CHAPTER 11

Becoming Disturbed in Disturbing Landscapes

Methodology and Epistemology in Anthropocene Wastelands

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You will need rubber boots to get through the Anthropocene, because as you zigzag between infrastructures of accumulation and extraction—archives and industrial farms, mining pits and dumps—you are always sinking in and losing your footing. Go to the field with a backpack large enough to hold all the appropriate types of footwear. A thermos is also recommended. At first, during our time with Aarhus University Research on the Anthropocene (AURA), rubber boots emerged as an eminently practical concern (Figure 11.1). This was because of the particular territory of our field site, which had attracted our attention in the first place: its history of extraction had left behind a scarred landscape made of sand dunes, waterlogged open pits, and geological instability, a landscape where we literally got lost, sidetracked, and stuck in the mud time and again. Rubber boots allow you to venture into vague and ambiguous territory: waterlogged soil, flooded ditches, boggy expanses with unknown capacity to bear weight. They also are the vectors of a strong grip that the mud exerts on you, sucking you into its logic and its immediacy, getting you stuck. The Anthropocene that you find in apparently innocuous places like the middle of Jutland may look boring, but it is not: it is an unstable and shifting terrain, a Bermuda triangle of collapsed intentions and constant reconfigurations, out of which spills a ruderal growth of unearthed histories, complex feelings, and strange observations.

Here we reflect on one of the core conceptual and methodological tools with which we grappled throughout the AURA project: disturbance. Disturbance, in the ecological sense, is an event that transforms and rearranges biotic material. Disturbance is something that humans do, which contributes to structuring the world (Root-Bernstein and Ladle 2019). Here we propose that disturbance can be understood not only as an unreflective transformation of the environment but also as a deliberate, deliberative method for experimenting on, playing with, and learning about the affordances and structures of the world.

As we see it, methods are not simply practices that take place somewhere called the "field." Methods enact the dialogue between empirical or

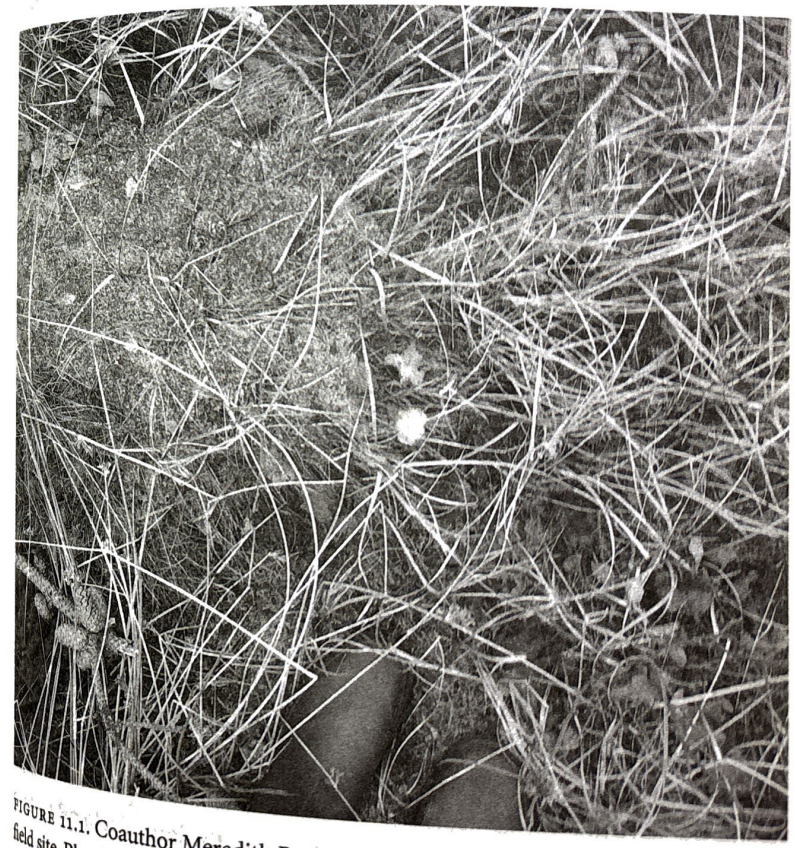


FIGURE 11.1. Coauthor Meredith Root-Bernstein wearing rubber boots at BKL field site. Photograph by Meredith Root-Bernstein.

phenomenological being-in-the-world and epistemology. We play with our idea of disturbance as method by acknowledging that disturbance as method can be disturbing—it can, and even should, disturb our ideas of what methods are and our existing methodological practices. We bring this meta-disturbance to the fore by structuring our chapter like a series of ecological disturbances—a discontinuous set of patches of altered affordances and surprises within a background matrix of case study presentation and analysis. Our first patch is about deer and the deer-hunting forest structure. Our second patch is about uncovering paleohistory. Our third patch takes place at a pig farm. It may be too early to see everything that will flourish in these patches, but we give some indications of what our disturbing and being disturbed generate.

The Background Conditions

In this chapter, we ask both how disturbance shapes multispecies landscapes and how to ourselves *be disturbed in our methodological expectation*—to cultivate the capacity to overcome the banal (Swanson 2017) or "mild" (Brichet 2016) character of the Anthropocene apocalypses. As Bubandt, Andersen, and Cypher describe in the Introduction to this volume, the former brown coal mines have a long history of disturbance in the ecological sense; Søby was the site of a major extraction project especially from World War I to the 1970s. By 1970, as mining became unprofitable, the area was left as a wasteland, scarred by deep, sandy pits that quickly became waterlogged and unstable. Not only did mining processes disrupt and make anew this swath of central Denmark but landownership, ecological succession, cultural heritage, and sociotechnical relations also overturn the territory, in fundamentally banal, everyday forms (Swanson 2017). None of this made BKL, as we called the field site following a Danish term for brown coal fields, particularly special.

One of our explicit methodological goals was to understand BKL as an Anthropocene site from a multispecies perspective, which implies disturbing disciplinary boundaries. However, what this meant in the field, in practice, and as method was unclear: How to abandon an anthropocentric stance, and how to study other species, without just actually doing ecology? Did we need to develop totally original field practices? Methods in the absence of an

interpretative framing have no meaning: a key question for us was thus where to find a framework of original meaning making for our field practices.

Here we use the ecological disturbance concept to make sense of what we were doing. An attraction of the disturbance concept is that it is regularly used in the ecological literature to mean both bad, destructive things that humans do to ruin landscapes and life on Earth and natural events with a range of unique outcomes, including increasing biodiversity (see Root-Bernstein and Ladle 2019). It thus operates across the ecological divide between the "natural" and the human, the good and the bad, inherent in the debates on the Anthropocene that our group was trying to navigate. Disturbance ecology can be simultaneously used to resist and reinforce the idea that humans are somehow external to nature, the sole and unique cause of the order of the world (Willig and Presley 2018). In what follows, we interrogate this claim of human power and sole causality not in the general but in the specific, asking whether our own particular practices of disordering and rearranging, observing and sensing, are the sole determinants of what we learn from methods. We claim that methods are not only the outcome of human research practice in the field but interactions co-constructed by multiple actors and multiple species.

Patch I: Human–Deer Behavioral Disturbances

Multiple times across the years, we (N.F., M.R.-B.) booked a university car, gathered available AURA colleagues, agreed on who was both willing and legally allowed to drive, booked a local hotel, and made the several-hours' drive out to BKL. We stopped along the way to buy a large amount of food at a supermarket and sandwiches at a bakery. Arriving in the late afternoon or evening, we unpacked the car, installed ourselves, and set about cooking, drinking, and discussing the research project. In the morning, we put on our warm, waterproof outdoor clothes and our hiking or rubber boots and packed our backpacks with thermoses, notebooks, and cameras. We drove to particular bits of the forest. Some of us had a better mental map of BKL than others; it was a relatively uniform landscape, and somehow it was easy to get discombobulated on the few roads. We once got the van stuck in some mud. We walked through the landscape observing random things, followed deer tracks and trails, and tried to imagine spaces that would be interesting to deer, discussing concepts

of deer interestingness among one another. We placed camera traps and tracking cards (thick paper with charcoal bands so that animals crossing them would leave charcoal footprints). To place camera traps effectively, we had to locate appropriate positions, distances, angles, and heights, to capture frequent deer activity. We attempted to choose promising positions mainly by placing the cameras near deer trails and other animal tracks or other sites of deer activity, such as the edges of clearings and places within forest cover with bark stripping. Once we had decided where to put the cameras, we moved like deer to check that the angles and heights of the cameras were adequate for registering animal movement. When we chose places to put tracking cards, we also speculated about what the tracking cards looked like to the deer and other animals and whether they would step on them.

These may resemble scientific practices, but they lack the structure of scientific methods. They are not anthropological methods either. Is it an art project? Is it a children's game? What can these practices possibly be good for?

In addition to our seemingly inexplicable and playful modes of discussing, tramping, and placing objects across BKL, on several trips structured like the generic field trip described in the preceding paragraphs, over several years, we walked around with and talked to hunters. The red deer hunters at BKL with whom we spent time had a far deeper experience with materialities and temporalities of disturbance. Hunters and landowners spoke of relations among the smells and sounds of human bodies, the machinery of vehicles and weapons, the vegetation of closed forest and open clearings, and the sensory acuity of deer and their social arrangements through the seasons. As we walked and spoke with them, they frequently justified their quiet steps through the forest, their long waits in their hunting blinds after a shot was fired, or their vehement resistance to mushroom pickers enacting their legal right to forage along the roads of their property holdings in terms of a strict imperative not to "disturb the deer."

Primatologist Thelma Rowell (1987) argues that particular environments suggest and guide us toward watching and understanding more-than-human socialities through the environment's material and sensory affordances. Rowell reflects on the intimate zigzagging between the structure of methods, the affordances for knowledge that methods render available and select among in the world, and thus the epistemologies to which methods contribute. But, in a multispecies move, she sees this zigzagging as something that

other species are also doing. For example, in her reflections on the intersections between multispecies ecologies and the humans who enter these ecologies as behavioral observers, Rowell observes how red deer in the Scottish moorlands "allowed the first modern study of mammalian breeding behavior" (Clutton-Brock, Guinness, and Albon 1982) because of "the excellent visibility in the moorland habitat," which allowed researchers to observe social relations among deer in the wild with unimpeded vision (Rowell 1987, 656). She notes, however, that Clutton-Brock and coauthors express doubt as to whether the mating system they observed and recorded in such detail exists in red deer's original forested habitat of woodlands or thickets (656). In other words, both what human observers understand about being deer and what deer understand about being deer are shaped by the open moorland. Closed forest habitats may allow deer to be deer differently but also condition the affordances available to others for learning about what being deer means in such habitats. One of the big, but perhaps underappreciated, intellectual disturbances to ecology and biology has been the recognition that deer are many things and that this variance represents alternative, nongenetic livelihoods, strategies, and modes of life (Hebblewhite and Merrill 2009; Putman and Flueck 2011). Rowell (1987) helps us understand that methodological limitations on observation mean ecologists only see some of the ways of being deer.

The deer we were able to observe with our field methods seemed to be ephemeral beings well versed in avoidance (Forssman and Root-Bernstein 2018). While we could detect their trails, and scattered traces of spoor, tracks, disturbances, and browsing activity, the deer never left tracks on the tracking cards, and neither did any other animal. On our camera traps, the observed deer were flickers, fragments, and vague smudges in the dark. If we were hard-core positivist empiricists unable to take a science and technology studies perspective, we could conclude one of two things: (1) deer at BKL are a kind of ghostly being or (2) our methods are a failure as they did not render deer as we had been told deer should appear to us, either by hunters or by biological literature. Before coming back to think about this perplexing choice of conclusions, let us look at a third set of disturbances that we observed in the hunting forest.

The land managers at BKL wished both to shape the landscape into a dichotomized set of clearings and forests to shape deer behavior for optimal

hunting experiences (Forssman and Root-Bernstein 2018) and to produce timber. But the deer, and the way the trees responded to deer behaviors, did not always cooperate and often disturbed the well-laid plans of the hunters and land managers. In winter 2015, some members of the AURA "red deer team"[1] walked through Fasterholt plantation with Bo, a land manager for two of the largest landowners in the area.[2] Bo described his methods for managing vegetation in Fasterholt as we walked. In particular, we discussed the tensions of managing Fasterholt both for production forestry and for wildlife. Bo and other land managers around BKL were interested in wildlife primarily for hunting, not for biodiversity as such.

Bo led us along a human-made ditch that ran in a straight line through the coniferous plantation forest. Bo stopped to point to some trees where the bark had been stripped, in some cases around the entire tree. Much of the bark stripping was at eye level, but some was further down the tree. Bo told us that this area of the forest had enough damage from deer that it was no longer profitable to harvest the trees because they could be used only for wood chips. He looked around and said, "You can't find a tree that is not damaged," to emphasize the extent of deer bark stripping, browsing, and antler rubbing in this area.

Earlier in the day, Bo and Mikkel, a professional forester who also worked with the Fasterholt landowners, had shown us an area where young trees had been heavily browsed and stripped by red deer. They had pointed to a tree that had been stripped of bark. On the tan of the bare tree was a large black spot. Mikkel described how deer browsing and bark stripping made the young trees vulnerable to fungal rot.

In some cases, deer disturbed trees so much that they would kill trees in an area and prevent new growth, creating clearings, even while deer preferred the cover of dense forest. We were shown this by Bo and Mikkel, but it is also standard ecological knowledge: browsers, especially if the density is relatively high, can damage adult trees, slow woody plant growth, create dwarfed shrub habits, or reduce seedling establishment. This kind of ecological explanation, however, depends in no way on any imputation of behavioral motivations and, even less, affect. The only feeling that has worked its way into aspects of the animal–plant interaction literature is fear of predators (cf. the "landscape of fear"; Laundré, Hernández, and Ripple 2010). But our interlocutors disturbed this affectively narrow understanding of

deer-tree dynamics, and we stepped into the gap that this opened. While landowners at BKL attributed the sometimes extensive destruction wrought on vegetation by deer as "boredom," while meandering up and down the weird pits and slopes, in and out of the quiet clearings and pine stands of BKL, we speculated that activities like bark stripping and antler rubbing might indicate that deer "preferences and desires exceed" the "monotony of lives where they feel safe and are well fed by frequently cut grass and sometimes-daily deliveries of sugar beets and oat silage" (Forssman and Root-Bernstein 2018, 81).

To attempt to find methods to allow us to interrogate this speculation, we developed the field practice described in the beginning of this patch, meshing aspects of multispecies ethnography and ecology. In a multispecies ethnography mode, we intended to use existing ecological studies of the research site to identify places that were "interesting" to the deer (see Despret 2004). Maria Dahm, a master's student in biology, had already assessed deer presence at the site through a number of indices: feces, tracks, signs of bark stripping, gnawing and biting, and camera traps. Interpreting these signs through statistical analysis, she found that deer preferred areas with higher densities of trees or tall vegetation and areas far from buildings; however, plenty of variation in evidence of deer presence could not be explained (Müller et al. 2017). Following Maria's recommendations and our interviews and interactions with landowners and land managers (Forssman and Root-Bernstein 2018), we focused on deer trails, meadows, *hochsitz* (hunting seat) sites, and forest edges. But reinterpreting these objective landscape features as "interesting places" implied tinkering with and going beyond a distanced, objective ecological fieldwork practice. To speculate about the emotional valence of a landscape, or the emotional motivations of the deer, is to invite affective empathy into a subjective framing of the research question, in an anthropological mode (e.g., Stodulka, Selim, and Mattes 2018). These interesting places would then double as quadrats for an ecological phase that would look at the collaborative or interactive place making of deer along with other nonhuman species in their sharing of habitat structures over time. That, in short, is what we thought we were doing when we were doing our field methods.

As any scientist knows, the entire intrigue of methods lies in the gap between what you think you are doing, what

you were actually doing, and what the study object interprets you as doing. The evidence we obtained signals a gap—a disturbance in the mesh of knowledge—that is fertile ground for the establishment of some ruderal interpretations. We need not conclude that deer are ghosts nor that our methods are failures. The camera trap videos provided temporally acontextual snapshots that began and ended in the midst of things (in media res, like this patch). Just as the reader needs an intellectual framework to understand our methods, we needed ideas about interestingness to interpret the deer behaviors that we glimpsed acontextually.

Thus, through the very incompleteness and lack of traction of our interventions, we were able to learn something about the structure of their disturbance regime. Trees, deer, and humans are not convivially carrying out a negotiated agreement or stable "disturbance regime" of coexistence so much as strategically disturbing one another's plans, distorting, ruining, and reorganizing each other's ideas of an interesting landscape. The failure of our methods to (re)produce the expected richness of standard forms of evidence showed us how the deer disturb our plans (our methods) by having their own plans that exceed any simple account of them. We were all (deer, research team, hunters) improvising, being destructive, and generally trying to find a delicate balance between fervently attending to the other actors and scrupulously ignoring them, willing the others to render themselves comprehensible (Forssman and Root-Bernstein 2018). Our speculative, playful, subjective, tentative methods allowed us to glimpse fragments of ways and aspects of being deer that cannot be seen through standard disciplinary, objective, reproducible field methods.

Epistemological Disturbance

Disturbance is an integral concept in ecological thought, as it played an important role in the early debates about why species exist in particular combinations and structures in particular places (Johnson 2017). Early definitions relied on an intuitive idea: "disturbance was understood as a rare and transitory event that destroyed or interrupted the natural development or succession of biotic communities" (Johnson 2017, n.p.). Later definitions of disturbance more broadly included any disruption to resources, substrates, or the physical structure of the habitat (Pickett and White 1985). Species that

are specifically adapted to these transitory but common conditions are known as ruderal, or, in common parlance, as weeds.

In contemporary ecological theory, disturbance is rarely explicitly linked to models of ecological change but is enmeshed in clouds of concept boxes and process arrows that cannot generate clear hypotheses or be experimentally falsified (e.g., Vellend 2020; Pulsford, Lindenmayer, and Driscoll 2016). These new theoretical syntheses are themselves resilient to epistemological disturbance: they are so complex and opaque that they cannot be disproven. They capture everything and reveal nothing. The only prediction-generating theory of disturbance remains the aging intermediate disturbance hypothesis (IDH; Grime 1973; Horn 1975; Connell 1978; Figure 11.2). This graphical model predicts that disturbances that are neither very small nor very large

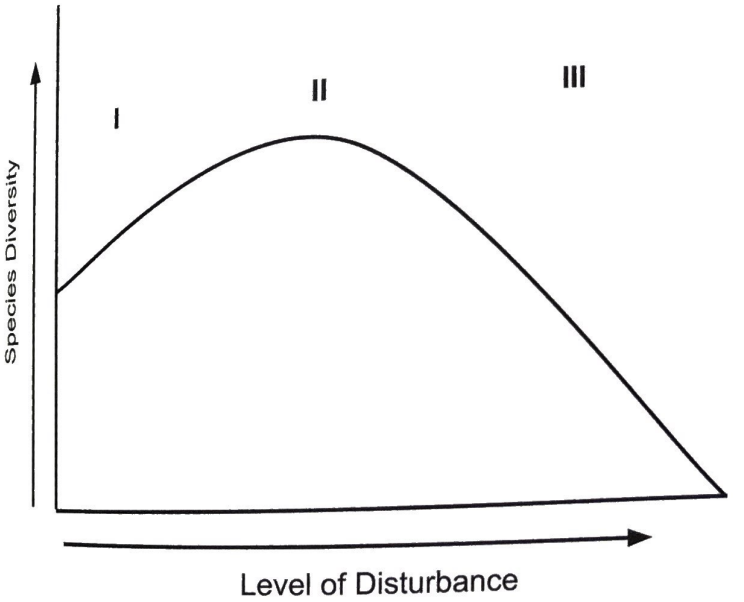


FIGURE 11.2. The intermediate disturbance hypothesis, which takes the form of this diagram. The *y* axis is, in this version, labeled "species diversity," and the *x* axis is labeled "level of disturbance." The three parts of the figure, marked I, II, and III here, refer to different outcomes: II is the famous intermediate disturbance that maximizes biodiversity. Image from Sciencerelatedusername, CC BY-SA 4.0, https://creativecommons.org/licenses/by-sa/4.0, via Wikimedia Commons.

(hence "intermediate") enhance species richness. The size of the disturbance is imputed post hoc by seeing where biodiversity peaks. This theory is generally unable to make correct predictions and thus has been challenged for decades, but without an alternative being proposed (e.g., Waide et al. 1999; Mackey and Currie 2001; Shea, Roxburgh, and Rauscher 2004; Willig and Presley 2018).

One way to frame this theoretical failure is to suggest that the range of relations and processes considered in the IDH is too diverse to successfully generalize about. More specifically, what variables are supposed to be represented on the *x* and *y* axes have been interpreted in multiple ways (see Figure 11.2; Grime 1973; Horn 1975; Connell 1978; Wilkinson 1999; Shea, Roxburgh, and Rauscher 2004; Michalet et al. 2006). What ecologists are trying to describe when they talk about disturbance is thus, in a profound sense, shifting and unstable terrain.

Of course, the demand for precision in meaning is specific to science epistemologies: we do not ask Haraway to explain precisely what is and is not "trouble" and precisely which actions consist of "staying" or how close "with" really is. Ecological data can only be interpreted, and compared to other data, if the methods producing all bits of data are isomorphic. The imprecision and vagueness of the IDF make it impossible to translate into replicable or comparable field ecology methods, which in turn translates into incomparable, unsynthesizable ecological interpretations. The IDF cannot precisely control and efficiently close down alternative possibilities for interpretation and thus gives rise to an unruly epistemological landscape unsuitable for scientific analysis.

The IDF is equally disturbing if we decenter its assumptions. Why, for example, is intermediate disturbance considered "good"? Because there is no inherent scale to the IDH, empirically small disturbances also increase species richness, but by too little to make any human-observable difference, while large disturbances also have similar impacts at large scales, but quite slowly, relative to human temporalities. There is thus a spatiotemporal framing to this concept, centered around human capacities and needs. Disturbance is best when it forms a "disturbance regime" (a pattern of disturbance as a baseline state [e.g., Cardinale et al. 2005; Clark and Johnston 2011]) within that narrow range of comportment where it contributes to the maintenance of a stable, optimized, human-scaled order. A goal of our

methodological experimentations was thus to attend to and highlight that multispecies ecologies also do disturbance in all the most disturbing, normative ways: interactive, multitemporal and multilocated, heterogeneous, incoherent, illegible, contentious, and messy.

PATCH II: AMONG GEO-EPISTEMIC DISTURBANCES

BKL is full of large pits, generally squarish. They are full of water. We walk around the pits. We look for mushrooms. We sketch things. Some of the pits have sides that are very abrupt; others have slopes going down to them that can be climbed. There may be an old refrigerator next to one of them, or a scattering of pinecones, or a newt. The water may be reddish. Some have docks for boats. Some are bordered by sand, some by dense pine plantations, some by grass and paths. We talk to local people about the pits. They tell us that some have been stocked with fish. Some may be anoxic. At one point, some of the fieldwork team puts on impermeable gear and, kitted out with buckets and other scientific apparatus, wade into some shallow pit borders and take water samples. We measure something or other. We measure pH. We take photographs. This rapidly becomes intensely uninteresting. There is no question to orient our field methods, no framework on which to cobble together something that would resemble something more than anecdote.

Disturbance as method first occurred to me (F.B.)—naughtily—not while I was in my rubber boots, playing with the field methods for BKL as I was supposed to be. The idea appeared to me in my own office. One of the first documents we were given as an introduction to the BKL project was a scanned copy of a geological description of the area. This mentioned Miocene swamps, ancient flora, and geological changes in landscape, but it didn't look much further than the "facts" of science: it did not explore how these "facts" had been accumulated. As someone with a training in science studies, I found this disturbing. I looked for more connections and references to the work that grounded what we were to use to ground our AURA field site. So, disturbance appeared to me as I was digging through old scientific surveys, in the form of a grainy photo in a report addressed to the Danish Geological Society. In the photo, the exposed wall of an open brown coal pit is the main subject, occupying almost the whole scene. Framing the rock

formation were, below, a raft floating on the waterlogged bottom of the pit and, above, the profiles of a few students, busy taking notes and visually joined to the raft through two long rope ladders extending along the machine-cut, steep wall of the mine. AURA was not the only project that had been attracted by the disturbances caused by the brown coal mining: in 1970 and 1971, a group of scientists and students from the Geological Institute of Aarhus University had ventured to the area before us. Their interest in the disturbance of mining was different, though. To them, the freshly dug pits of the recently abandoned mines were opportunities to easily access the sediment profiles at depth, and at no additional cost. As the two leading professors concisely put it in their annual report to the Danish Geological Society:

> field training courses have focused on the lignite beds in Fasterholt; in A/S Carl Nielsen's pit, a survey was carried out in 1970, immediately before the trench was submerged, and in 1971 the outcrops were analyzed in the partially waterlogged Damgaard's southern pit.[3] (Larsen and Friis 1973, 120)

The two sedimentological training programs, taking place as soon as the mining stopped, proved fruitful, as the exposures left by mining offered a great chance for geologists to cheaply and easily collect precious samples. The scientists involved in the training projects brought fossilized remains of plants back to the institute, where they sieved, washed, and carefully analyzed and characterized the pieces and traces of fossilized wood, pollen, seeds, fruits, and leaves they managed to collect. These trips resulted in the description of three important floras characterizing the Middle Miocene in the region: the "Damgaard," "Søby," and "Fasterholt" floras. This little, mundane, and even marginal nugget of history of science caught my attention.

As all AURA members joined in the shared experimental fieldwork in BKL, we had tried to read up on the specificities of this unconventional Danish field site. And as the geological landscape and history of the area emerged as a particularly salient characteristic of the site (as we learned thanks to the work of one of our master's students, Mathilde Højrup, on instability in BKL), I had zealously studied the documents and studies available on the geological past of the area. But these floras, and the Miocene environmental histories of which they offer glimpses, had appeared almost

as mere facts, objective realities of how the territory of BKL had looked *in the past*. Finding out about the training field trips in the 1970s and tracing their own historical dependence on specific disturbances—in this case, the two most recent open pits, dug and abandoned at the margins of the current site of the dump—reminded me of how disturbances actively shape what we know, and what comes to count as nature, as the past, present, and future of a specific landscape. It was the disturbances caused by mining that had made possible the deep geological knowledge of the area's transformations; but it was also previous geological excavation of the area that had identified the deposits that made mining for brown coal possible.

Another, similar dynamic emerged as I followed on the development of the geological characterization of BKL's past. The flora traced through these remains was mobilized to envision other, broader disturbances that preceded the anthropocenic brown coal landscape and that sedimented into contemporary Central Jutland. The minute traces of fossilized plant remains allowed an image of the past to congeal. The North Sea, during the Tertiary, extended inland, in a large basin that opened between the vast landmass that includes the contemporary United Kingdom and the Scandinavian Peninsula and covered a large part of northern Continental Europe. The region of Central Jutland was moving between the seafloor and the coastline, following changes in temperatures and ice cover, climate, seasons, deposition of sediments, erosion, tectonic uplifts, and continental drift. These processes will have acted as disturbances to the flora and ecosystems of Central Jutland, shaping a set of environmental conditions and structures lived in, and mutually shaped by, the flora and other species, in a *longue durée* version of the same story as in patch I.

The three sets of plant remains helped characterize this multispecies détente as taking the form of a warm temperate-subtropical swampy delta, shaped by the ebbs and flows of the area during the Miocene. As leaves, wood, and other parts of the plants fell to the waterlogged forest floor, they were prevented from completely decomposing by the anaerobic and acidic conditions. With time, these partially decomposed materials formed peat, and—as it was buried under the sediments transported to the area as the coastline advanced—the peat was compressed to form the lignite or brown coal layers that characterize the area.

Following the specific disturbance of the Damgaard's southern pit, excavated in the second half of the 1960s and abandoned in 1970, other disturbances appeared, folded inside the very same pit. The ebbs and flows of the ocean, the deposition of sediments, the partial decomposition afforded by the swampy environment, the transport of plant material along with the current, the pressures of sediment turning moss into peat and peat into brown coal—all these events may be represented as disturbances to other ongoing processes that they interrupted. The traces of old disturbances bring into being new ones, and geological strata and epochs echo each other in often subtle and almost unnoticeable ways. There is no original landscape.

Notice how this claim is radically different from the IDH. The IDH claims that material-transformation events perturb a system away from a baseline because disturbance essentially wipes out all pertinent ecological conditions: disturbances take you back to zero every time. There is thus no accumulation of structure or order and no historicity or history in the IDH vision of disturbance ecology. The IDH fails to imagine a baseline that is shifting, multiple, accumulating, and interactively constituted.

This slippery and accumulative quality of disturbance interrupted my repose on the side of the field, when my boots were happily exchanged for comfortable slippers in my study as I pored over archival material. Like the geological reading of disturbances as closely interrelated and complex series of events, learning from disturbance as method in this case means attending to the specificities of how disturbance shapes the conditions of how and what we know and simultaneously of how our knowing disturbs the world constantly. Our knowledge practices cannot be separated from disturbances and their dynamics but always need to be excavated in their complex relations.

It is also the case that to find what is interesting about a field situation, one cannot politely tiptoe around; one needs to disturb arrangements, dig things up, and see what may be hidden or how the system reacts. This played out as methods when, with Colin Hoag and Nils Bubandt, we decided to focus part of our ethnographic fieldwork on AFID Fasterholt, a recycling facility situated by the brown coal beds. Originally established in 1979 as a landfill, the dumping site—to which we familiarly referred as "the dump"—was chosen because of the devastations already brought to the area by mining (Figure 11.3). But, as we soon understood was critical, it was conditioned

both on the presence of other pits in the ground and on the absence of a pit in that particular spot: a disturbance history shaping the form of another disturbance. As the Ministry of Environment stated, "the deposition of waste in the area was considered justifiable, because the groundwater and the water in the lakes and streams were already heavily polluted by chemicals following decades of brown coal digging" (Miljøcenter Aarhus 2009, 7). Furthermore, and perhaps ironically, while the disturbance of mining in the area justified the choice, the ground underneath the landfill was appropriate because it had not been excavated, and the intact brown coal and clay layers were supposed to help in preventing the leaching of pollutants from the landfill. Elsewhere (Hoag, Bertoni, and Bubandt 2018), we showed how the historical disturbance of mining animated the flourishing of marginal forms of life and life-forms at the dump. Importantly, disturbances in the dump were not just a matter of industrial archeology and environmental history: they

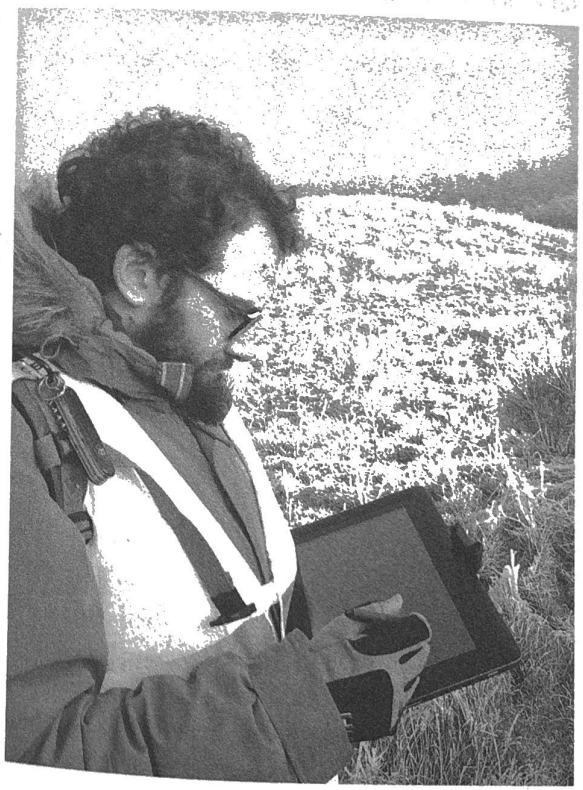


FIGURE 11.3. Filippo Bertoni at "the dump." Photograph by Pierre du Plessis.

were very much what the present ecologies of the dump were all about. As the site currently focuses on composting, a large part of the recycling process at AFID Fasterholt was about controlling and managing disturbance to transform waste into nutrient-rich soil by exploiting microbial succession and taking over their metabolisms.

Wearing rubber boots can only be understood in the context of wearing slippers, and vice versa. The choice of subject (e.g., the dump), the reification of certain things as objects taken for granted (the ground, the vegetation), the interpretation of the significance of subjects and objects (what do pits tell us?), and so on are methodological acts just as much as taking water samples or sketching pinecones are. We could not ask interesting questions of the landscape that the abandoned mining pits formed, or what the absences of pits might mean, without disturbing the framing of our initial fieldwork through digging up archival material underlying the assumptions on which we based those initial field explorations. The pits were not boring, but their interestingness relative to our multispecies landscape questions was not yielded to us through naive empirical observation.

A Recent Ecological Innovation in the Concept of Disturbance

Although not rising to the level of a novel theory making testable hypotheses, one new conceptualization of ecological disturbance deserves our attention because it has implications for disturbance as method. Jentsch and White (2019) claim that disturbance events are multidimensional or multifactorial transformations of biomass and are thus always inherently pulse/disturbance events—where a pulse is the ecological term for a beneficial increase in some resource. All disturbances simultaneously provide some resources for some actors, while reducing other resources for other actors. They alter the balance of multiple resource distributions across space and time. Ruderal species, after all, do not thrive in an absolute lack of resources but are those species that are able to requalify death, disorder, and excess as "pulses" of material that can be recycled and valued. If we use Jentsch and White's pulse/disturbance conceptualization of ecological disturbance to think about disturbance as method, we can ask what intellectual resources are created, but perhaps overlooked, when we alter or reinterpret practices.

Patch III: The Manifestation of Affective Disturbances

In fall 2019, I (K.O.) visited a pig farm not far from BKL with my colleague Inger Anneberg. We went to the farm in the morning and arrived at just about nine, as we had agreed with the farmer. This allowed us to go to kaffepause with the farmer, Troels, and his employees. They all removed their farm clothes (coveralls) when they left the barn and took off their shoes. They came into the farmer's kitchen, and we all sat down at the table for coffee, bread, butter, jam, and liver paste. One farmworker is Ukrainian, the other Romanian. Troels took us into the barns afterward. We entered a small hallway, where we could either put on sanitary foot coverings or wear some of their rubber boots. After we put on sanitary coveralls, we went to the farrowing unit. Troels walked us through and talked about some experiments he was doing with rearing arrangements. Later, we followed workers as they did castrations (Figure 11.4).

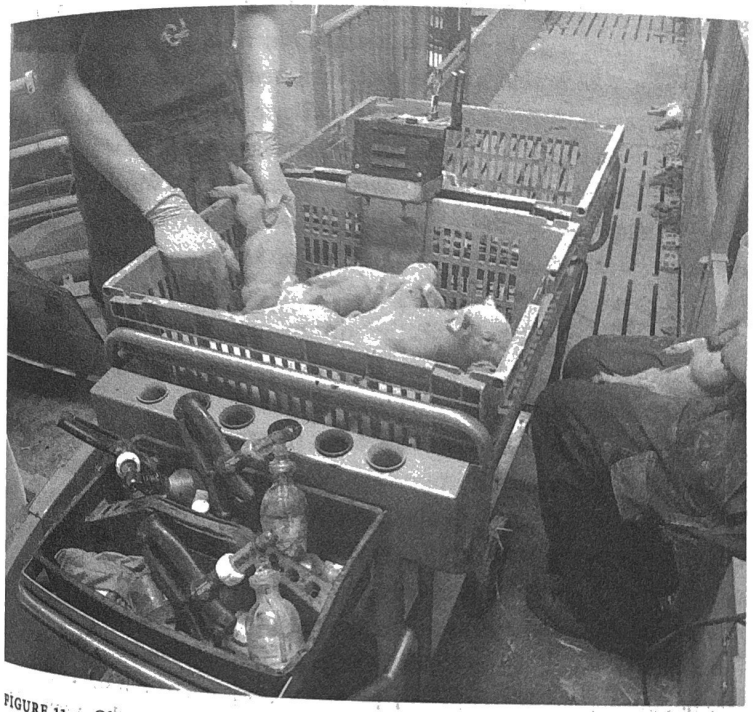


FIGURE 11.4. Observing piglet handling by workers at the pig farm. Photograph by Katy Overstreet.

The young worker from Romania allowed us to follow her as she inseminated pigs and then helped out in the farrowing section, where sows give birth and nurse piglets until they are old enough to be weaned. Lining the walkways between the enclosures were the dead bodies of newborn piglets. I saw that one piglet was still moving and struggling on the side of the walkway. I pointed out that the piglet was alive. The farmworker walked over and, with little surprise or change in manner, picked up the piglet, pointed out to me that the piglet's head was oddly shaped, and then, holding it by the legs, swung the piglet hard against the cement floor. She did so almost without pausing in what she was saying. She looked again at the piglet, hit it again against the floor, and then replaced it along the edge of the walkway. Moments later, she plucked a living piglet from an enclosure and put the piglet in my arms, cooing to the piglet in an affectionate way. While I held the warm and grunting piglet, she described how she loves working with the piglets because they are "very cute."

To say that I was disturbed by the disjuncture of that moment would be an understatement. But I was not disturbed by the actions of the Romanian farmworker. I knew that she was well respected by the farmer and her colleagues for her work and her patient handling of the pigs. Indeed, her way of killing the piglet is standard in the industry and is largely held to be the humane way to kill piglets under five kilograms (Grist et al. 2018). Yet the clear lack of emotion in that act and the bucket filled with bloated piglet carcasses and flies outside the door to the farrowing unit demonstrate the normalization of this kind of death.

Attention to affect and affective disjuncture is an ethnographic field method that has gained attention in recent years (Thompson 2014; Kundsen and Stage 2015; Stodulka, Selim, and Mattes 2018). One of the benefits of directing attention toward emotion in this way while in the field is that emotions indicate what is important, what matters, what is interesting to think about further. We have already seen this twice in the other patches in this chapter: our difficulties in interpreting deer emotions and our possible or partial failure in being interesting to deer and our boredom in an underinterpreted and undercontextualized field of "givens" consisting of abandoned mining pits. Of course, the field of the pig farm is not in BKL, and the visit was not during the BKL fieldwork period. We argue that it was, nonetheless, part of our methods of understanding BKL. It was the making-sense clue that allowed us to revisit our fieldwork practice in memory and write this

chapter. If the slippers phase of methods that we discussed in patch II looks to the historical contextualization of the site and comes before (because it creates or allows) the development of interesting field methods, the sanitary-shoe-coverings phase of fieldwork comes after and allows us to reinterpret our own field methods. The Bermuda triangle of methodology, that space between what you think you were doing, what your critics claim you actually did, and what the study object interpreted you as doing, is not a fixed and eternal hole in the landscape of epistemology. One can also, and indeed perhaps must, reinterpret one's own actions in the field in light of later actions in other fields, adjusting the contours of the unknown, the unknowable, the mistaken, and the unrecognized.

Although it was unpleasant to witness the dispassionate killing of a piglet, being disturbed by death is not what we are arguing for. Instead, this aspect of disturbance as a methodology means attending to the normalization of the present to defamiliarize, contextualize, and make space for an otherwise, even while cultivating a deep understanding of how this moment and place came to be. In the case of pig farming in Denmark, the killing of piglets such as this one is connected to a national-corporate project aimed at leading the world in pork productivity.

Denmark is one of the leading exporters of pork in the world and is considered to be a gold standard in pork production in terms of environmental, animal welfare, and hygienic standards. As part of the national and industry push to lead in pork production, breeding farms in partnership with SEGES (Landbrug og Fødevarer) have developed "hyperprolific sows." Hyperprolific sows gestate more piglets than they can feed. In Denmark, this means that conventional sows give birth to an average of just over seventeen live piglets, but sows have only fourteen teats. Furthermore, many piglets are "undercooked," as the Romanian farmworker put it; larger litter sizes tend to mean that many piglets are born premature or with abnormalities that prevent them from thriving. And these piglets, as the law dictates, should be killed humanely through a hard smack on a cement floor.

This might be called the national-corporate production of vulnerability. Danish pigs, and industrially bred and enclosed pigs more generally, are vulnerable to numerous diseases and injuries. These vulnerabilities necessitate intensive forms of biosecurity that in some contexts dictate—through corporate hegemony—the social parameters of human workers' lives (Blanchette

2015). In Denmark, this vulnerability is the justification for a controversial border fence across the border between Denmark and Germany. In 2018, the Danish Parliament approved the construction of this fence to prevent the entrance of wild boars and thus African swine fever into Denmark. Denmark completed the border fence in December 2019 despite criticism by wildlife advocates and parties concerned over the implications for human migrants. In a *New York Times* article on fence construction, Bent Rasmussen, the project leader and a forest manager with the Danish Nature Agency, is quoted as describing his job in this way: "my job is to disturb the wild boar as much as possible and humans and other wildlife as little as possible" (Sorensen 2018).

Although there are no pig farms in BKL, the biosecurity needs of pig farms thus shape wildlife and ecologies of all of the Jutland peninsula, including BKL. At one point, I went on a common hunt at BKL, accompanied by another research team member, and we followed along with a man hired by the landowner to do upkeep. We were talking about eating the deer and how bad the stags taste in mating season. He mentioned that he wished there were wild boar to hunt, because they taste so good, but that the pig agricultural industry is so powerful in Denmark that it will never be allowed. The hunting forest is thus shaped by the absence of wild boar (a species moreover known for its disturbance activities that structure habitats; Barrios-Garcia and Ballari 2012), harassed and excluded from Jutland to maintain domestic pigs in a state of stabilized vulnerability.

The emotional disjuncture that calls attention to the normalization of death within the pig farming system, its precarious excess and hyper-exclusionary landscape making in relation to outside agents—farmworkers, viruses, wild boar—also calls our attention to other moments in other fields. Even though the hunting forest of BKL is a landscape arranged around death, a rich and uncontrollable life is shaping its own conditions of being and dying in the contested spaces between hunters, forest cover, and deer (Forssman and Root-Bernstein 2018). We might see killing as the act of greatest signification that structures every move, every land management method, undertaken by the hunters in the forest. But actually it is not the act of killing but the method of *hunting* (independently of the success or failure of killing; Forssman and Root-Bernstein 2018) that structures the forest and the

hunters' knowledge of deer and forests. The act of killing piglets on Danish pig farms does not hold the same epistemological structuring role: there is no space (or time) between the production of an excess of piglets and humane killing methods, in which a complex landscape of desires and emotions, designs and counterdesigns of farmworkers, farm infrastructure, viruses, wild boar, and pigs can emerge.

There is, for sure, experimentation and methods development going on in the world of the pig farm, but our attention is drawn to how the possibilities and practices of their enactment are different than those in the hunting forest. Specifically, the enactment of methods in the field that do not leave a space of ambiguity between what we think we are doing (e.g., when we try to kill an animal), what the object of our method itself (the deer, the pig) thinks we are doing, and what some other actors (the trees, the wild boar) think we are doing is not generative of new understandings and ways of being. Our argument here is not specific to killing methods, and in any case, we can point to the close historical-epistemological links between methods of obtaining animals and plants for food and more general methods of learning about the world (Gell 1996; Liebenberg 2013). All methods that close down alternate possibilities through extreme efficacy do not generate the ambiguous, unresolved options and opportunities necessary for multispecies making and understanding of the world.

The sanitary-shoe-coverings phase of our methods tells us that methods that work perfectly on terrains that are stable and well defined merely reproduce and accumulate knowledge that we have already mastered and controlled, like so many pork chops. Thus what we describe doing in this chapter is methods, even if it looks like a failure of methods. It also answers our first question: to allow multispecies Anthropocene worlds to flourish, and to perceive them, we need to avoid highly effective, established, repeatable methods. The problematic ecological imprecision of the IDH is where we find the space of ambiguity to develop new interpretations. Furthermore, if we think of the pulse/disturbance concept introduced by Jentsch and White (2019), we should understand that for every upset, every failure, every boring abandoned mining pit—every discontinuity in whatever you thought was the local baseline of the world—there is a set of alternate affordances that can be reinterpreted as resources: resources for doing-otherwise

and for understanding-otherwise. These are the ruderal resources that we were gathering with our undisciplinary and underdisciplined hodgepodge of methods.

Conclusion

In this chapter, we wanted to stay with the trouble of the rubber boots metaphor, to be troubled by its implication that methods and fieldwork are identical terms or that methods can be meaningful without reference to epistemology. We argue that disturbances to our expectations about how methods will yield insight do not just form failure or garbage but can be reinvented as intellectual resources for thinking differently. Like the impatient land manager for whom a big disturbance takes too long to return to high biodiversity, you may well ask, Where is the big intellectual payoff? What is the concrete result these vague and unconvincing methods have yielded? Overturning ecology and anthropology will not grow back as a new interdisciplinary field within a mere five-year project. Yet BKL disturbed us on multiple levels. It disturbed us in the field, on the farm, and in the archive. It disturbed our expectations about understanding other species through observational field practices; it disturbed our perceptions of what is an interesting or a boring study object; and it disturbed our notions of what is upsetting about killing animals. But we learned much more than how to observe, be interested, or be upset differently. We also learned about the relationship between methods that close down possibilities of being surprised and engaged by the study subjects and those that playfully open up such possibilities. Several years later, we can still make out the traces of these open methods in our epistemological landscapes.

Notes

We thank all our interlocutors in the field as well as the other members of the BKL fieldwork team with whom we collaborated. Pierre du Plessis in particular assisted with fieldwork and helped shape some of our thinking. We also thank the editors for their engaging comments, which improved the chapter.

1. The red deer team included Pierre du Plessis, Natalie Forssman, Katy Overstreet, and Meredith Root-Bernstein, with support from Mathilde Højrup.

2. All of the interlocutors' names in this chapter have been changed to preserve their anonymity.

3. My (rough) translation. Here is the original: "Herunder har et par feltkurser været henlagt til brunkulsgravene i Fasterholt; i A/S Carl Nielsens grav blev der således i 1970, umiddelbart før graven blev sat under vand, gennemført en opmåling, og i 1971 opmåltes lagserien i den delvis vandfyldte Damgaards sydlige grav."

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