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DUST AND THE EXHAUSTED LIFE

Each particle of dust carries with it a unique vision of matter, move-ment, collectivity, interaction, affect, differentiation, composition, and infinite darkness.

—REZA NEGARESTANI, *CYCLONOPEDIA*

I used to live in the north. Even southern Finland had its fair share of snow some years, which meant the necessity to bring skis to sports class and, on alternate weeks, skates. Next to the ice skating rink was something to which one never really paid attention: the snow depot, growing from the snow gathered by clearing the streets after snowy nights. The mounds were sometimes rather big even in such a small town and perfect natural, although temporary, hills for sliding or building a snow castle.

I never thought of them as much more than that. I never thought of them, for example, as glaciers—as Christian Neal MilNeil suggests we should.[1] He pitches city snow dumps as significant geological constel-lations. We media theorists are primarily thinking of other sorts of waste dumps as our fields of research—from Walter Benjamin's figure of the ragpicker to the current interest in e-waste. But snow is a nonhuman collector; it is an accumulator that by summer leaves this collection in its wake. What snow demonstrates, acting as a sort of an inscription surface or more likely as a mushroom sucking it in, is the heavy air that sur-rounds us. The geological does not stay on the surface:

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There is a sediment that hangs in a haze above city streets: a low-dose toxic dust of lead and chromates from tire wear, clouds of carbon soot mixed with hydrocarbon gases and fine particles of nitrates, sulfates, and other metals from exhaust pipes. At every stoplight, worn brake linings leave behind microscopic flakes of copper, zinc, and lead.[2]

The geological is like a membrane, as MilNeil suggests. Might we even talk of a psychogeophysics of dirt, waste, and dust of cities? Such dust from car pollution and other sources leaves a streak on the white snow as it casts a membrane on outer and inner surfaces. Actually, there is no white snow—it rarely stays white for an extended period. The pure white stuff of imaginaries in advertisements and films does not really exist that often. Instead, we have dust, which is itself a curious case of a collective assemblage: dust carries with itself minerals and metals across distances.[3] But it is also a collective assemblage in the sense that it gathers a range of social, political, and media issues as part of its mobilization of materials: "metals and microbes, persistent organic pollutants and pesticides."[4] It's not restricted to specific regions or winds only but is also extra-planetary: tons and tons of cosmic dust remind us that we breathe in the otherworldly, the outer planetary—organic and nonorganic bodies suck in dust and chemicals, a realization we learned in the environmental sciences. Besides dust, our bodies still carry traces of DDT and other chemicals that have not been used for decades but linger as part of the environmental chains linking humans, animals, soil, and earth. And it goes on in other scales too. Ice layers that can be hundreds of thousands of years old record the chemical transformations of our planet. When it comes to corals, we can think of them as recording devices reaching back even millions of years, as indexes of the Anthropocene and, more recently, the residues of the atomic age (measurable in, for instance, carbon-14 concentration in the atmosphere and in corals):

In these rings they have found, for example, that some corals have recorded the atmospheric nuclear weapons tests of the late 1950s and early 1960s. Evidence of the Industrial Revolution is also documented, as is the Little Ice Age of the late seventeenth century. And

daily rings in coral may also document the gradual slowing of the earth's rotation that astronomers first postulated.[5]

This chapter engages with the microparticles of dust and reads those in relation to both the earlier themes of the deep time of geophysics of media culture and its relation to the materialities of human bodies and labor. Hence this double articulation of the chapter has to do with dust and exhaustion. The notion of dust transports us to the lungs of miners and Chinese workers subcontracted to produce digital media components in special economic zones. Health risks entangle with media materialism, dust with speculative realism, which, however, is approached from a political angle together with Franco "Bifo" Berardi's notes on the exhausted cognitariat. This chapter looks at this side of the cognitive capitalism, wanting to ground it in more mundane work and material features. Dust narrates the story but in a way that is paying attention to the nonhuman agency of this narrator. Geology of media can be continued with dust: not quite of the ground, not quite the atmosphere.

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 nonhuman particles as a work of art installed at the museum, "a purposeful inactivity."[6] Dust can transform, even if it can itself easily escape any grip. It is amorphous, even metamorphic, in the manner Steven Connor describes.[7] There is also a lot of it. 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, and monuments—which remind us not only of these things themselves but of the gradual sedimentation of dust. Dust forms geological strata. 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."[8]

Even lack of breath has something poetically romantic about it. 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 tuberculotic body feeds the image of 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."[9] 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.

Indeed, some people already take dust seriously—and not only the likely underpaid cleaning laborer working at a city corporate office at 5:00 a.m. Dust consists of so many things: hair, fibers, dead skin, plant

Figure 9. Rachel de Joode, *Dust Portrait,* 2014. Courtesy of the artist.

pollen, and nonorganic stuff like soil minerals. Even dust is metallic, geological. But the other pole is smart. 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 nonhuman transactions that can facilitate, track, record, and govern human affairs. We are nowadays fascinated by things minuscule, mobile, peer networked, and able to calculate, process, and further transmit the data it receives. Dust can be seen in this sense as "the minimum recognizable entity of material transformation and circulation."[10] 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 and 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."[11]

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 geology of media as "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 and geology 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."[12] It fits in our emphasis on geology of media: to track materialities and times of media culture through nonorganic components, entangled in issues of labor, economy, representations, and discourses.

Dust takes us—and our thinking—to different places and opens up multiple agendas. In this case, dust talks to issues of global labor, media materialism of digital culture, and illuminates how to approach media materialism through nonhuman nanoparticles. The 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).

Material things are often mistaken as modest—their numbers can be mostly 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, suggest. Peter Sloterdijk talks of the processes of inhaling and exhaling in this manner—as deterritorializations of sorts, like when the child blows her breath into a soap bubble, exporting a part of herself, externalization, extension.[13] Dust, too, must be thought as more of an environmental and atmospheric quality through which a different spatial and temporal thinking emerges.

Perhaps, then, dust is not just "matter" but something that troubles our notions of matter. Steven Connor talks of it even as antimatter: "evacuated of air, the gaps between the particles reduced to their minimum—hence its muffling, choking effects."[14] 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.[15]

Games of Hardware and Hardwork

Why dust and games? To talk of nonhumans is to talk not only 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 nonhuman in the way in which dehumanization is at work in contemporary information technology (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 focus on two games that address labor, materiality, and IT. 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,[16] 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, and 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.[17] Aluminum itself is one of the primary chemicals and metals of technological modernity: its fetishlike shininess defines Italian futurism as much as post–World War II automobile culture.[18] There is a bitter irony that the residue of the utopian promise is registered in the soft tissue of a globally distributed cheap labor force.

A variety of metal and mineral materialities are essential for a wider picture of digital economy. Some of these are mapped as part of our awareness of the chemical sides of digital culture—entangled with issues of global politics. Good media art examples include *Tantalum Memorial* (2009) (Figure 10) and YoHa's *Aluminium* project (2008), focusing on the residue materiality of the metal. Molleindustria's painfully simple game creates another map of this darker side of media materiality. This map is about nonorganic and organic materialities: mining, suicides, electronic waste, and planned or meticulously scheduled obsolescence form the perverted side of the attractive, entertaining end device.[19] The iDevice 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, as the player–subject, are sucked into a systematic production of a limited, repetitive, depressive, and oppressive world without an outside.[20] What if we mobilize such critique 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 geology 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

Figure 10. The *Tantalum Memorial* installation addresses the entangled circuits of communication, tantalum mining, and the Congolese civil war. Harwood, Wright, Yokokoji, *Tantalum Memorial–Residue,* 2008. Manifesta7 Bolzano/Bozen, Italy, 2008. Raqs Media Collective, "The Rest of Now." Photograph by Wolfgang Trager. Reprinted with permission.

hardness. This harder perspective does not downplay the argument 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 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 that offers a paradoxically different pairing in the context of geology of media.

What if you breathe the heaviest of air? What if you breathe residue of the metals and chemicals of digital culture? Should we speak of the exploitation of the soul through the contamination of the lungs? 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.[21]

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.[22] 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 Félix 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 bodily states 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 toward the seemingly infinite creative powers of the human.[23] 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 mental 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 future fossils (see chapter 5); 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. Indeed, we need to understand how the air and atmosphere of digital culture is one heavy with metals and chemicals, and the ground of digital culture is opened up for mining operations, such as minerals. The materiality of minerals and metals, from silicon to coltan, is entangled with the materiality of the lungs. In other words, this is the materiality of the nonorganic at the hardware end of things and a materiality of hardwork that connects to the labor sustaining the hardware.

The second game I want to discuss—iMine—does not differ much in terms of its content. Also available on various platforms, iMine focuses on the difficult life of the coltan miner in the Democratic Republic of the Congo. The game is rather simple, and to put it mildly, is rather boringly depressing in its repetitive content, with action limited to tiring, repetitive gestures on the phone or the keyboard to mine for tantalum. 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 more conceptually,

and in terms of the narrative, the game touches on what is described by the game developers/artists 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.[24]

What both games seem to convey is the goalless, helpless situation of digging and working for hardly any reward. The miner in iMine is mapped as part of the more abstract flow of mineral prices on the global market in relation to valuations 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 release our playful cognitive capacities and transform "the redundant into the information."[25] Instead, both games remind us of points important for any material theory of media: like labor, IT is material. This materiality is made of components—mineral and chemical—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, through 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 also act through the disciplinary power of (media) machines. Bodies are made docile and behave in certain patterns of gesture and memory.[26]

The term *Aufschreibesysteme* originates from a curious case from the late nineteenth and early twentieth centuries—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).[27] In the peculiar but rather appealing piece of autobiographical prose, Schreber talks of bodies and inscription surfaces for the celestial scribes who write down everything about him, which for Kittler becomes a way to understand the new effects of technical media.[28] The body becomes passivized into a victim as "divine nerve rays invade and retreat, destroy organs and extract brain fiber, lay down lines of communication and transmit information."[29] Such hallucinatory case studies as Schreber's also produce the body as the locus of research and as epistemic objects too: for Freud psychic, for Kittler technological.

Kittler elaborates the idea further in relation to technology and argues that the focus on "bodies" 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 nonhumans seriously; so far this move has been often in terms of technologies, scientific elements, or what pejoratively has been called a technodeterminist approach (the media theoretical equivalent to "strangling cute puppies,"[30] as media theorist Geoffrey Winthrop-Young so aptly and with definite black humor calls it).

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's tortured body with the focus on 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

IT production—and discarding—in lungs, brains, nervous systems, and more. They are indeed inscription surfaces for the "persistence of hardware," a conceptual turn Sean Cubitt also called for.

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.[31]

Such a list could be continued, but the preceding 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 *hardwork,* 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. A lot of hazardous chemicals were effects from mining and the use of coal and copper, lead from gasoline keeping transport media running, or the sulfur dioxide air we breathe and cough that characterizes the atmosphere of modernity, especially in urban areas and across borders as acid rain.[32]

Besides machines, chemicals facilitate 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 material effects that early print technologies had on the body and the environment. Besides the toxic by-products 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,[33] consider, for instance, ink. Quite a banal, gray factor when considering media studies topics that are keener 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."[34]

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, in media historiography, often neglected 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 U.S. telegraphy) were produced."[35]

Take a deep breath, inhale: damage to your lungs and mucous membranes and skin irritation. The air you breathe is metallic.

The Residue Elements

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 on to the chemicals and components that compose the technology: these are semiotechnological 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. 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 the 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.[36] So-called German media theory has been instrumental in reframing the materiality of media technologies (see chapter 1): the brilliant studies of the likes of Kittler and, more recently, Claus Pias, Wolfgang Ernst, Bernhard Siegert, Markus Krajewski, and others, have shown how we need a meticulous understanding of histories and practices 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.

A lot of the discussion goes under the name of new materialism, but perhaps we should consider historical materialism of the Marxist sort as a parallel stream to that. In a critical fashion, Manuel Delanda has rather aptly pointed out the anthropocentricity in Marx's theory of value: "only human labor was a source of value, not steam engines, coal, industrial organization, et cetera."[37] Yet instead of a full-fledged dismissal, this actually prompts the necessity to reconsider a postanthropocentric and a more, in the context of this book, geocentric and nonorganic (from chemicals and metals to technology/media) appropriation of the issues of labor, value, capitalism, and depletion of resources.

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)."[38] 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 of which we should also be aware. Labor consists of work and of working "the biosphere where the time-scale may be 1 million years";[39] processes of photosynthesis, fossil fuels, and 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 points of the normal processes of production to which twentieth-century philosophers—from Heidegger to Gilles Deleuze to Bruno Latour—continuously referred: only once things fail, *then* you start to see their complexity. In our case, that failure might come on such a scale that it is planetary: the depletion of resources, from fossil fuels (oil as the obvious case, and the discourse of peak oil[40]) to the already mentioned rare earth minerals. To this list let us add clean water, air, and soil.

Gary Genosko has referred to the Empedoclean four elements of earth, water, air, and fire as ways to molecularize also the contemporary realities of material reality where the elements and their new variations take a double role: empirical and metaphysical. In his reading, relying on Negarestani, Genosko moves further from an environmental or aesthetic understanding of the elements[41] toward a more molecular insight: how to map the constitution of contemporary issues, including polluted air, blood-stained mineral mining, new forms of contamination, and other mixing of elements into a new planetary machinic phylum resurfacing from the inherited four:

> Wrapped around these elements is the planetary phylum, a great
> tellurian cable bunch with its own products: EARTH: electronics;

WATER: liquidities like bottled water, which throws forward diagrammatic intensities in the explosion of plastic debris; AIR: gases (greenhouse) and; FIRE: artificial plasmas and lasers.[42]

This new mix of things is a way to investigate the elements of the media technological but also the wider mix of things in which contemporary culture takes place and takes form as part of environmental, political, and economic issues. In terms of dust, as mentioned earlier, it can be seen as a collective assemblage of materials as well as issues. It covers a lot of the globe (deserts) and a lot of our obsolescent media but also participates in processes of production of electronic high tech. The YoHa art project *Coal Fired Computers* (2010) articulated the entanglement of fossil fuels, miners' lungs, bronchitis, and emphysema with computer culture (Figure 11). Coal is one of the most significant energy sources, powering cloud computing data centers, 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."[43] Besides the
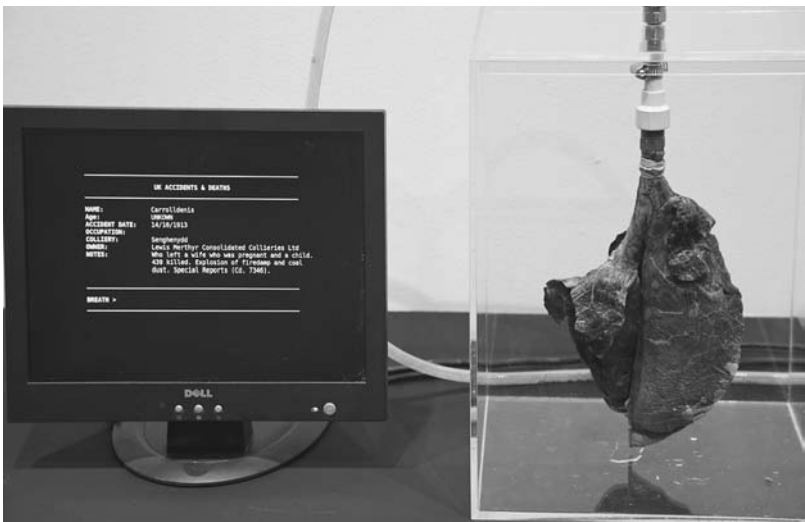

Figure 11. A close-up from the YoHa installation *Coal Fired Computers,* 2010. Arnolfini, Bristol, United Kingdom, 2010. "Coal Fired Computer and Tantalum Memorial." Photograph by Jamie Woodley. Reprinted with permission.

environmental impact, such a production process is a direct health hazard to the lungs that register the geologically heavy air. 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.*[44] The underground culture of mines and mining is essential for an evaluation of not only industrialization but also the elemental Anthrobscene in computer culture. The breathless state of the organic inscription surface persists, registering the geophysical traces as well as the dust of mines.

Coal dust is not the only type of dust relevant to this mining perspective to digital culture. Silicon dust has been identified as another significant danger to miners.[45] In terms of the older (visual) medium of film stock production, Eastman Kodak's Park Plant in Rochester, New York, was, besides being a heavy polluter of the region and a massive consumer of freshwater, also a place of acid vapors and dust.[46] The silver of the silver screen was at the less glamorous production end of things and produced serious health effects among 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 insides of lungs, and it covers our abandoned electronic devices. Planned obsolescence ensures that this happens with a quick turnaround. Dust is also supposed to be kept out from devices defined by refined electronics and their manufacture: 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. . . . Dust threatens the functioning of these machines, yet dust returns as a definitive mark of the materiality and temporality of electronics."[47]

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 come with a residue dust: coal-fired computing that supports the existence of such glossy products.[48] Media are polished, also literally.

Aluminum dust is one of the excess "products" from the manufacture of computerized technology, such as from the process of polishing iPad cases. The minuscule dust particles already mentioned carry with them a double danger: they are highly inflammable and, more importantly, they can cause a variety of lung diseases among workers.

YoHa's *Coal Fired Computers* provides a good way of understanding the underground mining perspective to computational culture, and their *Aluminium* project from 2008 is a parallel one that relates to the metal–chemical composition of technology.[49] The project picks up on the imaginary of the aluminum defined by "beauty, incorruptibility, lightness and abundance, the metal of the future," mixed together with political realities (futurism and fascism in the Italy of the earlier part of the twentieth century) and materiality. Aluminum carries and assembles both realms of imagined meanings and the long trail of material residue, which becomes a method for the location-based installation at an Italian aluminum factory of the 1930s, investigating it from a media ecological perspective. This included both local elements, for instance, the power grid energizing the factory and the mythology of aluminum as the symbolically national metal of Italy of the time, alongside the accelerated industrialization throughout the 1930s and the rather longer and more abstract connections linking aluminum to contemporary concerns of material and technological culture.

The collaboration with the Raqs Media Collective rested on key terms and methodologies such as the notion of "residue":

> The extraction of value from any material, place, thing, or person, involves a process of refinement. During this process, the object in question will undergo a change in state, separating into at least two substances: an extract and a residue. With respect to residue: it may be said it is that which never finds its way into the manifest narrative of how something (an object, a person, a state, or a state of being) is produced, or comes into existence. It is the accumulation of all that is left behind, when value is extracted. . . . There are

no histories of residue, no atlases of abandonment, no memoirs of what a person was but could not be.[50]

The artistic methodology of refinement connects especially to the residue. It refers to the alternative narratives of materials, labor, and imaginaries surrounding the leftovers, resonating with a certain media archaeological spirit of lost paths and losers in (media/political) history,[51] but in this case, it also relates to the metallic geology of media culture. The residue is evident in the theoretical methodology of tracking dust, which connects new sorts of contexts, stories, and nondiscursive realities. This refinement does not lead only to the highly functional high-tech and scientific material components that quietly constitute the everyday life. It also resurfaces as the residue that is registered on two "surfaces" deemed expendable and disposable: human labor and the environment, which both bear the chemical effects of hardware.

Health risks are just one of the indicators 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 nonhuman element. This narrativization through residue links up with the realization of taking dust as one element in the constitution of contemporary biopolitical and geopolitical reality. It shares some insights from Negarestani's idea of the singularity of dust too:

> 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.[52]

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.[53]

A Political Economy of Dust and Labor

So-called new materialism has great philosophical potential to assist in analyzing dust's materiality across scales and artistic methods.[54] It is able to offer a cartography of residue. New materialism is also a potentially vibrant methodology in that it helps to understand agency of nonhuman particles and the fabrics of materiality in which they function. 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 nonreducible to linguistic signification. I do not wish to dismiss any 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 transmit and process "culture," and it engages in its own version of the continuum of natureculture (to use Donna Haraway's term) or, in this case, medianatures (see chapter 1).

The dust particle from a polished iPad is a residue of the admittedly beautiful fetishistic surface; the dust particle is what registers the global-ized 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."[55] The clean surface of the electronic commodity only betrays "the toxic conditions of production and their effects on worker's health and the environment."[56] Indeed, if we want to stick by such terms as the "nonhuman" and the "nonhuman turn," and also insist on using new materialisms irreducible to the vocabulary of atoms, or even forces of production, 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. 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 the heavy air of computer-industrial capitalism.

In short, I am trying to work through some themes that are clearly part of the agenda of media materialism by showing how they gesture toward a politically significant materialism. This relates to geology of media through a tracking of the residues and materialities that tie planetary durations, chemical compositions, and media technologies into such assemblages, which move in different ways than traditional political, aesthetic, or media vocabularies.

As Harwood from YoHa 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 [*sic*] context and contaminates human ecologies."[57] This is where activity of the material, nonhuman, and nonorganic articulates itself: as a reality entangled with human concerns. Harwood, while articulating the idea behind the *Coal Fired Computers* project, makes a point relevant to the previously discussed contexts of materiality, minerals, and geopolitics:

> 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.[58]

We could add various as absurd-sounding but as real "needs" produced alongside commodity and digital culture production. 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. Or we could say that digital culture needs the underbelly of underpaid workers displaced from the center of consumption to the global south (so to speak), endangering their health in poor working conditions, removed from corporate responsibility by way of subcontractor

arrangements. Or we could even argue that the digital capitalism demands the exploitation of nature through its unsustainable exploitation and depletion of resources that range from energy (oil) to materials (copper and others). This should not be mistaken as a deterministic attitude that would forget the contingency of modes of production; it just flags how the other, darker sides of production are attached to labor and global economy.

An afterlife of the machines (see the Appendix) presents one further "materiality" in our investigative tracking of the nonhuman dimensions of media culture—and a focus on media materiality before media devices becomes another track for the cartography of residue and refinement.

Hence focusing on the materiality of components and the waste of electronic media suggests the extremely long and uneven networks of spatial distribution—and 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"[59] 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. There is in any case a weird feedback loop between the race for resources of modern technological society, which started with colonialism and continued throughout the twentieth and twenty-first centuries: the search for minerals, metals, and oil across the globe, including Africa, only to return in the refined form of consumer products and the continent reterritorialized as a business opportunity. In this context of refinement, we need constantly to ask, what is the residue—both environmental and human?

Imagine materiality as a multifarious complexity: it is expressed in the perspective of minerals that are sedimented for millions of years before being mined by cheap labor in African countries for use in IT factories. After the short use-period for which an iPhone is destined, the device becomes 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 nonlinear history as a proposition to engage

with the long durations of rocks, minerals, biomatter, and language.[60] As suggested in this book, we need to turn that into a million, a billion, years of nonlinear 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 materialists, archaeologists-cum-geologists excavating how the *stratified* participates in the contemporary biopolitical sphere. This is a media geology 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 also the postindustrial regime: abandoned paper factories in Finland, after their production has moved to cheaper locations, are being reused 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 chapter serves as a reminder of the alternative materialities of technical media culture that tie together issues of political importance and the murky sides of hardware. Bifo's reference to the "cognitariat"—the class of cognitive, creative, IT-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.[61] 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 lungs violated by dust. It also includes chemicals, minerals, and hardware as sociotechnical conditions for the existence of IT culture. In Bifo's words, "life, intelligence, joy, breathing—humanity is going to be sacrificed in order to pay the metaphysical debt."[62]

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."[63] 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 leading to reduced crop lands. These issues expose the residues in our modes of production. This is geophysical terrorism.

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