about the research partners – the environments – and thus has the capacity to reveal social conditions. Conversely, what I filter *in* as part of a thick description in biology is filtered *out* for scientific validity. While Michael works in his office, purifying his empirical data and formulating his findings, I am sitting in my office, attempting to enrich my text with sensory descriptions of the field situations in which I found myself, along with Michael, in the spring of 2015 and 2020. I am not doing this as an author of a novel, but to allow my audience to engage with what I encountered during my fieldwork as precisely as possible, while being aware of my partial perspective, the only perspective I can have. With this, I attempt to add one piece to the puzzle of scientific work that usually remains a mystery to people outside the scientific community.

6.3. Thick Description by Means of Visualisation

I introduced the metaphor of filters to offer a new perspective on what Latour and Woolgar called 'cascades of inscription'.[29] The metaphor was used to understand the practices of knowledge generation in my case study differently. The concept of filtering is useful to attend to the practices, thus analysing the processes of data collection rather than independently analysing the results. However, this metaphor also has limitations and disadvantages. The concept of filtering is often closely related to refinement, purification, and essence, thus affirming the notion of improving and optimising the data. As I have attempted to argue, this process of filtering – and the *purified* results – while inevitable for knowledge production in evolutionary biology, is, from an STS perspective, closely related to a *poor*ification of data: the loss of complexity. One could also call it

29
Latour and Woolgar, *Laboratory Life*, 21.

a *thinning* of the data, with reference to the ethnographic method of thick description, as certain layers of information are filtered out.

Thus, filtering works as a productive metaphor only when viewing it *critically*. Otherwise, it affirms, in the natural sciences, an ongoing paradigm of objective data as data that appear neutral, that are not ambivalent, and represent clarity. However, I would like to emphasise that it is precisely the unfiltered, *dirty*, and *messy* data that make knowledge production in the natural sciences interesting. They allow one to complexify what has been simplified. For this reason, I conclude this chapter by suggesting the concept of a *multimodal thick description,* that is, a combination of the different (raw) materials that result from the process of knowledge generation among evolutionary biologists.

As I have illustrated in this chapter, data have different qualities when viewed from different epistemological perspectives. They enable different thoughts, tell different stories, and produce different insights. Therefore, I subjected this material as arte*fact*s of a process that aims to produce facts from an STS perspective and suggest a different way of viewing it. In so doing, I wish to address the effects of treating certain data as *waste products*. More precisely, those data are treated as a *residue* because materials that are filtered out do not *go to waste,* but are stored in the archives, a prerequisite for conducting my research. However, this biological residue does not become part of the analysis, and it is neither interpreted nor reflected on. It is filtered out.

By reintroducing these raw field materials into the discourse, I offer a dense presentation, a thick description, of the scientific knowledge production. In so doing, I also reveal the different modalities that accompany the scientific process. With this, I shift the perspective from *what* is thought to *how* the thinking occurs. This shift further al-

lows transformation from a representational perspective to a performative one that focuses on the processes rather than the results. Rather than viewing the knowledge production in this study as a linear process from bird to data via visualisation, studying the overall dataset provides an understanding of the relationship between the different data materials as entangled networks. In them, the relationship between research objects, artefacts, and biologists becomes visible, as they form the basis of knowledge production, one of the most important aspects of making scientific sense of the world.

In ethnography, thick description is understood as a detailed account of the ethnographic observations that 'bring us [the audience] into touch with the lives of strangers',[30] 'what generality it contrives to achieve grows out of the delicacy of its distinctions, not the sweep of its abstractions'.[31] To attend to this 'delicacy of distinctions' requires considering what made the observed practices specific rather than generalising them into abstractions. Applying this to my case study means combining the datasets and the practices that lead to them. Rather than studying them from the *outside* and generalising them, thereby creating abstract representations, a thick description means the opposite: immersing oneself in the research conditions to study them from the inside and create a thick, detailed representation. Instead of filtering them out, my aim was to offer a *thick* account of the biologists' reality that, as declared in my introduction, brings epistemological and ontological invisibilities to light.

I conclude my discussion on the concept of a multimodal thick description by referring to the concept of infrastices, suggested by Ingold and Anusas: 'Western industrialized design produces objects by dividing surfaces from what we call "infrastices". By infrastices we mean all manner of

30
Clifford Geertz, *The Interpretation of Cultures* (New York: Basic Books, 1973), 16.
31
Ibid., 25.

electrical, chemical, and mechanical workings; their parts, structures, and conduits; and the energies, gases, and fluids they carry.' In a footnote, they add: 'We have coined the term "infrastitial" here (from infra = "below, beneath" + stare = "stand") as an alternative to "infrastructural", to avoid the latter's connotations of foundational support. From this, we derive the terms "infrastices" and "infrastitiality"'.[32]

While these authors are mainly referring to the hidden characteristics of objects beneath the surface, I would like to appropriate this term for my research in a more metaphorical way by suggesting that 'infrastices' are the production conditions (situated mediations) that lead to opaque surfaces; they may become invisible but are still inscribed on them.

I argue that the final graphs, even the raw, digital Excel data plots, lack infrastices. They are opaque surfaces that separate the sources of data – the birds – and their results. This final visual representation does not allow even a glimmer of the birds to shine through. It is entirely separated from the ontological space in which the data originated and has been moved to a new ontological and epistemological space that follows the logic of scientific rhetoric, image production, and representation. Accordingly, when taking the infrastices seriously and examining them, they can help change the status of scientific graphs and models as evidence towards the result of graphical operations with their origin in a research subject, the Siberian jays.

Visualisation is the interface between the sciences and the world, and a particularly important aspect of knowledge production. Currently the predominant instrument for presenting evidence, the visual way in which knowledge is transmitted influences how we think about the world. The scientific audience is usually confronted with the end of the life cycle of data, which, from my perspective

32
Tim Ingold and Mike Anusas, 'Designing Environmental Relations: From Opacity to Textility', *Design Issues* 29, no. 4 (2013): 58, https://doi.org/10.1162/DESI_a_00230.

as a designer and STS anthropologist, has become *dead* material, when compared with the raw material that led to it. This book can be understood as a multimodal thick description that addresses the different senses the biologists engage with during the research process, makes the biologists' standpoint clear, reveals the selective nature of knowledge production, illustrates the notion of thinking in practice, and situates the research.