**Fieldwork in the Anthropocene.
On the Possibilities of Analogical Thinking between Nature and Society**

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1. Introduction

The planetary climate crisis and biodiversity loss have engendered many effects on the organization and the understanding of knowledge practices. Social and natural scientists agree that the 'Anthropocene' might replace, in the long run, 'modernity' as the core concept for the description of contemporary eco-societies (Folke et al., 2020). However, the Anthropocene will remain a 'poisoned gift' to the humanities (Latour, 2014) if the effective entanglement of nature and society for which it stands remains unnoticed on the level of practical knowledge exploration. The 'practice' and 'pragmatic turns' by the turn of the millennium have indeed been reshaped through the ontological unsettling of the dualism of 'nature' and 'culture' (Blok, 2019; Descola, 2013). Consequently, some scholars have shifted their approaches from observation of towards collaboration with the natural sciences (Bieler et al., 2020). This is particularly visible through the international success of science and technology studies, followed up by an abundance of new 'studies' movements, linking, for instance, human-animals, hydrosocial worlds or multispecies concerns.

Therefore, today, and even more facing the Covid-19 pandemic, an interdisciplinary sensitivity takes into account the epistemic upheaval of the Anthropocene. As the global ecological movement suggests, such accounts could foster better knowledge for sustainable futures. However, their still fragmented academic organization counteracts intellectual progress. In this paper, I want to address this topic through a pragmatist query about the possibilities of analogical thinking between nature and society. I present an ethnographic journey, starting in a taxonomist's laboratory on biodiversity research towards an experimentalist revision of fieldwork, relating biologist and sociologist modes of reasoning. Analogical thinking refers to the idea of interdisciplinary dialogue and mutual learning by searching for conceptual and methodological connections between these disciplines (Barry and Born, 2011).

Field studies have grounded and anticipated the emergence of the natural and empirical cultural sciences since the late 19th century. Regardless of the vibrant debates on the constitution and the methodological challenges of fieldwork in the humanities (Bourdieu, 2001; Hastrup, 2014; Marcus, 1995; Star, 1999), however, the historical kinship between naturalist and sociological fieldwork has

been somewhat forgotten. Instead, it was the 'lab' which became a frequent topos to describe eco-social worlds and their particular enactments. The 'lab topoi,' explored notably through science and technology studies epistemics, includes the idea of "laboratizing and de-laboratizing the world" (Guggenheim, 2011), experimentalist approaches to the encounter between the natural and the social sciences through reflexive "co-laboration" (Niewöhner, 2016), or "real-world-labs," promising to transgress interdisciplinarity towards participative transdisciplinary research (Engels and Walz, 2018; Groß et al., 2005).

Some of these empiricist approaches retrace, though often rather implicitly, classical pragmatist philosophy, inspired by experience-based practical reasoning. Pragmatism for John Dewey and Charles S. Peirce consisted of the translation of laboratory logics into modes of dealing with the general challenges of humankind (Dewey, 1984; Peirce, 1997). Dewey's procedural evolutionism was particularly committed to the idea that an "experimental theory of knowledge" could learn from naturalists through analogical thinking (Dewey, 1906). Following the paths of William James' "radical empiricism" (James, 1922), Dewey aimed to provide analytical foundations to reconcile empiricism and rationalism. This reconciliation, for Dewey, would link nature and society through the heuristics of the naturalist's experiment, where ignorance and uncertainty fuel new and previously unknown terrains (Dewey, 1983). However, this partly simplified idea of cross-disciplinary transposition is of striking actuality today, where the planetary entanglement of science and society engages citizens, scholars and experts to address the environmental uncertainties of our times (Chakrabarty, 2021; Latour, 2018; Nowotny, 2016).

While the pragmatist renaissance by the end of the twentieth century helped social theory to promote actors' transformative capacities and nonhuman involvement in social enactments (Boltanski and Thévenot, 1999), the often overstated anti-structuralist gesture (Descola, 2013: 91) discarded analogical thinking. The humanities might miss opportunities to acknowledge naturalist's own experimental enactments by discharging social analysis from analogical thinking as a heuristic tool. However, while the lab expressed a sociologist 'cautious welcome' of the natural sciences through the, though partly contested, Anthropocenic framework (Lidskog and Waterton, 2016), an interdisciplinary renaissance of 'the field' within the natural sciences is also given voice (Burt and Thompson, 2020). Geographers, botanists, geomorphologists, zoologists and meteorologists stress the importance of qualitative description, improved sensitivity and experiential knowledge. They counteract the overwhelming material, financial and epistemic hegemony of system analysis, molecular genetics or satellite remote sensing. Such concurring developments testify to the intriguing dynamics within the natural sciences and particularly within the domain of taxonomic

biodiversity research, on which I will focus here. They shed a light on the possibilities of analogical thinking and their social-theoretical consequences in the Anthropocene. Before inviting the reader to join me in the empirical grounds of my experimental approach, I will address this dynamic transformation through a brief overview on the issue of biodiversity loss.

2. The Biodiversity Crisis: Challenges for the Natural and the Social Sciences

By the end of the 20th century, world society had become aware of the alarming planetary limits of the modern exploitation of nature. The UN Conference on Environment and Development in Rio de Janeiro in 1992 was the first transnational convention to introduce the idea of saving and conserving terrestrial and marine biodiversity in the public sphere. Men's modern degradation of nature, it turned out, impacts nature's fate more than ever, and much more than evolution could handle. Geologists named this epochal shift the "Anthropocene", where "humankind has become a global geological force in its own right" (Steffen et al., 2011: 843), assuming that "earth systems are seen to be decidedly 'post-natural'" (Brown, 2019: 107). This 'post-naturalism' has been assessed, along with climate change, through "the sixth extinction" of earth's biodiversity (Kolbert, 2014). Since the turn of the millennium, transnational, academic and public attempts to improve global biodiversity assessment and, simultaneously, mitigate biodiversity loss have accelerated on a formerly unknown scale.

2a. Ontological Analogies

The ontological outsourcing of nature and technology from the domain of society and the outsourcing of society from the domains of nature and technology (Beck, 1992; Latour, 1993) have proved to be not only an outdated but a most dangerous modern reality. Hence, 'biodiversity,' as a term, transgressed the boundaries of biological research on life's inventory on earth and became a normative and, thus, a societal issue. What were the consequences of the biodiversity-crisis for the natural sciences, on the one hand, and the social sciences, on the other? The use of the term 'analogy' seems appropriate here. Stemming from biology, analogy embraces a structural resemblance between two entities; a resemblance which originates, however, in different histories. In contrast to homology – a term Pierre Bourdieu (2001) frequently employed in his theory of the field – it is not the structure itself that facilitates the resemblance but the way in which resemblance is enacted. Transposed to the natural and the social sciences, the analogy lies in their respective ontological transformation.

Figure 1: Ontological Analogies between the Natural and the Social Sciences

1a. Modern Division of Labor between the Natural and the Social Sciences

1b. Ontological Enrollment in the Age of the Anthropocene

Figure 1: Ontological Analogies between the Natural and the Social Sciences

While biologists provide the necessary data to assess the scope and the sources for biodiversity loss, impacted notably through human societies, social scientists today have integrated nature and nonhumans into society. Consequently, the modern division of labor between nature and society underwent an analogical “enrollment” (Callon, 1999: 74) through the global critique of the consequences of the Anthropocene.

While analogical enrollment can be observed on the level of ontology, still, analogy does not mean symmetry. The epistemic boundaries between the natural sciences and the humanities not only remain rather robust, they also tend to increase unequal funding, demarcated disciplinary training and often ineffective intergovernmental action. They are, therefore, obstructive for mutual learning. It is one of the core problems, as Rebekah Brown and colleagues put it, that “so many well-meaning attempts at interdisciplinary collaboration fail to deliver tangible outcomes” (2015: 315). However, the current Covid-19-pandemic teaches us that interdisciplinarity today requires dialoguing epistemic cultures to foster “preparedness” (Keck and Lynteris, 2018). “Preparedness,” in the sense of pro-active engagement into unknown Anthropocenic futures, experiments throughout cross-disciplinary collaborations, which are generally based on heterogeneous ontologies (Keck and

Lynteris, 2018: 10). And this is hard work because it requires time, resources, and curiosity. In other words, where symmetry is scarcely available, the possibility of analogical thinking between disciplinary borders invites experimental enactment.

2b. Enacting Disciplinary Enrollment: Marine Taxonomy in a Museum's Lab

My query regarding the (inter-)disciplinary dynamics effected through the planetary loss of biodiversity started in 2011 from the angle of the natural sciences. I chose the Parisian National Museum of Natural History (Muséum national d'Histoire naturelle: MNHN) as a site. I wanted to understand how the ecological crisis and the political charge of conservation strategies had shaped the everyday work and the ontological configuration of nature as a research object for biologists in one of the world's leading natural history museums. Embracing the social consequences of their findings implied, in my first suggestion, a two-fold ontological shift, firstly, of their very objects of inquiry and, secondly, of the accountability of these objects in terms of sustainable knowledge and conservation governance. How do biologists experience their disciplinary 'enrollment' through society? How do they deal with it?

After several detours throughout the MNHN, I finally gained field access in early 2012. I was received in the division of marine taxonomy, part of the Institute for Systematics, Evolution and Biodiversity, headed by Professor Philippe Bouchet.¹ For two months, I observed notably the team of morphological, anatomic taxonomy in the rue Buffon, and included several trips to the phylogenetic laboratory in the rue Cuvier on the other side of the botanic gardens. Taxonomy is part of evolutionary biology and zoology and, hence, a foundational science. It consists of the determination of life on earth through qualitative, morphometric and genetic analysis, and the classification of living beings in space, time and number. The taxonomists at the MNHN specialized in the assessment of marine invertebrates, i.e. sea mollusks, scallops, crabs and all kinds of spineless small water species. Marine invertebrates constitute about 90 % of all species described and have a fundamental impact on the Earth's ecology. Taxonomy represents an interesting case to study to understand the current disciplinary dynamics for three reasons: Firstly, taxonomy belongs to the oldest classification practices in naturalists' inquiries and in biology becoming a science – think about Darwin, Merian, Linné and Lamarck. Secondly, taxonomy plays a key role in measuring the

¹ Today the division is part of the Unité mixte de recherche (UMR) 7205, which has been called the "Institut Systématique, Évolution, Biodiversité" since 2014. The institute integrates the taxonomic research of flora and fauna of all kinds and works in close collaboration with the Université Pierre et Marie Curie (also called Paris 6) and the École Pratiques des Hautes Études (EPHE) in Paris.

current dramatic loss of biodiversity and, thereby, in orienting environmental politics. And, thirdly, taxonomy is an experience-based field science, inviting the possibility of analogical thinking between nature and society.

2c. “Biodiversity – it’s us!”: Methodological Collaboration against Fragmentation

The taxonomist’s inquiry has always been, as the marine specialists told me, about the state of the art of planetary biodiversity. “Biodiversity – it’s us!” they used to confirm proudly. However, taxonomic methodology today is twofold, which provides another good reason to take it as an example for the investigation of analogical thinking in the Anthropocene. Comparable to sociology, current taxonomy includes outdoor fieldwork, qualitative description, the development of quantitatively dense databases and statistical (genetic) analysis. Despite the obvious differences between biological and sociological methodologies and their different aims and scopes, both are embedded in a “fractal disciplinary distinction” (Abbott, 2006: 43) between qualitative and quantitative approaches. Such fragmentation does not happen easily. The shock of the “sixth great extinction” had thrown taxonomy, by the turn of the millennium, into a fundamental methodological upheaval (Waterton et al., 2013: 9). This crisis arrived nearly coincidentally with the fast overturn of the molecular revolution in the life sciences, downgrading the century-old morphological approach into an apparently outdated practice, not least because of the new awareness of taxonomists’ ignorance about the state of the art of global biodiversity (Bouchet, 2006: 33; Ellis et al., 2010: 500). Above all, the concern of “naming earth’s species before they get extinct” (Costello et al., 2013) addressed what Geoffrey Bowker called “the panoptic dream” to “complete” the global inventory of life (Bowker, 2000: 645).

The shared commitment of the taxonomists (either in the rue Buffon or in the rue Cuvier) to methodological collaboration found its material infrastructure in the freshly established “MarBOL” curation database. MarBOL was launched in 2010 as a cooperation between the consortium for the Barcode of Life and the Census of Marine Life and had a strong impact on global marine taxonomic assessment and curation practices. In a joint paper, the authors stressed the importance of a “standardized workflow” combined “old taxonomy and new collections,” especially within the framework of the MNHN in Paris (Puillandre et al., 2012). This cross-methodological workflow linked the genetic databases of the rue Cuvier with the rue Buffon and spanned from fieldwork to scientific documentation through both lab facilities. Methodological fragmentation, thus, turned out to be ineffective for the sustainability of taxonomy as a science.

Here was my first finding related to my previous question regarding a biologist's enactment of the biodiversity crisis: The societal pressure through the global biodiversity crisis enhanced, in the case

2a. Intervention of the Biodiversity Crisis caused by Humans in two distinct Research Approaches

2b. Disciplinary Enrollment through “Integrative Taxonomy”

of the marine invertebrate taxonomists at the MNHN, systematic cooperation between morphometric (qualitative) and molecular genetic (quantitative) approaches. Instead of increasing competition and deepening a fractal dynamic, they opted for mutual enrollment and cooperation. Cooperation as an experimental response to (the) crisis was not limited to assessment practices, as I will show in the following sections.

The enrollment of biodiversity as a burning societal issue through the development of a collaborative methodology did not, however, affect the methodological boundaries between the natural sciences and the humanities (see Figure 1b). This is not surprising given the robustness of the modern academic borders in academic institutions worldwide sketched above. The example of disciplinary enrollment was instructive in that the idea of an effective “external” intervention of a social/cultural–scientific account of the biodiversity crisis through pathways which are alienated to the taxonomists’ own research practices seemed now to me at least naïve. As an ethnographer in the museum’s laboratories, I wondered, thus, about a different, more ‘natural’ collaborative approach. Perhaps it was too obvious to be noted right away.

3. Doing Biodiversity between Nature and Society

The biodiversity crisis, impacted by humans, had effected an upgrading of the taxonomists' devices, practices and networks. The latter established a "compromise between two worlds" (Boltanski and Thévenot, 1999: 374), i.e. between two methodologically fragmented practices, through the freshly introduced workflow standard. Another important step in accounting for the societal impact on the biodiversity-crisis consisted of the successful planning of large-scale biodiversity expeditions. I will expand further on this in a moment. Within the museum however, the taxonomists remained reluctant towards biodiversity research typically associated with the social and cultural sciences, such as sustainable governance, public and participative sciences, or museology.

Yet, this professional distance was not a sign of social distance towards non-naturalists. On the contrary, the lab in the rue Buffon was a place of enormous openness and even, in my impression, of exceptional hospitality. It was not only packed with masses of species but also with people with diverse backgrounds. Colleagues, friends, amateurs, technicians and volunteers from places throughout the world popped into the lab on a daily basis and moments of absolute silence were rare. Above all, the traditional support of amateurs regarding the museum's collections was constantly present. One staff member told me that "50 % of the mollusks collected come from high-level amateurs!" I witnessed, through the busy dynamics in the lab, a veritable reenactment of the long history of collaboration between amateurs and natural history museums (Kohler, 2002; Manceron, 2015; Lepenies 1976; Star and Griesemer, 1989). While most of the amateurs were retirees, their professional backgrounds ranged from lower middle- to upper-class members – there were ex-ambassadors, ex-engineers and ex-school teachers, to name but a few.

In addition to this diverse bunch of participants in the lab, I was not the first social scientist who had been received by the team in the rue Buffon either. Several other sociologists and ethnologists had observed and accompanied them during previous expeditions since 2005 (Faugère, 2019). These interdisciplinary encounters, including my own presence, were based on the special convention of ethnographic fieldwork: Social scientists observe biologists and write accounts of their "laboratory lives" (Latour and Woolgar, 1986). However, was my observational approach not exactly rehearsing the good old modern ontological division of labor the Anthropocene actually teaches us to overcome?

3a. *The Field in the Lab*

Disciplinary enrollment through the integrative approach did not affect the taxonomist's methodology in such a way that they would integrate public, anthropological or sociological knowledge on an equal footing. But there was striking evidence of their affinity for heterogeneous accounts based on daily enactments of transdisciplinary "epistemic cultures" (Knorr-Cetina, 1999). This affinity was an indication of the potential possibility of analogical thinking between nature and society. Such observations turned my attention toward a more profound reflection on possible commonalities between the taxonomic enterprise in the rue Buffon and my own as a sociologist. During the time of my two-month stay in the rue Buffon, I became part of the laboratory furniture. Through my existence as a well-received ethnographer persona, I experienced a certain similarity between us in dealing with heterogeneous people and things. A shared "habit," in the sense of John Dewey (1896), which originated in a century-old and longtime slightly ignored professional kinship. Only years later, through the analysis of my fieldnotes, did I realize that this kinship had a name. It lies in the congregation characteristic of fieldwork, consisting of an experience-based reconfiguration of people, things and living beings.

However, I did not see that at the time of my laboratory study. I was trapped in my own disciplinary observatory container. Nevertheless, it was impossible not to notice that the 'field' was more than an external unit in the museum's marine taxonomist workplace. 'Doing biodiversity,' under the auspices of a civic engagement for nature, did not end at the lab's walls. Fieldwork campaigns were constantly present within the lab, precisely because they constituted 'the soul' of the lab; either in the molecular systematic service in the rue Cuvier within the sequencing machines and databases, or in the rue Buffon, through the overwhelming material presence of the geographical maps, collected specimens in the trays, compartments, lots, on the tables, in the books, posters and papers, or in a funny comic strip of a little swimming individual captioned by the phrase: "Wanted – dead or alive!" I never departed from the laboratory without at least one note testifying to long and intense debates and phone calls on the planning of the next expedition. They left me astonished and fascinated about the logistical, financial, geopolitical and, not least, cultural complexity of taxonomists' investment in organizing the next campaign, while constantly assessing the vast stocks gained through multiple expeditions. Thomas Gieryn (2006: 6) observed that in "some scientific specialties, knowledge claims gain legitimacy by preserving and drawing on simultaneously – and in a complementary way – the assumed distinctive virtues of both lab and field." This virtue was, in the case of the MNHN taxonomists, expressed through a professional fieldworker ethos, actually encompassing nature and society and their academic, ontological and epistemic differences.

This fieldworker ethos can be traced back to the historical affinities between naturalists, anthropologists and early pragmatists, starting with naturalists' expeditions in the "pre-academic" era of colonialism. Throughout history, the term 'field' shifted from the natural towards the social sciences through physical immersions in the study of human–environmental relations. Franz Boas participated in a polar expedition in 'Baffin Land' in 1883/84, converting him from geography to ethnology. Danish anthropologists Kirsten and Frida Hastrup credit the zoologist Alfred C. Haddon with having "imported the term fieldwork into anthropology from zoology" (2015: 8). Haddon's pioneering expedition to the Southwestern Pacific Torres Straits Islands in 1898/99, where naturalists and anthropologists worked together, was a core epistemic event for the creation of anthropology as a discipline (Stocking, 1983). The Torres Straits expedition promoted the three-year stay of Bronislaw Malinowski in the Trobrian Islands (1915–1918), conceived as the foundational moment for the fieldwork approach in the humanities.

The continuity between nature and culture through 'field studies' also shaped early pragmatism and sociology. Charles Peirce was a professional land surveyor before he converted to philosophy. For John Dewey, who met Boas at Columbia University in 1904, the translation of fieldwork into cultural analysis constituted, along with Darwin's evolution theory, an important background for his analogical naturalism and his theory of experience (Lewis, 2001; Torres-Colón and Hobbs, 2015; Bogusz, 2018). Later, sociologists imported the anthropological field approach through, notably, the First Chicago School of Sociology in urban studies (Palmer, 1928) and Pierre Bourdieu's practice theory (2000, 2001).

Distancing themselves from the armchair humanities of their times and from the pure ratification of social theory or statistical data today, most field researchers stress the central importance of experience. Within the humanities, they circumvent the geopolitical and epistemic division between sociology and anthropology, supporting thereby a longstanding criticism against the consequences of colonialism for academia (Randeria, 1999). They embrace the embodied, reflexive and material encounter with inquired environments. So do biologists, actually defending their solid field approach against sole molecular assessments of nature's inventory (Fleischner et al., 2017; Rios-Saldania, 2018).² In the Parisian taxonomists' lab, however, where the integrative workflow standard was highly appreciated, my own 'fractal' fieldwork posture inspired a new question for me: Could taxonomist fieldwork, similar to ethnography, pave a way to analogical thinking in the

² For a lively account and defense of fieldwork in current biology, see the homepage of the British "Field Studies Council" <https://www.biology-fieldwork.org/> [accessed September 19th, 2021].

Anthropocene? I also wanted to participate in one of the lab's overseas expeditions to get a more complete view into taxonomists' in situ fieldwork practices. As chance would have it, my ethnographic journey brought me into exactly the same geographic area where Alfred C. Haddon had converted from zoology to ethnography. However, if I enrolled nearly the same territory, history has not only shifted from modernity to the Anthropocene but also from the colonial to the postcolonial age.

3b. The Lab in the Field: Expedition in Papua New Guinea

Seven months after my study in the Parisian MNHN, I attended a large-scale expedition in Papua New Guinea (PNG) in November and December 2012. The PNG expedition was part of the campaign "Our planet reviewed. Taking a closer look on biodiversity hotspots." The campaign had started in 2006 and covered terrestrial and coastal biodiversity surveys in Vanuatu, Mozambique, Madagascar, New Caledonia and, after PNG, French Guiana. The choice of PNG was, first of all, data-driven: Being part of the so-called 'coral triangle,' the taxonomists mapped PNG as a largely understudied area of planetary biodiversity and considered it notably as the planet's richest "hotspot" of marine biodiversity (Press Kit, 2012).

As a particularly intense form of fieldwork, which is comparable to an ethnologist's in-depth stays abroad, naturalists' expeditions often build on (post)colonial infrastructures (Anderson, 2002), diverse knowledge cultures and conflicting modes of nature/culture problematization (Helmreich, 2009; Hornidge, 2018; Thomas, 2015). Expeditions enact 'liminal' forms of experience, being dense endeavors of work, people and logistics. They feed myths of extreme bodily and cultural investment, as well as harsh critiques of epistemic and material exploitation of non-Western people (Leshem and Pinkerton, 2019; Robben and Sluka, 2012). Simultaneously, expeditions process heterogeneous sociomaterial goods (Law, 1987), globally "circulating references" (Latour, 1999) and, as history has shown, generate specific forms of knowledge which, in turn, invite analogical thinking between nature and society.

The marine and terrestrial program of the PNG campaign comprised about 300 participants from over 20 countries. The marine part that I observed was composed notably by taxonomists, specialized in the research of marine invertebrates, supported and observed by students from Madang, Port Moresby, Bougainville and other Melanesian Islands, civic guides from Madang province, technicians, amateur naturalists and public visitors. The expedition's goal consisted of exploring the magnitude of marine invertebrate biodiversity in the coastal zone of Madang and the

local freshwater and delta regions. My ethnography covered boat and coastal trips to observe the taxonomists' different practices of species extraction from the waters and coastal sampling through different techniques (handpicking, brushing basket, dredging and sieving, first preparation for DNA analysis). I realized participant observation in the expedition's lab nearby Madang harbor, recorded the scientists' workflow, assisted in the sorting of the species, followed them throughout water access negotiations with Papua New Guinean citizens, politicians and NGOs, had daily exchanges, breakfast and lunch with them, and conducted a set of interviews with core representatives from the expedition's campaign, and with the receiving partners of the expedition. However, sensitive to the epistemic limits of my observational approach, I hoped to detect conceptual inspirations for the possibilities of analogical thinking between nature and society.

Both morphological and molecular genetic taxonomists constituted the marine group, thereby confirming their integrative approach not only on paper but through the shared experience of fieldwork. This infrastructural translation of the Parisian lab situation to the expedition was echoed by the large number of transdisciplinary naturalists integrated in the everyday tasks. The Parisian museum's 'field in the lab' was now reversed to 'the lab in the field,' though this reversion correlated with an enormous increase of material and people within and outside the lab. This engendered many issues, largely exceeding the lab's concerns.

Biodiversity loss and the ecological crisis, though generally conceived by PNG researchers, students and NGOs as important global problems, were, however, not preeminent for most Madang citizens. Instead, and similar to Europe and most world regions today, they were shaped through local eco-social challenges of a different scale. In Madang, these issues consisted of overfishing, rising sea levels, land erosion and the overturn of their territorial resources by multinational mining companies. They rivaled with the taxonomists' desire for access and political consent by claiming a mutual trade-off in the governance of transnational biodiversity research, thereby adapting the Nagoya protocol (Secretariat of the CBD, 2011) in their own right.

Consequently, field (or rather water) access turned out to be an extremely challenging problem for the taxonomists. Moreover, different to any properly prepared fieldwork and rather surprisingly, many communities were not informed by the PNG government about the researchers' arrival and survey. People were shocked to see them extracting species from their properties, seemingly without having asked for permission. The researchers were occasionally attacked with stones or their findings were dropped back into the sea. This led to many public and informal gatherings where access was negotiated between the villages, clans, NGOs, scientists and the expedition's leaders. These events not only reminded me again about the analogy to ethnographic fieldwork, as access is

always a crucial point which can potentially yield to political conflicts. Moreover, and very much like ethnographic fieldwork, the taxonomists were confronted with altering and formerly unknown approaches regarding their research topic. Such cases or incidents were especially evocative when a trial situation – for instance, a rejected water access and in situ ad hoc negotiations – had not been expected or when different ontologies of human–environmental relations met. This could lead to occasional transdisciplinary enrollments linking nature and society, as I will demonstrate next.

3c. Transdisciplinary Enrollments: ‘Worlding’

Leaving aside the marine species themselves, around which the daily marine fieldwork was organized, not only humans and sea animals were involved in such enactments. The following story was related to me one night in the lab. During a daily coastal sampling boat trip, officially confirmed by the Madang government, a small group of biologists became aware that a basket full of samples had disappeared. To the biologists’ stupefaction, the citizens explained that the former had violated a local law. It turned out that the taxonomists have dived into the sacred territory of a sea goddess called ‘Samalangdun.’ Samalangdun prohibited access to her waters, and no local citizen would ever enter her domain. After two local expedition staff members had delivered a prayer of forgiveness to her, the basket reappeared at the same place in the deep sea where it had evidently been lost some hours before. Taking notice of this insoluble enigma and the compromise resulting from it, the biologists happily brought the basket into their boat. Consequently, they regretted not having adapted their habitat mappings to the local conservation laws. One of them wrote in the expedition’s blog on the night of the event: “One thing is sure, next time, before diving into a new site, we will take notice of the local beliefs. At any rate, the cultural richness of Papua New Guinea is as diverse as its biodiversity” (Faure, 2012, translated by the author).

Following Anna Tsing, we could call such practices “worldings”: “All researchers develop their work in context-making collaborations [...]. Worlding is the only way to take difference seriously in a collaborative research practice” (Tsing, 2010: 49). To me, Samalangdun represented what the western culture usually knows through intergovernmental conventions promoted by, for instance, the United Nations. From a pragmatist angle, taking difference seriously by maintaining the possibility of acting through heterogeneous worlds confirms a basic assumption for the success of democracy (Dewey, 1956). The postcolonial moment enacted by Samalangdun and “worlding” led thus to another “compromise” between different worlds. Boltanski and Thévenot assumed that, “[i]n a compromise, people maintain an intentional proclivity towards the common good by

cooperating to keep present beings relevant in different worlds, without trying to clarify the principle upon their agreement is grounded” (1999: 374). As an authority transgressing western nature–society ontologies, Samalangdun and not the taxonomists enacted a transdisciplinary enrollment of a “postcolonial moment” (Verran, 2002) in the Anthropocene.

Figure 3. Transdisciplinary Enrollment

Heterogeneous collaboration through a postcolonial moment in the Anthropocene

Fieldwork knowledge is, thus, not acquired through an external perspective of the object of inquiry but through interactional involvement with it: It is a relational process facilitated through conflicting ontologies channeled through experimental practices. According to Dewey’s classical experimentalist theory of knowledge, the taxonomists, similar to ethnographers, reconciled fieldwork experiences with disciplinary reflexivity. They experimented in their observed environments through flexible practices, adapting themselves to often unpredictable encounters. Establishing a collaborative workflow, negotiating field access and “worlding” constitute three experimental characteristics of fieldwork in the Anthropocene. While it could be argued that the taxonomists maintained a certain naturalist universalism which is easy to criticize from a humanities–perspective (Boltanski and Thevenot, 1999: 364-365; Brown, 2019: 103; Faugère, 2019: 62ff.), the expedition’s infrastructure, based on human and nonhuman support, allowed, despite its modern feature, a successful cooperation while taking difference seriously. Transdisciplinary enrollment facilitated through fieldwork facilitated taking a reflexive approach vis-à-vis their own critical potential towards this very universalism.

I left Madang impressed and puzzled. Back at my desk at home, I tried to relate my observations to my theoretical assumptions. While seeking possible collaboration, I felt, indeed, that the poisoned character of the ‘gift of the Anthropocene’ makes it even easier for ethnographers to remain stuck in the humanities container. However, this, at times, awkward situation increasingly fueled my thoughts on how to leave it – while appreciating the in situ opportunity for “a more dialogic kind of cooperation” (Sennett, 2012: 28). Could the enrollments observed in Madang eventually contribute to a pragmatist analogical thinking between nature and society?

4. From Pragmatism to Experimentalism

The expedition confirmed that fieldwork is ‘experienced’ rather than ‘conducted’ – a statement constantly rehearsed by anthropologists and sociologists since the classics. Moreover, experience, trial and cooperation regarding ethnographers and naturalists’ encounters are impacted and enhanced by moments of uncertainty and mutual learning. This fits perfectly with the pragmatist legacy. Dewey created an ontological continuity between ‘experience’ and ‘experiment’ by stressing the entanglement between observation and object construction. His concept of democratic experimentalism was driven by the idea that political cooperation would reflect human undefeatable curiosity to discover the unknown, based on the entanglement of experience and knowledge. Thinking about this further through Richard Sennett’s works on the craft of cooperation (Sennett, 2012), I argue that cooperation must be reframed as a practice in which socially and culturally heterogeneous actors reassemble around particular problems. By proposing ‘analogical thinking’ between nature and society, practicing critique is not the precondition but the object of the “cooperative mindset” that Sennett describes as a fundamental democratic challenge: “[C]ooperation needs to be developed and deepened. This is particularly true when we are dealing with people unlike ourselves; with them, cooperation becomes a demanding effort” (2012: ix). This is, as I have tried to outline in this paper, as true on the broader societal level as on the level of the academic organization and collaboration between the natural and the social sciences in the Anthropocene. Consequently, my study resulted in an outline for a future collaborative approach through a reaffirmation of the experimental perspective inherited through the pragmatist tradition.

My Parisian and PNG studies led to the determination of three similarities between taxonomist and ethnographic fieldwork: Firstly, they are exposed to similar sociopolitical challenges through the current ontological reconfiguration of nature and society; secondly, they enact experimental methodologies to sustain their research infrastructures and adjust them to their goals; and, thirdly,

both taxonomist and ethnographic fieldwork foster transdisciplinary heterogeneous cooperation between human and nonhuman participants. Hence, I concluded that fieldwork in the

Figure 4. Experimental Enrollment through a shared “Field-sciences”-Approach

Anthropocene, organized on a collaborative base, could facilitate analogical thinking between nature and society.

With the theoretical resurgence of classical pragmatism, fieldwork in the age of the Anthropocene points to a core epistemic continuity between nature and culture, which is strikingly topical again today. While the laboratory as a metaphor for the observation and enactment of knowledge sometimes “tends to obscure rather than help to think” (Guggenheim, 2012: 15), fieldwork stems from concretely located places where naturalists and social scientists meet with heterogeneous participants. Through the ontological continuity between observation and object construction, a core assumption of the experiential-based pragmatist theory of knowledge, ‘the field,’ embraces alterity and difference where symmetry is unattainable. Despite its somehow romantically-laden past, fieldwork neither pretends to rehearse positivism nor is it limited to practices alone. Moreover, ‘co-elaboration,’ keeping the morphology of the ‘lab,’ can irritate and foster naturalists and humanist knowledge respectively but on familiar grounds.

Furthermore fieldwork, either naturalist or humanist, is driven by series of experiences, trials and cooperations. While “real-world labs” are often, however unintentional, reserved for already settled problems and better educated people, fields also invite surprise as knowledge-generators as well as for the hands-on curious and the unsettled. Admittedly, the twist of ‘analogical thinking’ in the digital age plays with the slight, yet, ironically self-limiting preference for theoretical exploration through classical scientific craft experience as ‘making and repairing,’ another pragmatist “clin

d'oeil" (Sennett, 2012). However, as the example of the Parisian taxonomist shows, fieldwork does not exclude digital and quantified knowledge but can provide opportunities for their problem-oriented integration. Such, however tentative, assumptions will constitute the baseline for the further development of an interdisciplinary field science research framework.

5. Conclusion

At the start of this paper, I wondered about the possibilities of analogical thinking between nature and society in the age of the Anthropocene. I have explored a set of arguments showing that taxonomy and ethnography as field sciences are good candidates to encompass the modern nature/society divide. More concretely, this divide concerns preeminently alienated epistemic cultures and practices. In order to open up disciplinary containers, researchers need time, support, curiosity and the capacity to translate different forms of knowledge into different forms of practicing it.

Aligning with pragmatism, science studies and the anthropology of nature, the social sciences have proliferated and innovated inter- and transdisciplinary instruments and concepts for "both observation and thought experiments" (Tsing et al., 2019: S000) which are good to think with. Through my acquaintance with a team of taxonomists, I learned, however, that this is not enough. If the shift from observing the natural sciences towards analogical thinking and real collaboration is more than urgent today, social scientists must also actively leave their humanities containers. While Bourdieu described his practice theoretical approach as the "fieldwork in philosophy" (1987), sociological theory today can improve, with the support of open-minded naturalists, through 'fieldwork in the Anthropocene.' The ecological crisis and postcolonial reflexivity made many naturalists not only more available but also more sensitive towards cultural analysis and critique. This is a good momentum to foster the possibilities of analogical thinking against the division – without being naive about its practical impediments. Such possibilities are, in a time of planetary ecological destruction and the global crisis of democracy, precious antidotes to the 'poisoned gift of the Anthropocene,' yet, still waiting to be further explored (Bogusz & Holtappels 2021). This is why the development of a 'cooperative mindset' on the familiar grounds of fieldwork actually strives for experimental knowledge between nature and society. Reassembling this knowledge towards an interdisciplinary 'field sciences' framework creates promising pathways for sustainable futures of inquiry.

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