games as labor involve special “communicative cooperation, use of networked technologies and a blurring of the line between labor and leisure time” to use the words from *Games of Empire* — but rather flags that supportive mechanism of labor on which immateriality can exist. This other labor — of factories, production lines, and lung diseases — shows a different notion of immateriality, which takes the near-immateriality of “lungs” and breathing as one central conceptual trajectory.

For Franco “Bifo” Berardi, the Italian philosopher, the soul becomes a way to understand the mobilization of language, creativity, and affect as parts of capitalist exploitation and production. Soul is the new ground for exploitation of cognitive capitalism, but it is a material soul that can also be exhausted:

For a certain period the conquest of extraterrestrial space seemed to be a new direction of development for capitalist expansion. Subsequently we saw that the direction of development is above all the conquest of internal space, the interior world, the space of the mind, of the soul, the space of time. [18]

This is the world of cognitive capitalism and the cognitariat, which mobilize knowledge, affect, and other intellectual skills as a production force to be exploited –hence the need for careful practices of managing and organizing such skill sets and the cognitive labor force. [19] It is not, however, the case that the immaterial is *without* a material basis. Indeed, in his notes on “Exhaustion/Depression,” Bifo argues that there is a relation between the slumping global economic regime and the psychosphere — a conjoining of depressions in a manner that clearly implicitly picks up on Felix Guattari’s ecological thought: that we need to think of ecology not only through nature but through subjectivity and social relations. Bifo pays attention to the side effects of a brain-powered cognitive capitalism and its mantras of creativity by pointing out the increase in both various psychopharmacological means of mood management and in mental disorders. He comes to the conclusion that exhaustion and depression are actually the key moods through which to understand creative and cognitive capitalism and the world economy — the worn-out soul cannot keep up with its digital machines.

Bifo argues that the expansionist drive of capitalism no longer only reaches out for new natural resources but reaches towards the seemingly infinite creative powers of the human. [20] It is in this manner that I want to continue Bifo’s emphasis on exhaustion but with a slight caveat: that this exhaustion should not be mistakenly read as only about the psychic powers of the rather still privileged informational workers, and that digital machines are themselves not understood as infinite or immaterial either. Instead, digital culture is also sustained by the rather exhausting physical work in mining, factory production lines, and other jobs that are not directly counted as part of “cognitive capitalism” — and the machines themselves grow obsolescent and die, their remains leftover media-junk; and ecological resources are exhausted as well, part of the increasing demand for minerals and other materials for advanced technology industries.

But Bifo does also insist on a material notion of the soul. The soul is a matter of breathing, lungs, and entanglements across scales; this is a point that unfolds throughout this essay’s concrete references to exhaustion and being out of breath. Indeed, we have already at least two nodes of materiality: the materiality of mining for minerals and metals, from silicon to coltan, and the materiality of the lungs. In other words, this is the materiality of the non-organic at the hardware end of things, and materiality of hard work that connects to the labor sustaining the hardware.

Regarding *Phone Story*, ironically, the game was available for the iPhone on Apple’s App Store for only a short period before it was banned. This is a curious story in itself, one that relates to the accepted filters for design for iPhone Apps. In a striking manner, the Apple guidelines stylistically allow us to draw the connections between neoliberal “free” capitalism and medieval witch hunts or Stalinistic measures of the twentieth century. The



guidelines really allow their bizarre explicitness to shine through when quoted at length:

If you want to criticize a religion, write a book. If you want to describe sex, write a book or a song, or create a medical app. It can get complicated, but we have decided to not allow certain kinds of content in the App Store.... We will reject Apps for any content or behavior that we believe is over the line. What line, you ask? Well, as a Supreme Court Justice once said, 'I'll know it when I see it.' And we think that you will also know it when you cross it. [21]

Apple's email to Molleindustria apparently claimed that four such lines were crossed: two lines related to "charities and contributions," and two further "crossed lines" that suggested the game had depicted "violence or abuse of children" and "excessively objectionable or crude content." [22] With a curious bit of irony, the letter from Apple focuses on the very trendy discourse of protecting children from the moral hazards of the Web — a trend also picked up by the current Tory government in the UK, which promotes various protective methods to ensure kids are safe from/in the online world. Indeed, one is tempted to connect such a moral panic discourse to a wider neglect of other types of surely more direct abuse of children, as well as other vulnerable groups of workers worldwide. Protect the kids, if they get online — but not if their labor helps you get online and support the digital economy slightly further away from the actual cognitive work.

The second game I want to discuss — *iMine* — does not differ much in terms of its theme or content. The game play is different; whereas in *Phone Story* the user just touches a screen, in *iMine* the user has to thrust the phone. But besides this physical motion, the game is rather simple and actually repetitiously boring, as it is supposed to be. Also available on various platforms, *iMine* focuses on the difficult life of the Coltan miner. The game itself, to put it mildly, is rather boringly depressing in its repetitious content, with action limited to tiring, repetitive gestures on the phone or the keyboard to mine for tantalum. This relates to what more conceptually is described as "persistence of hardware":

All the "magic" that today's technology offer [sic], ubiquitous computing and networked communities, depends on the reliability of hardware and physical power and communications infrastructure. This means that though the experience of electronically augmented daily life has changed significantly over the past few decades, the physical conditions which support these new realms of experience has not. Hardware still has to be made, under precise often difficult conditions. And hardware is made from materials which all started out, at one point, in the earth. The closer we get to the origin of the materials of digital technology, the more difficult the conditions often are.

[23]

What both games seem to convey is the goalless, helpless situation of digging/working for hardly any reward. The miner in *iMine* is mapped as part of the more abstract flow of

mineral prices and global trade, which is contrasted against the current market prices of tin, tantalum, tungsten, and gold. The game articulates the repetitious processes of mining as part of the abstract valuations that offer a financial basis for the trade of minerals, and fights against some of the misperceptions of past decades of media theory that believed that telematics could free us from repetitious and boring work and could release our playful cognitive capacities and transform “the redundant into the information.” [24] Instead, both games remind us of points important for any material theory of media: like labor, information technology is material. This materiality is made of components — minerals and chemicals — and will some day end up somewhere. It won’t just disappear; both ends of this simple chain include labor and organic bodies, each of which are the registering surfaces for effects and affects of media.

Media work in and through bodies, or, more widely, materials and things. Hence, we turn to a different focus concerning what Friedrich Kittler’s material media theory flagged as *Aufschreibesysteme*, or “discourse networks,” which refers to systems of inscription and a more genealogical account of the term that recalls the axis of Nietzsche-Kafka-Foucault to which Kittler belongs: social instructions are carved into the flesh by meticulous drilling, which is not only metaphorical but can act through the disciplinary power of (media) machines too. Bodies are made docile and behave in certain patterns of gesture and memory. [25]

The term *Aufschreibesysteme* originates from a curious case from late nineteenth and early twentieth century — that of Daniel Paul Schreber; a prestigious German high court judge who was eventually diagnosed with paranoid schizophrenia, and subsequently spent much of his time in treatment and in hospitals, becoming a widely discussed case study for Freud and many others. This was partly because of his book *Memoirs of my Nervous Illness* (1903). In it, Schreber talks of his body as an inscription surface for the celestial scribes who write down everything about him, which for Kittler becomes a way to understand the new effects of technical media. [26]

But Kittler elaborates the idea further in relation to technology and argues that the focus on “bodies” itself remains insufficient when it comes down to the world of technical media. Indeed, such a stance is important in transporting the cultural theoretical vocabulary to take non-humans seriously; so far this move has been often in terms of technologies, scientific elements, or what pejoratively has been called a techno-determinist approach (the media theoretical equivalent to “strangling cute puppies,” as media theorist Geoffrey Winthrop-Young so aptly and with definite black humor calls it). [27]

And yet perhaps we can extend that approach back to bodies — only not the model of the body adopted from Schreber’s story, which inspired Kittler to write about technical media. What if we replace Schreber with underpaid (and mistreated) workers’ bodies at the hardware end of digital electronic media production as the model for inscription systems? Sick, vulnerable, sacrificial bodies on the systematic production lines of products where the polished brand has its direct link to production processes and cheap labor. These bodies are epistemic objects as well, in the sense that they register the materiality of information



technology production — and discarding — in lungs, brains, nervous systems, and more. They are indeed inscription surfaces for the “persistence of hardware,” a conceptual turn also called for by Sean Cubitt, and here worked through a variety of material scales.

One way to make sense of this is to look at it through a chart I have devised — what I call a syndrome per metal or chemical chart. So, instead of celestial scribes that influence through, as well as inscribe upon, Schreber’s body, this chart shows how other sorts of materials are inscribed on bodies of IT hardware laborers who open up the devices for valuable materials, such as gold:

Lead: damages the central and peripheral nervous systems, blood systems, kidney and reproductive system.

Cadmium: accumulates, for instance, in the kidney.

Mercury: affects the brain and kidneys, as the fetus in pregnant women.

Hexavalent Chromium/Chromium VI: passes through cell membranes, producing various toxic effects in contaminated cells.

Barium: causes brain swelling, muscle weakness, and damage to the heart, liver, and spleen. [28]

Such a list could be continued, but the above is enough to make the point about the materiality of media technologies and their material entanglement with our brains and spleens. It also points to the chemical, metal, and mineral materiality of both hardware and *hard work*, and ways in which we can map those genealogical traces through labor. This is not merely an issue that has recently popped up with digital media and the global processes of mining and distribution of labor to cheaper conditions. It escorts the birth of the modern media age. Richard Maxwell and Toby Miller point this out brilliantly — well supported by the range of research and statistics they are able to mobilize, they discuss the physical effects that early print technologies had on the body and the environment. Besides the toxic byproducts of the nineteenth-century innovation of processing of fiber for making paper — the effects of which I witnessed when I lived on a river next to a paper mill in Finland —that directly contribute to massive water pollution and deforestation, [29] consider, for instance, ink. Quite a banal, grey factor when considering media studies topics that are more keen to talk about the semiotics of what the ink stands for, ink is, however, worth considering for its crucial material role in the emergence of print media As Maxwell and Miller write, “the ink was composed of lampblack, turpentine, and boiled linseed oil — the first was harmful to the lungs and mucous membranes; the second to the nervous system, liver, and kidneys; and the third irritated the skin. For most of the nineteenth century, turpentine extraction and distillation in the southern United States depended on slave labor; after the Civil War, forced labor became the norm.” [30]

This mapping of an alternative “Schreber” can be carried over to more technical media, like the telegraph, too. The effects of media’s materiality as chemistry and as toxicity are evident in considering what was necessary to sustain such seemingly immaterial communication. Indeed, just as with our digital communications, which have been consistently branded with a breath of lightness in marketing discourses and even

theoretical writings since the 1980s, illusions of telegraphic immateriality are inscribed directly on the bodies of workers. Telegraphic communication was naturally based in electricity and, more specifically, the oft-neglected (in media histories) innovation of the battery. Again, to quote Maxwell and Miller, early batteries were prime examples of “chemical energy storage” consisting of sulfuric and nitric acid: “Liquid battery acid helped produce the chemical reaction that generated the electricity, and as the components (zinc, copper, and other materials, including mercury) dissolved, toxic gases (nitric oxide in the case of the early Grove cell used in US telegraphy) were produced.” [31] Take a deep breath, inhale: damage to your lungs and mucous membranes and skin irritation.

### III. A Lack of Breath

This side of materiality, this persistence that lingers across scales from minerals and chemical elements to the lungs and organic tissue, and from the emergence of mass-produced modern media cultures to the current advanced worlds of IT, cannot be reduced to genealogies of media that would trace it to the impacts of war and science. This is partly how some currents of German media theory have approached materiality: the brilliant studies of the likes of Kittler, and, more recently, Claus Pias and Wolfgang Ernst, have shown how we need a meticulous understanding of science and technology to understand technical media. However, modern media is about chemistry too — it is about components such as zinc and lead, and about systematic health hazards that are directly connected to production mechanisms and conditions of labor. Hence, modern media technologies elaborate what we could call “mixed materialities,” similar to the manner of how Félix Guattari talks of mixed semiotics. This idea acknowledges that there are various materialities at work, from practices of labor to production chains and onto the chemicals and components that comprise the technology: these are semio-technological arrangements. Indeed, speaking of “new materialism” — a term recently suggested to counter the overemphasis on meaning, representation, and signification — reminds that we are facing a variety of materialisms. [32]

We are able to tap into such materiality with Marxist tools as well. Marx was very aware of the relation between the soil (advances in agriculture) and capital. Indeed, we too should be aware of the relation of the *bios* to capital, which extends to what Jason W. Moore has called “peak appropriation,” described as “the long history of enclosure and exhaustion of coal seams, oil fields, aquifers, and peasantries across the space and time of historical capitalism. In this light, the chief problem is not ‘peak everything’ but peak *appropriation*. Capital’s problem today is not depletion in the abstract but the contracting opportunities to appropriate nature cheaply (with less and less labor).” [33] But of course, there is work, and then there is hard work: work that does not correspond to the idealized notions of capitalism of the brain (cognitive capitalism), but cheap, repetitive and physically exhausting labor. It is this connection between labor and the biosphere that we should also be aware of. Labor consists of work and of working “the biosphere where the time-scale may be 1 million years”; [34] processes of photosynthesis, fossil fuels as well as the now-increasing centrality of rare-earth minerals as memories of geological durations but mined as an essential part of advanced technological information culture — all these are part and

parcel of the entanglement of materiality of work and the long-term duration of the materiality of the earth. For sure, such perspectives are usually only revealed in the critical breaking down of the normal processes of production that twentieth-century philosophers — from Heidegger to Gilles Deleuze to Bruno Latour — continuously referred to: only once things fail, *then* you start to see their complexity. In our case, that failure is the depletion of resources, from fossil fuels (oil as the obvious case, as and the discourse of peak oil) to the already mentioned rare earth minerals. To this list let us add clean water, air, and soil. As for their complexity, after things run out, you start to miss them.

Hence, in such a perspective, despite the grand apocalyptic tones above, even the insignificant counts. Instead of just chemicals, and minerals, remember dust. It covers a lot of the globe (deserts) as well as a lot of our obsolescent media, but also participates in processes of production of electronic high tech. The Yokokoji-Harwood (YoHa) art project *Coal Fired Computers* (2010) articulated the entanglement of fossil fuels, miners' lungs, bronchitis and emphysema, and computer culture; coal, one of the most significant energy sources, powering computers but also an essential part of computer production itself — as the exhibit points out, “81% of the energy used in a computer's life cycle is expended in the manufacturing process, now taking place in countries with high levels of coal consumption.” Besides the environmental impact, such a production process is a direct health hazard to the lungs, to the breath. It's about the breathlessness: “Breathless from the strained vigilance, breathless from the oppressiveness of the stuffy night-air” writes Hermann Broch in *The Death of Virgil*. [35]

It is in this sense important to consider mining itself as a constituting the world of industrialization as well as computer hardware. The miner's hat lamp is a medium of vision that allows for the murky underground to expose itself in narrow spaces.

The dust itself has its own history, one that is also a human history, as recounted in 1550–56 by Georgius Agricola in *De Re Metallica*, his careful explanation of the specific skills of mining — which entail much more than just labor. Indeed, the cultural techniques of mining as recounted by Agricola have to do with the ability to read and understand rock “veins, stringers and seams” and to demonstrate that necessary familiarity with “varied species of earths, juices, gems, stones, marbles, rocks, metals and compounds.” And there is more, in the sense that Deleuze and Guattari explain as being part of the metallurgical skill and new materialist ethos. This skill is already captured by Agricola, who mentions “assaying substances and of preparing them for smelting; and here again there are many altogether diverse methods. For there is one method for gold and silver, another for copper, another for quicksilver, another for iron, another for lead, and even tin and bismuth are treated differently from lead.” [36] And, as he continues, to be knowledgeable in philosophy, medicine, astronomy, surveying, arithmetic, and architecture all come handy when composing the skill set of the miner — things that might not come to mind considering how today's mining practices are sometimes organized.

But *De Re Metallica* does flag the other side of mining, too. Indeed, the book reads like a distant warning of that connection between wealth and its price, of ill-health and sacrifice. It

is a sort of psychogeophysics:

Where water in shafts is abundant and very cold, it frequently injures the limbs, for cold is harmful to the sinews. To meet this, miners should make themselves sufficiently high boots of rawhide, which protect their legs from the cold water; the man who does not follow this advice will suffer much ill-health, especially when he reaches old age. On the other hand, some mines are so dry that they are entirely devoid of water, and this dryness causes the workmen even greater harm, for the dust which is stirred and beaten up by digging penetrates into the windpipe and lungs, and produces difficulty in breathing, and the disease which the Greeks call ἄσθμα. If the dust has corrosive qualities, it eats away the lungs, and implants consumption in the body; hence in the mines of the Carpathian Mountains women are found who have married seven husbands, all of whom this terrible consumption has carried off to a premature death. At Altenberg in Meissen there is found in the mines black pompholyx, which eats wounds and ulcers to the bone; this also corrodes iron, for which reason the keys of their sheds are made of wood. Further, there is a certain kind of cadmia which eats away the feet of the workmen when they have become wet, and similarly their hands, and injures their lungs and eyes. Therefore, for their digging they should make for themselves not only boots of rawhide, but gloves long enough to reach to the elbow, and they should fasten loose veils over their faces; the dust will then neither be drawn through these into their windpipes and lungs, nor will it fly into their eyes. Not dissimilarly, among the Romans the makers of vermilion took precautions against breathing its fatal dust. [37]

Coal dust is not the only type of dust relevant to this discussion. In terms of mining, silicon dust has been identified as another significant danger to miners. [38] In terms of the older (visual) media of film stock production, the Eastman Kodak's Park Plant in Rochester, New York was, besides being a heavy polluter of the region as well as massive consumer of fresh water, also a place of acid vapors and dust. [39] The silver of the silver screen was at the less glamorous production end of things, and produced serious health effects to workers. In addition, as Maxwell and Miller elaborate, the other essential material in the early years of cellulose nitrate film was cotton. Cotton too, with its dusty media material trail, registered in the old media workers' bodies another health hazard, this one named *byssinosis*: brown lung syndrome.

Dust covers our abandoned electronic devices, which are supposed to become obsolete even before they have to — the persistence of planned obsolescence. But dust is also supposed to be kept out, or at least managed, especially in relation to our devices; the detailed and laboratory conditioned fabrication processes of computer technology demand a specific dust-freeness. As Jennifer Gabrys writes, “electronics are rendered functionless if they are contaminated with even a speck of dust during manufacture.... [D]ust threatens the functioning of these machines, yet dust returns as a definitive mark of the materiality and temporality of electronics.” [40]

There is something that feels so obsolete about coal and other dust. Mines are a central part of this picture of cognitive capitalism and IT too, as Harwood reminds us, even if they are displaced to locations such as India and China. Such centrality of metals and minerals was true already of the earlier media age, with its need for silver and copper, for instance. As for the “new” media? Even “clean” digital media comes with a residue dust: coal-fired computing that supports the existence of such glossy products. [41] Electronics are cleaned from such dirt, and our consumer goods arrive in the nicely polished condition you recognize from the advertisements. But aluminum dust is one of the excess “products” from the manufacture of computerized technology, such as from the process of polishing iPad cases. These minuscule dust particles carry with them a double danger; they are highly inflammable, and, more importantly, they can cause a variety of lung diseases to the workers.

Health risks are just one of the markers of cost-saving practices at the production end of digital culture, but dust can, in this sense, act as a good trajectory to understand the significance of the nearly imperceptible non-human element. Expendability is a key word here: both human workers and hardware become expendable. The prices of hardware devices, such as tablets, are plummeting. As Jay Goldberg noted when he visited Hua Qiang Road North in Shenzhen, the epicenter of global electronics consumption of products produced nearby, hardware production is so cheap that it is changing business models as the platforms become secondary, cheap, and discardable. [42] Besides the change in business models (“no one can make money selling hardware anymore. The only way to make money with hardware is to sell something else and get consumers to pay for the whole device and experience”), [43] we have to face what this means from the ecological perspective that takes into account the raw materials of production and discardment. This process is registered on two “surfaces” deemed expendable and disposable too: human labor and the environment, which both bear the chemical effects of hardware.

We can discuss this expendability in terms of the complex political economy of animals too, which, as Rosi Braidotti notes, are another disposable element alongside cheap workers and nature. Animals and nature constitute the “zooproletariat” — without a soul, they are suitable for the machinelike work that demands endurance of repetition. They supply raw material from their bodies:

This political economy of full-scale exploitation continues, as animals provide living material for scientific experiments, biotechnological agriculture, the cosmetics and pharmaceutical industries, and other sectors of the economy. In advanced capitalism, animals are disposable bodies traded in a global market of posthuman exploitation. Illicit traffic in animals constitutes the third-largest illegal trade in the world today, after drugs and arms but ahead of women. [44]

Before moving on from a consideration of the expendability of organic things, I gesture towards speculative realism (a term that covers a variety of rather different philosophical



arguments interested in non-human reality and materiality) in order to elaborate the materiality of dust. The speculative realist writer Reza Negarestani writes in his novel *Cyclonopedia*:

Each particle of dust carries with it a unique vision of matter, movement, collectivity, interaction, affect, differentiation, composition and infinite darkness — a crystallized data-base or a plot ready to combine and react, to be narrated on and through something. There is no line of narration more concrete than a stream of dust particles. [45]

Such narratives are less linguistic and symbolic chains — the dust itself carries an affective force that is material and assembles collectivities around it. Dust does not stay outside us but is a narrative that enters us: dust has access in every breath inhaled, and it entangles with our tissue. Indeed, such a material agent of transformation as dust — whether smart or just irritating to the lung — is itself a reminder that there is an excess to the symbolic narratives.

One way to understand this is to consider smart dust: the military innovation that is able to gather data on environmental conditions and process as well as transmit that data in peer networked manner: “Smart-dust particles are designed to float through the air as innocuously as dandelion seeds, gathering and transmitting data in real time.” [46] Smart dust is not, however, restricted to military applications — all the talk of smart cities demonstrates how the possibility of equipping urban environments in such smartness presents a new paradigm of controlled environments. If smart dust is the marker of the creative informational city — in that it joins together creative brains and the city itself (thus the city becomes brainy, communicative) [47] — then we also need to remember the dumb dust that entangles itself with information and creativity: it is partly the residue of information technology smartness, yet we still need to be aware of its qualities as creative, effective matter (to follow Negarestani’s philosophical idea).

#### **IV. A Political Economy of Dust and Labor**

So-called new materialism has great philosophical potential to assist in analyzing dust’s materiality across scales. It is also a potentially vibrant methodology in that it helps track what non-human particles carry when they constitute parts of wider phenomena. The dust particle from a polished iPad is an excess of the admittedly beautiful fetishistic surface; the dust particle is what registers the globalized wage labor relation on the soft organic tissue of the Chinese worker. Of course — to paraphrase Ned Rossiter — perhaps dust is simply a good indication of the “fantastic power of the commodity-form to abstract itself from the experience of labor and life.” [48] The clean surface of electronic commodity only betrays “the toxic conditions of production and their effects on worker’s health and the environment.” [49] Indeed, if we want to stick by such terms as the “non-human” and the “non-human turn,” and also insist on using new materialisms non-reducible to the vocabulary of atoms, or even Marxist production forces, perhaps we still can think of the political economy of new materialism too — where new materialism can contribute to



perspectives on work, waste, and wasting human bodies as part of work. We need to attend to the material soul, made of lungs and breath — and the shortness and time-management of breath. The soul is not just an immaterial, quasi-mystical entity of immaterial inhaling and exhaling; it is constantly produced across the body — this is what Foucault argues. Indeed, it is produced as emblematic of incorporeal materialism, and, as such, of what can attach to lungs, too. The soul is at work, and the work leaves its stain on the lung.

In short, I am trying to work through some themes that are clearly part of the agenda of media materialism by showing them as passages that gesture towards a politically significant materialism too. My media studies-biased proposition goes something like this: new materialism is not only about intensities of bodies and their capacities — such as voice or dance, movement and relationality, fleshiness, ontological monism and alternative epistemologies of generative matter — and active meaning-making of objects themselves non-reducible to linguistic signification. I do not wish to dismiss any of such perspectives; I rather want to point out the specificity and agency in *mediatic* matter, too. New materialism is already present in the way technical media transmits and processes “culture,” and it engages in its own version of the continuum of natureculture (to use Donna Haraway’s term) or, in this case, medianatures.

Besides dust, media history is one long story of experimenting with different materials — from glass plates to chemicals, from selenium to coltan, from dilute sulphuric acid to shellac silk and gutta-percha — and with processes such as crystallization, ionization, and so forth. The transistor-based information technology culture would not be thinkable without the various meticulous insights into the material characteristics and differences between germanium and silicon — or the energetic regimes, whether they involve the consideration of current clouds (as in server farms) or media’s historically constant attempts to manage power consumption. For instance, the junction transistor’s innovation was how it could be completely functional with radically less power — it operated at “a tenth of a volt, drawing a current of only 10 millionths of an ampere,” [50] and provided a much more energy cost-effective way of amplification than the transistors that already existed around 1951. Now we are facing the dilemma of the economies and geopolitical energy of cloud computing — far from being fluffy and immaterial, the cloud is embedded in massive energy regimes. [51] Whereas media and communication regimes and information technology might support practices of immaterial labor, they themselves are just as reliant on inventions in high level physics and material sciences as they are on minerals and other materials processed and managed from their “raw” materiality into media materiality. And materials are not only found, they are generated as well; the Large Hadron Collider experiments are potentially composing new types of matter such as “color-glass condensate.” [52]

Minerals are exemplary of this media history and theory of matter. The already mentioned Coltan is found in the capacitors and resistors used in both the entertainment sector and the military technology industry. Germanium, obtained from zinc ore processing, is needed for fiber optics. Gallium is used for LED lights as well as in a range of technological

applications. The next time you swipe your screen with your index finger, remember that it also “touches” indium, necessary for touch screens. The media mineral list is long and is part of a longer production chain, which means that even if a given mineral is not necessarily “rare,” it is bottlenecked by geopolitics of supply. We can also talk about the geopolitical and geophysical-political implications of metal. A range of politically influential regimes, such as the European Union, have limited resources, whereas China currently controls the majority of production. Indeed, Deng Xiaoping voiced this claim in 1992 with straightforward Communist Party self-confidence: “There is oil in the Middle East; there are rare earths in China.” Since the 1970s, China has invested heavily in increasing its production. Of course, this fact has not been ignored by other globally dominating powers, such as the United States. [53] In 2009, China’s Ministry of Industry and Information Technology was talking of a complete ban of export of some rare earth elements.

As Harwood articulates in relation to the activity of matter: materials have their own ability to “recursively unfold possibilities, transforming the flesh, the social, political and economic. Essentially what a material makes possible and what it shuts down when it’s ripped from the earth and it’s context and contaminates human ecologies.” [54] This is where activity of the material, non-human and non-organic, articulates itself: as a reality entangled with human concerns. Harwood, while articulating the *Coal Fired Computers* project, makes a point relevant to the above contexts of materiality, minerals and media matter politics:

The materials also come into existence as a force when the political, geographical and economic situations are right for them to do so. Aluminium “needs” Italian Fascism to “need” a national metal, it “needs” Italy to lack coal, iron and have bauxite instead. Coal for a long time in the UK was dug from deep cast mines and the shafts required pumping out which creates the steam engine which in turn requires more coal and more labor. Tantalum “requires” political unrest in the Congo, kids playing Sony games. [55]

And, we can add, it is as if the electronic culture “needs” the increasingly growing e-waste mountains with their garbage collectors who are after the valuable materials inside the machines. This afterlife of the machinic presents one further “materiality” in our investigative tracking of the non-human dimensions of media culture.

Hence, focusing on the materiality of components and waste of electronic media suggests the extremely long and uneven networks of spatial distribution — and also labor distribution — of media cultures. It oddly emphasizes the broadening of the markets on a global scale. In some disturbing accounts, such as one by the media rating company Nielsen, the fact that “more Africans have access to mobile phones than to clean drinking water” [56] is seen as a rather unproblematic statistic that cries out loud for the importance of business opportunities in the technologically revolutionizing African continent. Sometimes dust also equals lack of water.

Imagine materiality and new materialism as a multifarious complexity: it entangles the

perspective of minerals that are sedimented for millions of years before being mined by cheap labor in African countries for use in information technology factories. After the short use-period that an iPhone is destined for, the device becomes a part of the materiality of e-waste, leaking environmental hazards into nature through river-dumping or incineration. In the latter, the burning produces toxic vapors that attach to the nervous systems of underpaid laborers in China, India, and Ghana. Manuel Delanda wrote of the thousand years of non-linear history as a proposition to engage with the long durations of rocks, minerals, biomatter, and language. [57] We should extend that into a million, a billion years of non-linear history — in the way Negarestani suggests in his work of theory-fiction — concerning petroleum, dust, and other material agencies. We need to think like new materialist- archaeologists, excavating how the *sedimented* participates in the contemporary biopolitical sphere. This is a media archaeology of minerals, of chemicals, of soil as the resource for the active mobilization of those things constitutive of contemporary media consumer cultures; in short, it is about energy, and the energetic regime that not only seems to have succeeded the industrial regime of the nineteenth and twentieth centuries, but the postindustrial regime: abandoned paper factories in Finland, after their production has moved to cheaper locations, are being re-used as server farms partly because of their proximity to water, which acts as a cooling mechanism — renewable energy. The digital is a regime of energies: human energy and the energy needed for technological machines.

To conclude, it is in this context of the materiality of labor and dust that we need to talk not only of the soul at work, but of the lungs at work. This essay serves as a reminder of the alternative materialities of technical media culture that tie together issues of political importance with the murky sides of hardware. Bifo's reference to the "cognitariat" — the class of cognitive, creative, information technology supported smart labor — as the "semiotic labor flow" includes a wider materiality than any loose reference to a virtual class. For him, the cognitariat involves "the body, sexuality, mortal physicality, the unconscious." This description resonates with Matteo Pasquinelli's call to include both material and darker, libidinal energies in our accounts concerning media cultures and creativity discourses. [58] It is precisely because of this call that any extended understanding of the cultural techniques and technologies of the cognitariat needs to be able to take into account not just souls, but where the breath comes from. This includes both the mental labor that is increasingly invested in high tech communicative work processes that consume mental energies and the lung violated by dust. It also includes chemicals, minerals, and hardware as socio-technical conditions for the existence of information technology culture. In Bifo's words, "life, intelligence, joy, breathing — humanity is going to be sacrificed in order to pay the metaphysical debt." [59]

The lack of breath, whether from dust particles or from the increase in anxiety disorders and panic attacks, is indicative of the tie between immaterial labor and the material exhaustion of bodies of nature. Le Corbusier's modern fantasy of rationalized, filtered and optimized "exact air" in *The Radiant City* has proven to be a short-term dream. With a different focus, Peter Sloterdijk identifies the beginning of the twentieth century with a

specific event of breathlessness, in the early phases of World War I: “April 22, 1915, when a specially formed German ‘gas regiment’ launched the first, large-scale operation against French-Canadian troops in the northern Ypres Salient using chlorine gas as their means of combat.” [60] Lack of breath, or “atmo-terrorism” (as Sloterdijk calls it), escorts the technological twentieth century into the twenty-first century, where we continuously face the same danger: not only from state terrorism, but from (in)corporate(d) terrorism across industrial and postindustrial production; the twenty-first century as the century of dust, depletion of water resources, desertification, as well as the residues of our modes of production.

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[2] Steven Connor, “Pulverulence,” *Cabinet* 35 (Fall 2009), <http://cabinetmagazine.org/issues/35/connor.php>, accessed May 25, 2013.

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[4] Susan Sontag, *Illness as Metaphor* (New York: Farrar, Straus, Giroux, 1977), 13.

[5] Ned Rossiter, “Dirt Research,” *Depletion Design: A Glossary of Network Ecologies*, eds. Carolin Wiedemann and Soenke Zehle (Amsterdam: Institute of Network Cultures, 2012), 44.

[6] Jennifer Gabrys, “Telepathically Urban,” *Circulation and the City: Essays on Urban Culture*, eds. Alexandra Boutros and Will Straw (Montreal: McGill-Queen’s University Press, 2008), 49.

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[8] Martin Heidegger, *Poetry, Language, Thought*, trans. Albert Hofstadter (New York: HarperCollins, 1971), 164.

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[11] Connor, "Pulverulence."

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[14] Adam Gabbatt, "Foxconn workers on iPhone 5 line strike in China, rights group says," *The Guardian* (October 5, 2012), <http://www.guardian.co.uk/technology/2012/oct/05/foxconn-apple-iphone-china-strike>, accessed May 25, 2013.

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[16] Nick Dyer-Witheford and Greig de Peuter, *Games of Empire: Global Capitalism and Video Games* (Minneapolis: University of Minnesota Press, 2009), 199.

[17] N. Katherine Hayles, "Traumas of Code," *Critical Digital Studies: A Reader*, eds. Arthur Kroker and Marilouise Kroker (Toronto: University of Toronto Press, 2008), 25-44.

[18] Franco "Bifo" Berardi, *Precarious Rhapsody: Semiocapitalism and the Pathologies of the Post-Alpha Generation* (London: Minor Compositions, 2009), 69.

[19] Dyer-Witheford and de Peuter, *Games of Empire*, 38.

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[25] See Pasi Väliäho, *Mapping the Moving Image: Gesture, Thought and Cinema Circa 1900* (Amsterdam: Amsterdam University Press, 2010).

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[30] *Ibid.*, 47.

[31] *Ibid.*, 53.

[32] We are dealing with multiple materialities and contested meanings of what materiality is: post-Fordist Marxism offers alternatives to German media theory. Actor-network theory offers a different set of interests to those of the feminist materialism of, for instance Deleuzian scholars such as Braidotti and Grosz. Affect theory addresses topics of embodiment in new material ways. Cultural studies have, since early days of Raymond Williams, been talking of materialism in relation to practices of cultural production. Speculative realism is one latecomer to these discussions as well. See also Jussi Parikka, *What is Media Archaeology?* (Cambridge: Polity, 2012), 163-64.

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