Epilogue

I am in my office in Zurich in September 2021 on an online call with Michael and two of his PhD students: Camille, whom I met during my fieldwork, and Andrea, whom I have not met before. They are currently doing fieldwork in Sweden and Michael is joining the call from his home office in Switzerland. During our meeting, it suddenly strikes me that the conversation between the three biologists relates to what, in hindsight, could be viewed as a paradigm shift in their methodology.

The biologists are using new terms in their discussion of the fieldwork. They are discussing 'artificial intelligence', 'pipelines', and 'algorithms'. These are concepts that, until now, I had rarely heard from Michael. I struggle to follow their conversation, which makes me realise that this group of evolutionary biologists are undergoing a transformation prompted by AI, not only in their analytical practices in their offices but also in their fieldwork, situated mediations, and filtering practices. What had, until now, fascinated me from an STS perspective – the remarkable resistance to using digital technologies in data collection and processing, which led to the extensive use of seemingly anachronistic practices in this evolutionary biology study – has suddenly changed.

Henceforth, the main task during fieldwork will be to produce video recordings of the birds' interactions in a manner that allows analysis not through human filtering but by AI. To achieve this, the video recordings must be produced in a more formalised way and human observations must be-

come secondary. The biologists will have to follow a strict protocol for recording events in the field so that the AI can filter them, produce datasets, and further quantify the birds. In short, the AI will replace the biologists during the second layer of filtering, while the way in which the data are produced in the first layer will be geared towards the AI's ability to process them. The biologists' main task will be to develop and apply the correct code to the data plots to model them.

The shift I refer to here is one from human labour, sensory engagement, and intelligence towards the automation of data collection, and particularly filtering. While, until now, the filtering processes were conducted by the biologists themselves, in conjunction with certain tools, these processes will now be taken over by technology, further obscuring them as they disappear behind an algorithm. Once their AI has been sufficiently trained, the biologists would not even have to view the videos themselves, as they will be directly translated into datasets by the AI. In addition, the only witnesses to the events that will be transformed into data will be the biologists who made the video recordings in the field.

From the biologists' perspective, this represents substantial progress in their data processing and their research in general. Soon they will be able to process and analyse a much larger dataset, address different research questions, and increase their research output. They will further quantify their field data and, among their scientific peers, their data will appear even more robust. Now, AI can even analyse previous video material collected over the years. However, this will be possible only if the video files are suitable and the AI has been trained to analyse them, a process that could take months or even years. On this video call, Michael mentions that his research group will be the first field biologists to work with AI data analysis. Until now, this practice has been performed only in laboratories under controlled conditions.

Now I consider it even more important than ever to attend to the ways in which knowledge has been constructed in this study. By focusing on the practices from a sensory and bodily perspective, I hope to have provided more transparency about the conditions of scientific knowledge production. However, having emphasised their role in knowledge production, the biologists should reflect on this when these practices are replaced and their scientific work is digitalised. There are informal aspects that may not directly influence the data itself but do affect the data-collection process and the fieldwork, and thus should not be overlooked or replaced. One such aspect is the behavioural observation protocol, an important tool for training vision. The general sensory engagement with the field is also important for making observations in the first place and, based on empirical observations, developing new questions.

Lastly, as Michael himself emphasised recently, the role of humour and joy during fieldwork should not be underestimated. As this component of data collection can become partly redundant and potentially boring, the biologists' attention and capacity to focus may be affected. From this perspective, it is important to keep the biologists busy during fieldwork and maintain their attention through focusing media, such as notebooks and protocols that frame observations and train the eye. However, there is another aspect to the joy of doing fieldwork: it attaches the researchers to the field (i.e. *nature*). They gain explicit and implicit knowledge about the natural world, learn about processes, entanglements and dependencies, and eventually understand how life on earth is interdependent and why humans are dependent on ecosystem services.[1] Fieldwork might be one reason why scientists become activists, standing up for the conservation and protection

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Emilie Crouzat et al., 'Researchers Must Be Aware of Their Roles at the Interface of Ecosystem Services Science and Policy', *Ambio* 47, no. 1 (1 February 2018): 97, https://doi.org/10.1007/S13280-017-0939-1.

of nature. Scientists, often from societies with higher CO_2 emissions, constitute a small group of reliable protectors of nature, alongside, for example, Indigenous societies. Scientists' voices are particularly important when it comes to defending global change because their activism stems from a deep and substantial understanding of nature and its entanglements. I suggest that the depth of understanding derives from seeing challenges associated with climate change, biodiversity loss or ecosystem shifts in their results, and from being emotionally attached to the field. I have heard natural scientists speaking about nature as 'their one god', 'the only thing that brings them ease', or 'the place where they find spirituality'.

If fieldwork is reduced or stopped because the biologists have made themselves redundant, CO_2 emissions might be slightly reduced, although big data and AI also have significant CO_2 footprints. However, stopping fieldwork may come at a price: the attachment to nature may change to detachment. Scientists might lose their oversight of the importance of protecting the environment, thus contributing to, rather than defeating, the acceleration of global change.[2] In addition, this detachment might not just be from nature but also from other social beings such as fellow researchers because, as described earlier, fieldwork occurs in highly complex social settings, different from those of office work. If field scientists turn into informaticians, they may become more and more detached from their social surroundings and turn their attention towards big data sets. Big data has implications for the biologists and their practices. While, until now, the skills and education of field biologists were required for this research project, henceforth, the ability to handle big data, programming skills, and literacy with digital tools will be required; thus, scholars with an education in bioinformatics will be needed. Biologists are

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Masashi Soga and Kevin J. Gaston, 'Extinction of Experience among Ecologists', *Trends in Ecology & Evolution* 40, no. 3 (March 2025): 212–15, https://doi.org/10.1016/j.tree.2024.12.010.

no longer entering the field. They do not need to be able to identify the Siberian jays, register them, observe them, or document their behaviour. They do not need to *prepare* and *collect*. They must only *produce* by programming an algorithm and training the AI. The focus of the research project is thus no longer on the collection of data, and more resources are being invested in processing these raw data and obtaining as much information as possible.

However, speaking again in 2025 to Michael and the co-PI, Miya, I gain an additional perspective. Having thought about AI in the Siberian Jay Project over the past couple of years, Michael and Miya agree that AI and technologisation, in general, lead to what they call a disconnect. They use 'disconnect' to mean a lost relationship to the field, the birds, forests, and the mud, eventually to the natural world. To them, even after the introduction of AI, fieldwork still means 'to get your hands dirty, to expose yourself to nature, and to be out there.' While the high-resolution technical data are helpful for their research, they still consider it vital to maintain a social-emotional relationship with what is in front of their eyes: 'reality', as Michael calls it. Otherwise, *we,* as a society, run the risk of losing touch with the real world, which must be avoided given the problems of our times.

Returning to the quotation by Haraway in Chapter 1, the matters, stories, knots, thoughts, descriptions, and ties of knowledge production will change with this technological development. New questions will arise in relation to how knowledge is produced, what kind of skills and tasks can be delegated to an AI, and how the meaning of the field is shifting. This text lays the foundation for addressing questions of big data, the digitalisation of research, and the shifting role of biologists themselves. These topics are not part of this project, but I consider them worth studying in the future, as they once again shift the epistemologies, ontologies, and ethics of knowing.