

Chapter 6: Spores of Speculation

Negotiating Mold as Contamination

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This essay reflects on some of the often worrying worldings¹ of well-known fungal companions called “mold.”² It highlights the speculative character of mold-related negotiations and practices that originate from encounters in different contexts and settings. More specifically, it argues that we can usefully distinguish between a “firmative” and an “affirmative” mode of speculation, as proposed by the uncertain commons (2013) collective. Efforts that are determined to proceed by encoding and fixing mold as a signifier of contamination for human health and the inhabited built environment are framed here as firmative speculation. While mold can undoubtedly be harmful to humans (and to other organic materials especially when becoming its substrates), such attempts are nevertheless rife with obstacles and uncertainties. They are speculative, insofar as the individual susceptibility to mold is highly variable—depending on the conditions of one’s own immune system, for example, acute or chronic immunodeficiencies and allergic dispositions—and the principle of cause and effect is hardly linear or generalizable when it comes to providing a clear-cut diagnosis once symptoms occur. Furthermore, considering the extent and duration of exposition, the complex of problems needs to be related not only to the human body but also to the fungi, taking into account the quantity and quality of the diverse sorts of mold and their biomaterial characteristics, substrates, metabolisms, and varying forms of spatialization. Thus, other convergences with mold that open up rather contingent ways of negotiation and cohabitation can instead be understood as actualizing an affirmative mode of speculation. Attending to such affirmative engagements also signals possibilities

1 Drawing upon the work of Donna Haraway (2008), the notion of “worlding” or “becoming with” (301) “insists on the coconstitution, the material-semiotic interplay, that shapes what is” (van Dooren/Kirksey/Münster 2016: 12).

2 While I use the semantics of “mold” and “fungus” interchangeably here, they do not necessarily denote the same objects. Their respective meanings—along with those of related terms, such as “mildew”—have been shaped in different contexts, e.g. biology, medicine, vernacular language, metaphoric usage, and so forth (cf. Bates 2015: 49–50).

of shifting from speculations *about* mold toward ways of speculating *with* mold as contamination.

In proposing this shift, this essay connects to what Donna Haraway has termed the “Chthulucene.” Challenging the anthropocentric perspective aimed at controlling far-reaching socio-ecological entanglements between humans and nonhumans in what has become known as the Anthropocene, the Chthulucene is instead about ways of “staying with the trouble” and “making kin” with such potentially risky creatures as mold (Haraway 2015, 2016). In exploring different ways of speculating, I also draw on Karen Barad’s elaborations on “agential realism.” Barad’s entwined onto-epistemological concepts of the “apparatus”³ and “intra-action”⁴ will be deployed here as an analytical framework to avoid essentializing the living entities commonly assembled under the term “mold” and to highlight the performative (and necessarily selective) character of knowledge production around mold and contamination within the cases discussed. As Barad puts it: “Intra-actions always entail particular exclusions, and exclusions foreclose any possibility of determinism, providing the condition of an open future” (Barad 2003: 826). Hence, apparatuses are themselves materializing practices that perform “particular ways of drawing boundaries between ‘humans’ and ‘nonhumans’” (Barad 2012: 31)—so-called “agential cuts” that produce knowledge around what mold can be and do within specific settings.

In what follows, I examine the performativity of mold in relation to four apparatuses for “cutting together-apart the mould” (Bates 2015). My analysis draws on ethnographic research conducted between winter 2016 and fall 2017 in a variety of sites.⁵ The first two apparatuses, the “distributed sporesmeter” and the “(human) ventilator,” bring into relief firmative modes of speculation connected to

3 Barad presents her outline of an apparatus in the fourth chapter of *Meeting the Universe Halfway* (2007: 132–185). Importantly, an apparatus does not necessarily denote a given sociotechnical device in the classical sense but can refer to any material-semiotic assemblage through which knowledge regarding certain phenomena can be perceived. Furthermore, apparatuses do not exist in themselves but only through intra-active practices that perform them.

4 Barad coins the term “*intra-action* (in contrast to the usual “interaction,” which presumes the prior existence of independent entities/*relata*)” to highlight that the entities isolated by an apparatus that examines them do not exist as individual elements independently from this apparatus (2003: 815; cf. Barad 2007).

5 All research has been done by the author. Based on an ethnographic multi-sited research design, the data collected draws on field notes from participatory observations, review of specialized literature, ethnographic photography, conversations with experts in the fields of microbiology, mycology, sanitation, the building sector, and pest control, interviews with activists engaged in urban exploration and food saving, and discussions with concerned laypeople who shared their own personal experiences with me. In addition, the research also involved an experiment with a rapid testing device for analyzing the moldy load of indoor air, which will be described in detail in the section on the “sporesmeter.”

mold in common housing spaces. The last two apparatuses, labelled as “ruin-archive” and “waste container,” help to spotlight affirmative modes of speculation by drawing on the example of a decaying industrial ruin and the linkage of mold to both edibles and waste. In addition, these two latter cases of speculation emanate not from already prescribed regulative material-semiotic practices but from much less enclosed performances related to urban exploration and potentialities of affect, disclosing much more unanticipated apparatuses in turn. Finally, differentiating between a firmative mode and a more dynamic, affirmative mode of speculation will allow for modifying the prevalent understanding of contamination as threat, indicating a more contingent translation of contamination as collaborative encounters with diversity (Tsing 2015). This, I suggest, can further our understanding of human entanglements with mold and contribute to cultivating a more attentive and immersive notion of multispecies conjunctions (van Dooren/Kirksey/Münster 2016).

Part One: Speculating *about* Mold

The Distributed Sporesmeter: Making Spores Visible

Mold in buildings is a key area of mold-related interventions. Such interventions involve a range of actors, including technical experts and their various instruments, apart from the visible and invisible components of mold itself. Thereby, apparatuses of visualization for scientifically reducing uncertainties and the fuzziness of risk are key to such efforts.⁶ Attempts to fix the problem of uncertainty, which constantly challenges the field of expertise, can here be viewed as bounding practices of speculation that deploy technologies within a rigorously outcome-oriented mode that predominantly anticipates mold as contamination. All sorts of mold, along with their spores and material entanglements, are expected here to fit within technological frameworks meant to discipline them. Interventions in relation to mold in houses are enacted not only by professionals that often command the most up-to-date technical equipment but also by concerned laypeople.

The distributed apparatus I would like to discuss here is what I call the “sporesmeter.” A sporesmeter is a biotechnological device designed to diagnose the degree of contamination in the ambient air of closed rooms. Its main component, the “Sporometer,” is simply a kind of Petri dish or contact plate coated with agar

⁶ Questions of visualization have been discussed extensively in science and technology studies and other disciplines; for context, see, Burri/Dumit (2008); Rheinberger (2009); and Heßler/Mersch (2009).

as typically used in biological and medical sectors (fig. 6.1).⁷ It features a seemingly professional instructional manual containing descriptions for correct handling and can be purchased on the internet or in larger hardware and home-supply stores. The whole testing kit includes: a neatly vacuum-packed Sporometer with a contact plate that is pre-coated with an undefined agar; a brochure that informs the purchaser about fungi, possible health problems, and options for remediation, as well as advertising the manufacturing company; and an operating manual that provides further information about the testing procedure. The manual also includes an exemplification, a chart with specific values to denote the factor of contamination, and a protocol form for recording the findings as handwritten notes (fig. 6.2). An impartial volunteer, a 29-year-old student, carried out the entire test in her apartment with no visible mold in any location and no history of mold-related damage.

To start the experiment, the Sporometer was placed on a table in the living room of the flat, leaving the lid of the Petri dish open for thirty minutes, as stipulated by the operating manual. The little plastic box was then closed and sealed and put in a shaded place, leaving the agar and its potential new but yet invisible inhabitants to their own resources. Interestingly, after the recommended five days of incubation, the Petri dish transformed into a plastic greenhouse accommodating colorful bouquets of diverse mold cultures (fig. 6.1). The next step scheduled in the operating manual was to count out the visibly evolved spores that had taken residence and to make them readable in the protocol (fig. 6.2, third section from top). Apart from gathering information about the surveyed location as well as the date and the timespan of testing, the protocol offers a picture of the Sporometer segmented into two major quadrants—each further segmented into four minor quadrants—to locate and measure the concrete spots of the colonies, even though they appeared to be hardly separable. In fact, distinguishing them turned out to be the most challenging task in the entire test. Finally, the entities were pinned down to an approximate number of twenty discrete bio-settlers made visible in the Sporometer. In accordance with the chart provided, the degree of contamination in the apartment was classified as category C: “critical pollution” (fig. 6.2, second section from top).⁸

⁷ The manufacturer calls this agar-coated plate a “Sporometer.” In modifying this name, I use the term “sporesmeter” to refer to the entire buyable test setup, which includes Petri dish, instruction manual, protocol, and so on.

⁸ The contamination levels in the chart are: A (< 10) = noncritical pollution; B (10–16) = increased pollution; and C (> 16) = critical pollution.



Figure 6.1: The incubated Sporometer.

Beispieltestauswertung

Zählen Sie bitte die Kolonien!
Auszählung erfolgt nach 5 Tagen (120 Stunden)

Keimzahl Schimmelpilze	18
Testbeginn:	19.00 Uhr
Testzeit:	30 Minuten =

Vergleichen Sie mit der Richtwerttabelle!

Richtwerttabelle Keimzahl
(zur Belastung der Testraumluft mit Schimmelpilzen)

Belastungsgrad	Keimzahl
A unbedenkliche Belastung	< 10
B erhöhte Belastung	10 – 16
C bedenkliche Belastung	> 16

Die Beispielauswertung ergibt somit eine bedenkliche Keimbelastung des Testraums mit Schimmelpilzen, (18 Keime >16 Keime!).

Sporometer - Protokoll

Testauswertung
Bitte tragen Sie alle Kennwerte und Testbedingungen sorgfältig ein.

Testraum	Wohnzimmer	
Testdatum	11.10.2017	
Testbeginn	11.10.2017	16 Uhr
Testende	16.10.2017	16 Uhr

(Testzeit: 30 Minuten)

Auszählung erfolgt nach 5 Tagen
(120 Stunden)

Keimzahl Schimmelpilze:

Endergebnis:	20
Belastungsgrad:	A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/>

Figure 6.2: The completed protocol form.

Despite the fact that, strictly speaking, there was no mold visible or perceivable by any other senses in the apartment, the student volunteer's feeling of being at ease with her living situation—which had been considered healthy prior to these findings—subsequently eroded. The mere presence of the incubated Sporometer exposing such an amount of unexpected beings in her flat had discomfited her during the preceding days, when she had to watch the mold colonies slowly grow up from day to day underneath her table. Moreover, having heard about the potential threat of respiratory problems connected to the molding of potting soil, she started to be concerned about the potted plants and flowers decorating her flat. However, besides searching for a reasonable cause of the contamination within the realm of her own responsibility, she nevertheless started to question the alarming outcome of the procedure.

She was not the only one to express doubts. In the course of research, I met a microbiologist who runs an accredited and renowned environmental health institute that provides mold- and dampness-related damage assessments (among other services, such as drinking water analysis and hospital hygiene consultation). According to this specialist, there are quite a few obstacles to conducting such a do-it-yourself test with scientific rigor. Indeed, a failure of scientific standards is almost inevitable, as there are just too many misleading factors and potential sources of disruption that cannot be controlled by this lay practice. How constant was the temperature during the five days of incubation? Was there a window open or any other ventilation going on in the room during collection of the spores? What is the domestic architecture, and how does the arrangement of the room's interior—including the array of all possibly relevant objects and materials such as plants and flowers, furniture, radiators, etc.—influence the test? Has the box been placed in a spot protected from sunlight? What exact kind of agar has the Petri dish been coated with? Despite the fact that the manual of the sporesmeter informs the user about avoiding some of these obstacles, they are nevertheless hard to control completely—at any time. Seen from the perspective of scientific expertise, the distribution of such an apparatus does not make much sense, as its very application will multiply rather than reduce uncertainties regarding degrees of contamination.

Tellingly, the device also includes an advertising leaflet for mold-decontamination products as well as a printed form for submitting an analysis order (for an additional fee). The order form instructs the user to send the protocol with the recorded results and the mold-charged Sporometer to an assigned microbiological contractor to verify the findings and clarify the magnitude of threat.⁹ The

⁹ Even if the results are sent in to a laboratory, they cannot be taken as fully correct and exact under scientific premises, as any ex post facto evaluation would be incapable of reconstructing the actual testing situation that occurred in the user's place.

spore-catching and visualizing apparatus of this measuring instrument, with all its complementary components and processes, can therefore best be understood as what Muniesa, Millo, and Callon call a “market device”: “the material and discursive assemblages that intervene in the construction of markets” (Muniesa/Millo/Callon 2007: 2). Here, the necessary intervention to be made is to trap spores, turn them into distinct visible mold and translate the now (ac)countable colonies into an official form, making the results immutable and mobile so that they can easily be negotiated as supposedly reliable facts.¹⁰ Thus, the acts of selling and buying the gadget, on the one hand, and the fee-based follow-up requirements of sending in and defining what is at stake, on the other, represent the economic surplus of a market construction that relies on the ability “to stabilize a particular state of power relations by associating the largest number of irreversibly linked elements” (Callon/Latour 1981: 293). In this case, the major linkage at stake that needs to be stabilized consists of all the elements that get folded into the sporesmeter (test kit, spores of mold, temperature, moisture, humans, and so on), pushing speculation into the one-way street of always anticipating—and therefore calculating, imagining, and performing (Anderson 2010: 787)—contamination as economic payoff.

The (Human) Ventilator: Keeping Spores in Circulation

Frequently, the inhabitants of buildings are warned to avoid mold straight from the outset. In particular, what is often stated as having gone wrong when there are visible occurrences of residential fungi—not least by landlords—is the maintaining of sufficient circulation of air, which prevents spores from settling down in too large numbers. Despite the practical limitations of keeping air in circulation in every part of a building, despite the existence of other factors for mold to grow, and despite the fact that mold does not necessarily impair human health, having mold in one’s residence is therefore often connected to feelings of guilt. As one person I interviewed (“Lynn”) aptly elaborated,

Mold can always be taken as a sign, indicating that something goes wrong, that something happens, which normally shouldn’t. [...] It’s just like some people have a bad conscience when mold occurs in their homes, when they get the feeling that because something like this happens they might be living in the wrong way. For example, that they are not airing their apartment enough or something like that. [...] And mold always shows that things are somehow out of control, that these norms

¹⁰ Here I draw on the concept of translation as developed in actor-network theory (e.g. Callon 1984) to highlight the sociotechnical process of (re)formatting the inscription of mold/contamination as “material semiotics” (cf. Law 2008) and on Latour’s notion of “immutable mobiles” (e.g. Latour 1987: 227; cf. Law/Mol 2001).

of conduct are not applicable or at least that one can't meet these obligations properly. I think this is felt as a personal failure rather quickly, because actually you know what to do so that something like this doesn't happen.¹¹

Just like in the experiment concerning the sporesmeter—where the person carrying out the test suspected that the potting soil might be the problem and that she simply possesses too many plants—discomfort and a sense of personal failure can be felt. In both cases, what brings mold into appearance is an accumulation of risk factors that are related to blocking the flow of spores. The inscription of responsibility and guilt into people's practices of circulation can thus be viewed as a key driver for the apparatus I call the "ventilator."

To keep spores from accumulating, settling down and spawning up to potentially harmful levels due to ventilation signals a shift in mold apparatuses away from measuring a concrete process of contamination toward a mode of preemption aiming at the virtual (cf. Massumi 2009). In contrast to the prevention of a concretely contoured thread in the making, preemption "is a mode of power that takes threat, which has no actual referent, as its object" (Massumi 2010: 59). In this case, the practice of 'airing' is not dependent on anticipating calculable contamination because it is framed around diligent behaviors steadily integrated into normal, uncontaminated daily life. Diligence, in turn, gets empowered through principles of guidance and regulation, as Foucault ([2004] 2007, [2004] 2008) has analyzed in his works on (neo)liberal political economy. This governmental power-mechanism is key to an understanding of the ventilator as a decidedly 'conductive' apparatus on behalf of a biopolitical precautionary principle regarding spatial purity connected to human health. It is also a savagely preemptive apparatus against the nonhuman life cycle of mold. As Ben Anderson has also noted, the logics of preemption, precaution, and preparedness, as soon as they foster societal implementation of normalization and standardization, work even without any occasion of concrete suspicion (Anderson 2010: 787–792). The ventilator apparatus, in other words, seeks to preempt any (bio)material outcomes, and even any breeding of mold, by instigating cautionary actions independently of any specific indication of contamination.¹²

Nevertheless, in preempting the growth of mold by keeping spores in circulation, the ventilator retains mold as a key signifying component—but only its semiotics, not its bio-essential materiality and diversity. This indicates its major dif-

¹¹ Translated from German by the author. Besides being concerned with indoor mold, this highly reflective interviewee is also a food-saving activist and will be cited again in the section below on the "waste container" apparatus.

¹² Or the behavior-relieving installation of permanent technological solutions with aeration equipment, such as automated ventilation systems.

ference in terms of the material-semiotic outcome in relation to an anticipating apparatus such as the sporesmeter: 'mold' primarily gets passed on discursively as a guilt-laden and shame-ridden sign, indicating a socially ostracized and personally felt loss of control. In turn, to preempt such an unpleasant situation of contamination where feelings of guilt and shame affect the assigned human polluter, mold becomes a semiotic element that does not necessarily need a projected material correlate anymore as mold is exactly the materiality that is to be avoided. Firmative speculation functions here by stabilizing mold as contamination detached from any actual threat or risk to health. Even though firmatively minimized to the highest possible extent, the process is still—or even more—speculative in general, precisely because there is no factual evidence or even any predictable consequence regarding what the mobile spores might actually do once they are no longer ventilated. Thus, this preemptive variation of firmative speculation is based on exactly the kind of uncertainty that the anticipating sporesmeter pretends to overcome by intentionally producing and visualizing mold in contrast. However, both differentiations—anticipation and preemption—correspond to a firmative modus of speculation “that seeks to pin down, delimit, constrain, and enclose—to make things definitive, firm” (uncertain commons 2013: ch. 1).

Yet, regarding mold in buildings, there are also deviant and subversive behavioral patterns that withdraw from preemptive conduct by tolerating at least a certain degree of mold in residential spaces. Some people remove spatially quite limited mold spots from time to time with cleaning agents or enclose them with wall paint. Others even choose to strategically “stay with the trouble” (Haraway 2016) of growing mold without any attempts to eradicate it—for instance, in order to enforce an abatement of rent¹³—keeping the fungi more or less as “domestic’ organisms [...] whose species being has changed to a form that survives for human needs” (Tsing 2018: 232). However, the mechanisms that link anticipation to visualization and preemption to ventilation undermine the affirmative speculative potential of these more-than-human microbial apparatuses.¹⁴ Thus, in contrast to these firmative speculative practices that are more interactive than intra-active, arising from largely predefined material and semiotic apparatuses, the following

13 This can normally only be the case (sometimes even negotiated before the law) if it can be asserted that the spatialization of mold is due to defects or deficiencies in the construction and not by misconduct on behalf of the tenant(s), and if the landlord does not fix the problem in time. However, as I have been told by experts from the building sector as well as individual renters, not all tenants actually want to get rid of residential mold, just as clarifying cause and effect is not always a fast problem to deal with.

14 The sporesmeter is also rife with possible speculations, both in handling the apparatus and negotiating the outcomes. Likewise, for the yet unsettled spores in circulation, it remains unknown what specific effects a failure of ventilating may actually cause to matter (and meaning) in particular spaces and places.

two negotiations fairly invert this ratio by highlighting more contingent practices of speculation and bringing more unorthodox settings into scope.

Part Two: Speculating with Mold

The Ruin-Archive: Exploring Spores out of Time

To negotiate material-semiotic assemblages of mold differently from a firmative orientation requires an openness to uncertain ways of knowing. Akin to Caitlin DeSilvey's idea to follow "the invisible bookworm into the encyclopaedia" (DeSilvey 2006: 322), this can also mean to occasionally follow spores on their metabolic flights through the (sub)urban environment into rather unruly edgelands (Farley/Roberts 2011). Here an industrial ruin was one such destination.

The ruin I entered in the course of research used to be an iron foundry in the northern part of Bavaria, flame-cut by a fire accident and subsequently vacated in 2012. Since fire brigades flooded the remaining building blocks with huge amounts of water and subsequently left the area largely unsheltered, moisture had been able to enter, facilitating a range of biological processes that had been contributing to the ruin's progressive decay. The proliferation of fungi like mold within the entire complex, but especially in its remaining semi-closed rooms, forms part of this larger process. Not only do such places as ruins abandoned by humans provide an asylum for rats, pigeons, insects and other pollutants like mold, they also allow these critters to literally 'take place' and to grow and foster the very sorts of contamination that are typically eliminated by "papering over the mold and cracks" in our buildings and by covering "the world with a chemical armory [...] to escape rot's degenerative force" (Lorimer 2016: 236). In this sense, places left to rot, where the preemptive mechanisms for keeping spores in constant circulation through human and nonhuman ventilators are no longer operative, can also be seen as blended, unpurified spaces of defilement (Sibley 1995: 49–89).

Exploring ruins as assemblages where all kinds of human and nonhuman, living and nonliving materials and actors are no longer kept apart has the potential of giving rise to an affirmative apparatus where time is not necessarily linear and space is rarely Euclidean. As will be shown, the appearance of mold can be an index of the sort of 'topological' spatiality here, which Michel Serres has famously illustrated through the allegory of a handkerchief crumpled in a pocket, which brings points once far apart into an unexpected close contact (Serres 1995: 60–61). This means that a full-grown mold can be seen as a continuous reminder of an initial point of contamination lying in the past while being diffractively able to affect and alter encounters of contamination in the present: instants of time and materi-

ality get refolded in mold–substrate amalgams through the biochemical mode of decomposition that mold spores induce in their manifold substrata.

But it is not only the rotting materials that get transformed over time through decomposition. Their semiotics are also time-shifting, as they retain connections to the ruin's remaining "phantom networks" (Edensor 2005a: 63) where mold and their substrates are spatially embedded in history. As Dylan Trigg notes:

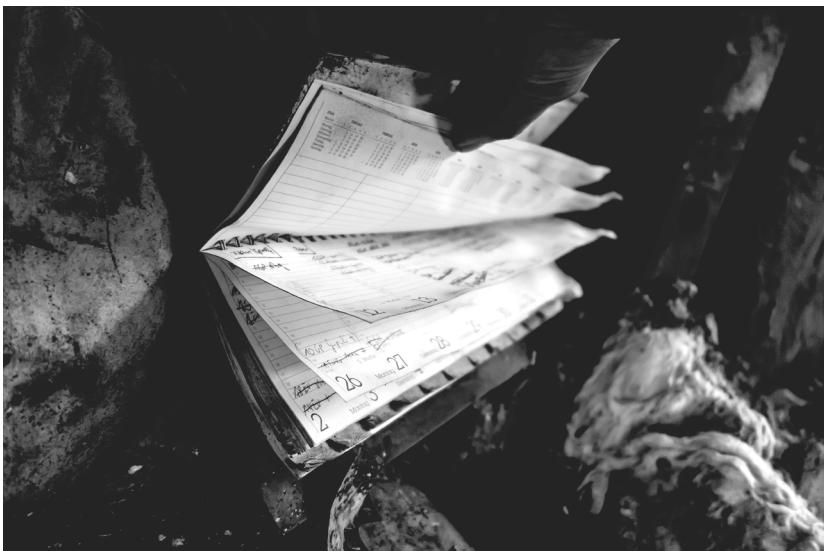
In the ruin, time runs off, so becoming timeless. The convergence of temporal categories means that linear progress loses its power of persuasion. We are confronted with an ambiguous space. Time has ceased, yet simultaneously attracts the impression of becoming. (Trigg 2006: 185)

It is precisely the persistent tension between an activating impression of becoming, on the one hand, and the overall impression of loss and decay in a seemingly passive state of ceasing progress, on the other, that the unpredictable melding of mold with its various material substrata can bring into relief. Therefore, past points of contamination in time can be encountered in the present, insofar as mold contains the potential to alter time-relations due to affirmative contingent impressions. In the vocabulary of agential realism, the processual experiencing of moldy materialities in ruins can be referred to as "spacetimemattering," denoting "a dynamic ongoing reconfiguring of a field of relationalities among 'moments,' 'places,' and 'things' (in their inseparability)" (Barad 2017: G111). This is the case especially when ruins are engaged in the intra-active practices of "urban exploration" (Garrett 2010, 2014). Entering such spaces where the presence of absence becomes mediated through all kinds of waste material provokes an affirmative mode of speculating with the lost and the found-again. This is because the

political assumptions and desires which lie behind the ordering of matter in space are thus revealed by the effects of objects in ruins, and they provoke speculation about how space and materiality might be interpreted, experienced and imagined otherwise. (Edensor 2005b: 330)

What speculations with mold can look like then becomes patently apparent in the foundry's decaying archive (figs. 6.3 and 6.4).

The old foundry's management and employment archive in one of the administrative offices is still filled up with files and folders that include staff lists, labor time schedules, conference protocols, accounting sheets, technical instructions and proceedings, guidelines, diaries, and so on. Ecologies of rot and decay have taken over the lead in (dis)ordering the materials over time. Intruding human and nonhuman visitors have moreover been walking through the archive, leaving their tags and marks behind, just as the flames had done before. Peter, one of the



Figures 6.3 and 6.4: Exploring the old foundry's former archive. Photographs by Christoph Schemann.

human visitors I accompanied, an urban explorer who had been drawn to ruins and other lost places for years, highlighted this archive as being exceptional because of its contradictory character: all these documents were once archived to be sustained and preserved for future times and to be retrieved whenever required;

now they are left to rot and be forgotten, with some of the files already almost unreadable and sooner or later possibly completely inaccessible. What has attracted various visits on the part of this explorer and his colleagues is just this paradoxical situation of the archive still being right in place yet falling apart in time. While browsing and flicking through the files, these explorers fantasized what this place might have been like for the workers, what kind of data the firm might have collected, scrutinizing which names can still be read on the schedules and wondering how many employees eventually tried to cheat management with sick notes. As Peter expressed it to me, they have become some kind of “contemporary witness” of a dying place with a gradual loss of memory to be eaten away by natural agents like fungi. Or, as Miles Ogborn reasons, “memory is chemical and biological”—and for spores of “archival fungi,” this is nothing but a favorable opportunity to live it up: “These fungi absorb nutrients from the dead or living organic matter on which they grow. For them books are good sources of cellulose and starches, albeit hard to digest” (Ogborn 2004: 240–241).

Affirmative speculations “produce futures while refusing the foreclosure of potentialities,” even as they “hold on to the spectrum of possibilities” (uncertain commons 2013: ch. 1). Therefore, ruins and their degrading walls, rooms, artefacts, and material leftovers can be seen as birth-giving substrates for mold and other commonly suppressed organisms that, in entanglement, stimulate commemorative intra-actions that render possible more contingent interpretations and engagements with the surroundings “presented in a speculative spirit” (DeSilvey 2006: 335). Urban explorers can speculatively realize productive possibilities, memories and desires to sense ruins (Edensor 2007; DeSilvey/Edensor 2012: 471–478) that otherwise would have been spoiled and demolished by virtue of administrative politics and economic (re)investments. When it comes to negotiating contamination in all this, it is especially the intertwining of human-nonhuman (de) composition of history and memory that can be speculated-with in an affirmative mode of exploring the material semiotics of the present past in ruins.

The Waste Container: Affecting Spores of (Dis)gusto

In contrast to the already mentioned contaminated fungal substrates, I will now highlight some affirmative speculations regarding mold on edibles.¹⁵ The main argument here is that what links mold to waste lies in the material capability of

¹⁵ Leaving out edible mold as a delicacy—for example, on certain kinds of cheese—I am solely focusing on mold as unintended contamination at this point. Concerning the microbiopolitics of crafting cheese and its relation to mold where “post-Pasteurians move beyond an antisep-tic attitude to embrace mold and bacteria as allies” (Paxson 2008: 18), see the work of Heather Paxson, especially her monograph, *The Life of Cheese* (2013: 46–49, 158–186; cf. Paxson 2014).

mold to bodily affect people, urging them to react in one way or another when encountered. The notion of a “waste container” as an apparatus enacted by practices related to affect has at least two dimensions in this context. First, a container can physically be something like a bin for household garbage, used to get rid of rotten and contaminated foods, which detains spores and prevents smells from circulating. Therefore, the possibility of placing food in a container is what distinguishes mold on edibles from mold on house walls and other spatially fixed materials. Here, attention turns first and foremost to the hedging or enclosure set in process when moldy food is thrown away. Second, as Mary Douglas has shown in her study *Purity and Danger* ([1966] 2002), waste is commonly culturally coded as impure and disorderly. As devices for minimizing contact with such impure matter and dissociating it from the domestic space, the refuse sacks of waste bins can easily be handled and bundled to carry garbage off—putting it out of sight and out of scent—highlighting the semiotic aspects of containment.

Mold that is becoming perceptible on food causes many people to displace the infected comestibles directly into the bin, as it often triggers an affective response of bodily repugnance—if not self-protection against poisoning and disease. Importantly, this response indicates a material-semiotic threshold, as tasty edibles become ‘dis-gusting’ and transform into something potentially unhealthy—rendered mere waste, accompanied by the foul-smelling odor of lingering decomposition. In consequence, there often does not seem to be much tolerance for the affects that the emergence of food-related mold can trigger. Thus, mold’s biomaterial capacity to elicit affective reactions of concern and disgust can be understood as a demarcation or agential cut (Barad 2012), indicating that what used to be food has just exceeded edibility.

Nevertheless, there is a diverse range of ways in which contaminations can be kept at unproblematic levels, for example, isolating the still fresh and tasty pieces from the rotten ones or cutting off molded bits. Even though such forms of customary knowledge among many people might not lead to a more generous approach to mold, they do indicate more affirmative modes of speculating with mold: they call attention to different practical possibilities to (re)negotiate and concretely localize the threshold between edibility and waste, disgust and gusto. The threshold between enjoyable food and repellent waste therefore cannot be seen as a fixed boundary. One possibility here consists of differentiating between diverse material qualities of foods as substrate: edibles with a rather soft texture such as marmalade, meat or certain sorts of fruits and cheese are more likely to be completely binned when contaminated with mold than bread, vegetables or other foods of a harder and more solid consistency. Rational reconsideration, alongside a more relational evaluation, can thus foster a more contingent engagement with mold, while at the same time also altering the affective predisposition for disgust.

Such an altered embodiment of mold intra-actions is particularly pronounced in the case of food-saving activists who, due to their socio-ecological orientations and their interventionist approach to the waste of food, engage in “dumpster diving.” Technically legal in the U.S. but illegal in Germany, this practice consists of reopening and climbing down the commercial waste containers of grocery stores, which dispose of large quantities of still edible foods due to strict legal regulations. In diving down these containers, the activists I interviewed speculatively reevaluated (dis)gusto in relation to what has been thrown away, inverting the waste container apparatus by containing their responsibility (and not the rotting food). They therefore maintained the ability to respond differently in speculating with contamination:

[“Mario”] Well, I don’t know the risk, I can’t really estimate it. That’s why ... it’s a very unknown risk. I don’t know, I mean you can’t ... Well it is hard to relate. Either way, I eat a rotten tomato, or I take a smoke from a cigarette, so to say. I can’t compare that. And I do smoke cigarettes from time to time. [...] It’s just the same if you go dumpster diving. You take a look in the container and see: There, at the corner, is a molded lemon that is completely green and next to it, there is a perfect eggplant that has been in contact for, I don’t know, two or three hours—I nevertheless take out the eggplant and just wash it off.

[“Lynn”] Sure! The brink of disgust has totally been reduced! Well, three, four years ago, before I started food-saving—that’s when the reduction of disgust initially started—then, five years ago, I wouldn’t go dumpster diving. I thought it was totally disgusting and I found it completely repulsive.

What can be fleshed out from these passages is that the practice of diving into the sometimes unpleasant interior of containers situates subjects within a state of affairs where the affects of (dis)gusto can be altered and acted upon differently. While the problematizing of an unnecessary binning of food, capitalistic over-production, sell-by dates and the like may certainly be the key drivers for these engagements, it is the ability to partly resist and resituate the negative affective intensities of moldy waste that allows the activists to renegotiate the degree of biomaterial contamination. In turn, both aspects—material and discursive—taken together could actualize and reframe the potential to critically address broader societal questions ranging from negotiations about consumption and value to sociocultural demands on the freshness of perishable foods (Freidberg 2009). The “affective life” (Hutta 2015) of this multifarious, living semiotic being called food mold—which frequently enters the encountering subject’s expressive registers by provoking deprecatory facial expressions or a shift in vocal intonation—is there-

fore the intra-active nexus that can either constrain the scope of speculating with mold or open it up to the possibility of reassessing its substrates again and again.

Conclusion

This essay began by picking up Donna Haraway's invitation to stay with the sometimes troubling entanglements of humans and nonhumans in favor of "chipping and shredding and layering like a mad gardener, mak[ing] a much hotter compost pile for still possible pasts, presents, and futures" (Haraway 2016: 57). As the likewise colorful and pillow-like compost piles of mold are regularly seen as threat to humanly colonized environments, 'contamination' is one of the key categories we can use to describe related negotiations. In turn, such negotiations rely on practices that are speculative inasmuch as they need to produce knowledge about a vital entity that cannot easily be reduced to a set of fixed qualities or a fixed scope of inferences—much less when seen in connection to its numerous metabolites and ingrowing substrates.

While the first two apparatuses have been identified to demonstrate how the practices related to them get firmly restricted in their speculative potential due to sociotechnical endeavors to anticipate and preempt mold as a material-semiotic signifier for unpleasant contamination, the last two agential practices can aptly be termed speculating *with* instead of *about* mold to draw attention to the fact that entering into active collaboration denotes a necessarily contingent shift in terms of what can (and not must or should) be encountered. Picking up Anna Tsing's notion of "contamination as collaboration," contamination itself can further be categorically expanded, denoting yet-to-be-known speculations that simultaneously reaffirm fungi such as mold (or Matsutake, in Tsing's case) and human subjects (Tsing 2015: 27–34). As for Tsing, "we are contaminated by our encounters" whereas "purity is not an option" (27). Likewise, Donna Haraway points in a similar direction by referring to "sympoiesis" (in contrast to a self-referencing "autopoiesis") as the central attunement to face the Anthropocene/Chthulucene, where "making-with" becomes the crucial condition of living in common (Haraway 2016: 58–98, 2017: M25–M31). Finally, engendering perceptive apparatuses that always cut together and apart such sympoietic contaminations requires an "accountability for the cuts that are made and the constitutive entanglements that are effected" (Barad 2012: 31). Hence, to perform speculations *with* mold in an affirmative manner also means to queer and blur demarcations in negotiating the role of the human and the nonhuman, the predefined and the possible, while remaining attentive toward the alterations made.

To negotiate mold and other cohabitants fraught with risk in a state of contamination can therefore be detached from a fixed understanding of contamina-

tion as mere threat, irregular and something to be avoided by any means necessary. Instead, it can be understood as creative and productive in a world whose future can only be speculated about but will definitely need further exploration of its awkward¹⁶ multispecies entanglements and constitutive contaminations.

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16 See also Ginn/Beisel/Barua (2014) and Lorimer (2014) in this context.

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